Analyst Forecasts around Restatement Announcements

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This study analyzes properties of the information contained in analysts' earnings forecasts around restatement announcements. We hypothesize that analysts will place greater emphasis on their own private information when there is greater ambiguity surrounding a firm's financial statements. After the firm announces a restatement, the ambiguity will decrease, and accordingly analysts' emphasis on private information will also decrease. Our empirical results are consistent with this hypothesis. We find that analysts' private information is higher in years before restatement announcements and insignificant after restatement announcements. We also find that the public information is higher in years before restatement announcements, although it is weaker than the private information.

INTRODUCTION

Restatements hit a new record in 2006. A study by Glass Lewis reports that companies with US-listed securities filed 1,538 financial restatements in 2006, about one out of every 10 public companies filed a restatement. This number represents a 13% increase from the record number in 2005. Studies show that there are significant market reactions to restatement announcements. Anderson and Yohn (2002) document an abnormal return of -3.5 percent over a 7-day window. Using a sample from 1995 to 1999, Palmrose, Richardson, and Scholz (2004) document an average abnormal return of about -9 percent over a 2-day announcement window. Restatements due to GAAP application failure indicate the failure of the internal control system of a company and/or the failure of its external auditors. However, prior studies generally focus on the valuation effect of a restatement. How these failures affect the information environment of market participants, especially sophisticated investors such as financial analysts, is still not clear.

In this study, we use analyst forecasts to examine properties of investors' information environment. Our primary interest lies in the issues of: 1) whether there is information leakage in the market that is systematically related to financial restatements, and 2) if so, whether this information can be used to predict accounting restatement. In other words, do sophisticated investors, such as financial analysts, anticipate accounting restatements?

Financial analysts are an integral part of the capital markets and provide information that supplements corporate financial reports. They provide earnings forecasts, buy/sell recommendations, and other information to brokers, institutional investors, and individual investors. Studies show (Nichols, 1989; Schipper, 1991; Land and Lundholm, 1996) that the behavior of analysts provides insight into activities and beliefs of investors that cannot be observed directly. These studies argue that analysts have the ability to produce information that exhibits individual-specific knowledge (Lang and Lundholm, 1996; Barron, Byard, Kile, and Riedl, 2002), and hence their forecasts augment the information contained in reported accounting earnings.

Following this line of thinking, we argue that analysts' individual-specific knowledge will be more pronouncedly reflected in situations where firms restate their earnings. Specifically, we hypothesize that an analyst's forecast will comprise a greater percentage of idiosyncratic (private) information before the restatement announcement date, and the private information will decrease after the restatement announcement date.

Our argument is closely related to that in Lang and Lundholm (1996), which assumes that analysts have a common forecasting model and observe the same firm-provided disclosures but possess different private information. They argue that analysts will place less weight on their private information as the informativeness of firm-provided disclosure increases. Following their argument, we assume that as the informativeness of financial disclosures of restatement firms decreases, analysts will place great weight on the private information they possess.

We further assume that analysts, as sophisticated market participants, have the skills and knowledge to identify firms that have material misleading accounting practices or other misrepresented financial information, even though they might not directly test whether a company's financial statements are consistent with GAAP. A report in AIMR (1997) supports this assumption. According to the report, analysts have to answer three qualification questions before evaluating a firm's financial disclosure quality: 1) whether the management of the company has suppressed or misrepresented material facts adverse to the company's operations or outlook during the past year; 2) whether any accounting or other managerial practices of the company are materially misleading; and 3) whether the company is unduly dilatory with respect to its press releases and/or earnings announcements. When analysts perceive that the informativeness of firm-provided financial information is decreasing, we assume that they will automatically adjust their forecasting model. Studies show that the information analysts use in their forecasts for a given firm is mainly provided by the firm itself. A firm has substantial discretion in the informativeness of its disclosures and the amount of detail it provides. Based on surveys of financial analysts, Lees (1981) finds that analysts' sources of information, in order of importance, are: (1) interviews with company executives, (2) 10–Ks and other reports to the SEC, (3) annual and interim stockholders' reports, (4) management forecasts, and (5) presentations by company executives. Lang and Lundholm (1996) argue that firm-provided informative disclosure is not a substitute for analyst services. Their findings show that different analysts make different forecasts primarily because of differences in non-firm-provided information, rather than differences in the interpretation of the common information.

Our primary empirical analysis focuses on the information environment of restatement firms before and after they announce their restatements. Restatements indicate the existence of material internal risks in the pre-announcement period. When these risks are not explicitly disclosed to the market, sophisticated investors will have different interpretations, and make different forecasts. After restatement announcements, uncertainties are cleared up, and individual investors' forecasts will converge to mean.

Our empirical results are consistent with our hypothesis. We find that the precision of private information is much higher in the three years prior to the restatement announcement year, and this effect disappears after the restatement announcement year. The precision of common information is also higher in the second and third year before the restatement announcement year, but this effect has disappeared in the year just before the restatement announcement year. The number of analysts following is also higher in prior years, but this effect has also disappeared in the year just before the restatement year. Results indicate that the informativeness of firm-provided financial disclosures is decreasing and the number of analyst following such firms is also decreasing before the restatement announcement year. This is

consistent with arguments in prior studies that the number of analyst following is affected by the informativeness of firm-provided financial disclosures. Results suggest that some information in analyst forecasts is systematically associated with restatement firms and might be used to predict future financial restatements. Results also show that large restatement firms and loss firms are associated with lower precision of both private information and common information. Results suggest that analysts tend to follow firms with better financial performance.

The remainder of the paper proceeds as follows. The next section discusses related studies. Section 3 addresses research design issues and the sample selection process. Section 4 reports summary statistics and empirical evidence. Section 5 summarizes and concludes the study.

FINANCIAL DISCLOSURES AND ANALYST FORECASTS

How financial disclosures affect investors' public and private information has been extensively studied in prior literature. Gonedes (1980) analyzes how disclosure rules affect production decisions of public information and private information. He argues that the effectiveness of disclosure rules cannot be assessed independently of private information-production activities if there are any substitution or complementary relationships among the signals produced through private information and those covered through disclosure rules. He proposes that empirical evidence dealing with the effects of new disclosure rules should reflect both the direct effects of the rules on produced information and the indirect effects of any changes in private information production activities. Verrecchia (1982) proposes a model in the spirit of Gonedes' (1980) work. He shows that more publicly-available information lessens the amount of costly private inquiry. However, he points out that investors substitute public information for private information only to the degree that their overall level of informedness increases. Kim and Verrecchia (1994) show that some disclosures might lead to different interpretations of a firm's performance. As a result of such disclosures, there may be more information asymmetry at the time of an announcement than in nonannouncement periods.

Empirical studies generally support the notion that increased disclosures increase analyst forecast precision. Critchfield et al. (1978) find that forecast accuracy increases through the fiscal year but the dispersion among analysts' forecasts generally remains unchanged. Brown and Rozeff (1979) find that analyst forecasts of annual earnings become more accurate following interim accounting reports, and Baldwin (1984) finds that analyst forecast accuracy increases for multisegment firms after the adoption of segmental reporting requirements. Brown et al (1987) show that forecast accuracy is positively associated with firm size and negatively associated with the dispersion of analyst forecasts. Nichols (1989) shows that a lack of disclosure leads to a low supply of analyst services. He quotes Robert Dunlap of Irving Trust, "I don't follow Pullman because they won't tell you enough about their business to allow you to get a handle on it…if they change and become more open with the street, there is no doubt that I'd take more of an interest in Pullman." Swaminathan (1991) finds that consensus increases following the adoption of segmental reporting requirements. Brown and Han (1992) show that earnings announcements result in a decrease in forecast variance, indicating that earnings announcements increase the commonality of information among analysts.

Lang and Lundholm (1993) find that analysts' evaluations of firms' disclosure practices are increasing in firm size and in firm performance, and decreasing in the correlation between earnings and returns, and higher for firms issuing securities in the current or future period. Lang and Lundholm (1996) show that firms have substantial discretion in financial disclosures. They find that firms with increased informativeness of disclosure have a larger analyst following, more accurate analyst earnings forecasts, less dispersion among individual analyst forecasts and less volatility in forecast revisions. They conclude that firm-provided disclosures are an important determinant of analyst following and of the characteristics of analysts' forecasts.

Barron, Byard, and Kim (2002) find that early forecasts contain mostly common information and later forecasts reflect both more common and more idiosyncratic information. They also find that increases in common and idiosyncratic information concentrate around prior earnings announcements, and the

absolute increases in the precision of common information are larger than the increases in the precision of idiosyncratic information. Interestingly, their results show that the percentage increase in idiosyncratic information is greater, and that increase in turn decreases common information. Barron, Byard, Kile, and Riedl (2002) argue and find that analysts supplement firms' financial information by placing greater emphasis on their own private information when deriving their earnings forecasts for firms with significant intangible assets. They find that the consensus in analyst forecasts is negatively associated with a firm's level of intangible assets. Byard and Shaw (2003) find that higher quality disclosures increase the precision of analysts' common and idiosyncratic information. Further, they find that the increased precision of analysts' idiosyncratic information is due to higher quality annual and quarterly disclosures publicly available to all market participants. They conclude that analysts rely more heavily upon publicly available financial data rather than privileged communications with management in forming their annual earnings forecasts.

Palmrose, Richardson, and Scholz (2004) is the study that most closely related to our paper. Using a 45-day window after the restatement announcement date, they find that analysts' forecast dispersion increases following restatement announcements, and mean forecasted earnings decrease after the restatement announcements. They also find that the increase in dispersion is significantly and negatively correlated with the announcement returns. They conclude that restatements increase uncertainty.

RESEARCH DESIGN AND SAMPLE SELECTION

Research Design

We use the following model to test the properties of analysts' information environment around the time of restatement announcements:

$$QUALITY = \lambda_0 + \lambda_1 LAGYR3 + \lambda_2 LAGYR2 + \lambda_3 LAGYR1 + \lambda_4 YR0 + \lambda_5 YR1 + \lambda_6 YR2 + X'\beta + \ddot{\upsilon} \quad (1)$$

OLS is used to estimate Equation (1), and we follow Newey and West (1987) to correct for the heteroscedasticity and the first-order autocorrelation in the pooled data. Results are robust to alternative estimations using a firm fixed-effects model.

The variables in equation (1) are defined as follows: QUALITY is the information quality measure to be discussed in the next paragraph. YR0 is a dummy variable that takes the value of one if the fiscal year is the restatement announcement year, and zero otherwise. LAGYR1 is a dummy variable indicating the first year before the restatement announcement year, LAGYR2 is a dummy variable indicating the second year before the restatement announcement year, and LAGYR3 is a dummy variable indicating the third year before the restatement announcement year. YR1 is a dummy variable indicating the first year after the restatement announcement year, and YR2 is a dummy variable indicating the second year after the restatement announcement year. LAGYR3, LAGYR2, LAGYR1, YR0, and YR1 are the test variables of interest. X is a vector of control variables, including SIZE, GROWTH, LOSS, and LITIGATE. SIZE is the natural log of a firm's total assets. GROWTH is the natural log of the market to book ratio, which is defined as a firm's market value deflated by its book value of equity. LOSS is a dummy variable which takes the value of one if a firm's operating income is negative, and zero otherwise. LITIGATE is a dummy variable which takes the value of one if a firm is from an industry that has high litigation risk, and zero otherwise. [1]

Following prior studies (Barron, Byard, and Kim, 2002; Barron, Byard, Kile, and Riedl, 2002), we use those measures developed in Barron, Kim, Lim, and Stevens (1998, here after BKLS) to measure properties of analysts' information environment. BKLS show that uncertainty (u), consensus (ρ), the precision of common information (h), and the precision of private or idiosyncratic information (s) can be expressed in terms of three forecast properties: expected dispersion, expected squared error in the mean forecast, and the number of analysts issuing forecasts. Specifically, we use the formulae below to calculate these measures:

$$U = (1 - (1/N))\, D + SE \quad (2)$$

$$\rho = (SE - (D/N)) / U \quad (3)$$

$$h = (SE - (D/N)) / U^2 \quad (4)$$

$$s = D / U^2 \quad (5)$$

where $D = (1/(N-1)) \sum_{a=1}^{N} (F_a - F\ mean)^2$

$SE = (A - F\ mean)^2$

F_a is the forecast by analysts a,

F mean is the mean forecast

A is the actual earnings realization, and

N is the number of analysts issuing forecasts

To empirically estimate these properties, we substitute ex-post realized dispersion and squared error in these analyst mean forecasts for the expected dispersion and squared error in the mean forecasts used in the BKLS model. As it is possible for $SE - D/N < 0$, the value of common information precision could be negative. Following prior studies (Barron, Byard, and Kim, 2002; Begley, Cheng, and Gao, 2007), we restrict the numerator to be positive when estimating the measure of common information precision. As values of common information precision and idiosyncratic information precision are highly skewed, we use square roots instead of raw values in all of our estimations.

Sample Selection and Data

As of October 18, 2007, there are 7,913 observations in the restatement dataset in Audit Analytics. Following the fiscal year convention in Compustat, we use the disclosure date to calculate the restatement announcement fiscal year. That is when a company's fiscal year end occurs between January 1 and May 31, we use the previous calendar year as its fiscal year. However, we use the fiscal year month from the Audit Analytics without change.[2] A firm could restate their financial information more than once during a fiscal year. When this is the case, we only keep the earliest restatement announcement observation. As the focus of this study is to compare analysts' information environment before and after the restatement announcement, we believe that controlling for multiple restatements in such a short sample period will reduce noise and produce better empirical results. This process produces a restatement sample of 5,344 observations over the period of 1999 – 2007 fiscal years. However, most of the observations are between 2001 and 2005.

Our measures of analysts' information properties are calculated from the I/B/E/S detail file. Specifically, to calculate our measures, we focus on US firms with EPS data for fiscal year t, and use the last forecasts made by individual analysts before a firm releases its annual earnings. A few important details are discussed below. First, according to I/B/E/S, analysts' estimates sometimes deviate from the accepted standard as defined by the majority of analysts covering a particular firm. These estimates might be removed from the database if a satisfactory resolution to the discrepancy could not be reached, and I/B/E/S excludes these estimates from the consensus data. Second, an individual analyst might remove his/her earnings forecast from the database due to different reasons. For example, a brokerage places a stock on a restricted list due to an underwriting relationship. In order to be consistent with I/B/E/S summary file, we first delete observations in the excluded estimate file and stopped estimate file before we calculate our measures. Third, as we calculate summary statistics based on these individual forecasts, we require a firm to have at least two forecasts of year t annual earnings to be included in our sample. Our final information property measures are winsorized at the top and bottom 1 percent.

Control variables and accounting measures are calculated from the Compustat Combined Industrial Annual file. Our final sample is thus formed by taking the intersection of the Audit Analytics restatement sample, I/B/E/S modified detail file, and the Compustat Combined Industrial Annual file. The final sample consists of 1,713 unique restatement firms, and 5,944 firm-year observations. Appendix A provides a summary of definitions of variables used in this study.

EMPIRICAL RESULTS

Sample Description and Summary Statistics

Panel A of Table 1 summarizes the categories of restatement firms used in our study. Audit Analytics organizes its restatement data into five categories: accounting rule (GAAP/FASB) application failures; financial fraud, irregularities, or misrepresentations; accounting and clerical application errors; non-financial statement disclosures, omissions, or corrections; and other significant issues. Audit Analytics also provides information regarding whether the restatement disclosure is under regulatory investigation either by the SEC, PCAOB, or other regulatory bodies. Our final sample includes four categories (few firms restate for nonfinancial reasons), and the majority of them are GAAP application failures, over 94%. Some of the restatement firms are included in multiple categories. For example, a firm that has violated GAAP might also belong to the category of financial fraud, irregularities, and misrepresentations, and at the same time be under regulatory investigation.

TABLE 1
SUMMARY STATISTICS OF RESTATEMENT FIRMS

Panel A: Categories of Restatement Firms

Categories	# of Unique Firms	Frequency	# of Firm-Year Observations	Frequency
Accounting Errors	70	4.09%	264	4.44%
Financial Fraud	49	2.86%	171	2.88%
E GAAP Application Failure	1,616	94.34%	5,566	93.64%
Regulatory Investigation	174	10.16%	614	10.33%
Other Significant Issues	127	7.41%	451	7.59%

Panel B: Categories of GAAP Application Failure

Categories	# of Unique Firms	Frequency	# of Firm-Year Observations	Frequency
Taxes	306	17.86%	1,054	17.73%
Acquisition	290	16.93%	1,003	16.87%
Relatedparty	311	18.16%	1,132	19.04%
Cashflow	216	12.61%	716	12.05%
Compensation	329	19.21%	1,163	19.57%
Debtequity	262	15.29%	834	14.03%
Derivatives	131	7.65%	508	8.55%
Inventories	204	11.91%	738	12.42%
Lease	293	17.10%	1,090	18.34%
Liabilities	297	17.34%	1,077	18.12%
PPE	259	15.12%	914	15.38%
Revenues	419	24.46%	1,496	25.17%

Panel C: Restatements by Industry

sic2	industry Name	# of Unique Firms	%	# of Firm-Year Observations	%
1	Agricultural production- crops	1	0.06%	1	0.02%
7	Agricultural services	1	0.06%	5	0.08%
8	Forestry	1	0.06%	2	0.03%
10	Metal mining	20	1.17%	71	1.19%
12	Coal mining	6	0.35%	24	0.40%
13	Oil and gas extraction	64	3.74%	240	4.04%
14	Nonmetallic minerals, except fuels	4	0.23%	18	0.30%
15	General building contractors	9	0.53%	29	0.49%
16	Heavy construction contractors	2	0.12%	4	0.07%
17	Special trade contractors	2	0.12%	10	0.17%
20	Food and kindred products	25	1.46%	95	1.60%
21	Tobacco manufactures	1	0.06%	2	0.03%
22	Textile mill products	5	0.29%	17	0.29%
23	Apparel and other textile products	12	0.70%	36	0.61%
24	Lumber and wood products	4	0.23%	16	0.27%
25	Furniture and fixtures	7	0.41%	27	0.45%
26	Paper and allied products	15	0.88%	50	0.84%
27	Printing and publishing	23	1.34%	88	1.48%
28	Chemicals and allied products	108	6.30%	384	6.46%
29	Petroleum and coal products	4	0.23%	15	0.25%
30	Rubber and miscellaneous plastics products	12	0.70%	39	0.66%
31	Leather and leather products	4	0.23%	8	0.13%
32	Stone, clay, glass, and concrete products	4	0.23%	9	0.15%
33	Primary metal industries	21	1.23%	67	1.13%
34	Fabricated metal products	17	0.99%	61	1.03%
35	Industrial machinery and equipment	84	4.90%	302	5.08%
36	Electrical and electronic equipment	130	7.59%	453	7.62%
37	Transportation equipment	27	1.58%	93	1.56%
38	Instruments and related products	73	4.26%	264	4.44%
39	Miscellaneous manufacturing industries	9	0.53%	21	0.35%
40	Transportation, communications, and utilities	1	0.06%	4	0.07%
41	Local and interurban passenger transit	2	0.12%	4	0.07%
42	Motor freight transportation and warehousing	5	0.29%	21	0.35%
44	Water transportation	7	0.41%	13	0.22%
45	Transportation by air	15	0.88%	53	0.89%
46	Pipelines, except natural gas	1	0.06%	7	0.12%
47	Transportation services	6	0.35%	24	0.40%
48	Communications	92	5.37%	313	5.27%
49	Electric, gas, and sanitary services	81	4.73%	311	5.23%
50	Wholesale trade--durable goods	31	1.81%	87	1.46%
51	Wholesale trade--nondurable goods	24	1.40%	84	1.41%
52	Building materials, hardware, garden supply, & mobile home	3	0.18%	11	0.19%
53	General merchandise stores	17	0.99%	55	0.93%
54	Food stores	10	0.58%	40	0.67%
55	Automotive dealers and gasoline service stations	13	0.76%	51	0.86%
56	Apparel and accessory stores	34	1.98%	127	2.14%
57	Furniture, home furnishings and equipment stores	11	0.64%	36	0.61%
58	Eating and drinking places	35	2.04%	130	2.19%

59	Miscellaneous retail	48	2.80%	171	2.88%
60	Depository institutions	106	6.19%	398	6.70%
61	Nondepository credit institutions	16	0.93%	43	0.72%
62	Security, commodity brokers, and services	13	0.76%	38	0.64%
63	Insurance carriers	48	2.80%	201	3.38%
64	Insurance agents, brokers, and service	9	0.53%	26	0.44%
65	Real estate	12	0.70%	37	0.62%
67	Holding and other investment offices	41	2.39%	103	1.73%
70	Hotels, rooming houses, camps, and other lodging places	5	0.29%	16	0.27%
72	Personal services	12	0.70%	35	0.59%
73	Business services	214	12.49%	700	11.78%
75	Automotive repair, services, and parking	6	0.35%	15	0.25%
76	Miscellaneous repair services	1	0.06%	1	0.02%
78	Motion pictures	11	0.64%	38	0.64%
79	Amusement and recreational services	12	0.70%	47	0.79%
80	Health services	32	1.87%	92	1.55%
82	Educational services	14	0.82%	46	0.77%
87	Engineering and management services	30	1.75%	115	1.93%

This table reports the summary statistics of restatement firms in the final sample. 1,733 unique firms that announced restatements during calendar year 1999 – 2007 are included in the final sample, which consists of 5,944 firm-year observations. Panel A reports restatement firms by restatement categories classified by Audit Analytics. Panel B reports categories of restatement firms identified under GAAP application failures, and Panel C reports restatement firms by industries (2-digit SIC code).

Panel B of Table 1 further reports categories of those 1,616 restatement firms classified as accounting rule (GAAP/FASB) application failures. According to the restatement description provided by Audit Analytics, we break restatements into 12 categories: merger and acquisition issues; cash flow statement issues; debt, quasi-debt, warrants, and equity issues; deferred, stock-based compensation issues; tax issues; financial derivatives and hedging issues; inventory, vendor, and cost of sales issues; lease, legal, and FAS 5 contingency and commitment issues; liabilities, payables, reserves, and accrual issues; property, plant, & equipment (PPE), intangibles, and other fixed assets issues; revenue recognition issues; and related parties transaction issues.[3] The largest category, about 25%, is revenue recognition related issues, and the smallest category is derivative related accounting issues, which only has 131 firms. Similar to the restatement categories discussed in the previous paragraph, some of the firms are included in multiple categories, and hence the total number of observations is bigger than 1,713 unique firms or 5,944 firm-year observations. Panel C provides summary description of restatement firms by 2-digit SIC code. We include in our sample firms representing 66 industries. These range from industries with 1 restatement firm to industries with over 200 restatement firms.

Panel A of Table 2 provides univariate analysis of analysts' information environment properties around the restatement announcement year. Apparently, the number of analysts following these firms decreases from Yr-3 to Yr-1. In the year of restatement announcement, the number of analysts following these firms slightly increases, but it remains relatively low in the three years after the restatement announcement year. Forecast error is negative, and decreases from Yr-3 to Yr-1, indicating that on average these restatement firms cannot meet analysts' consensus forecasts. In the year just before the restatement announcement year, this difference increases to the highest, -0.111. The change of absolute forecast error shows that the difference between a firm's performance and analysts' expectation is increasing from Yr-3 to Yr-1, and this trend continues after the restatement announcement year. Dispersion is also increasing before the restatement announcement year, but remains relatively stable after the announcement year. The squared error in mean forecast increases from Yr-3 to Yr-1, suddenly decreases in the restatement announcement year, and then remains at a low level in the next two years.

TABLE 2
PROPERTIES OF INFORMATION ENVIRONMENT AROUND RESTATEMENT ANNOUNCEMENT

Panel A: Properties of Analyst Information Environment Around Restatement Announcement

Variables	Yr-3	Yr-2	Yr-1	Yr0	Yr1	Yr2	Yr3
# of Analysts Following	8.508	8.424	8.125	8.234	8.117	8.059	8.172
Forecast Error	-0.014	-0.030	-0.111	-0.064	-0.061	-0.091	-0.069
Absolute Forecast Error	0.086	0.103	0.184	0.142	0.151	0.171	0.168
Dispersion	0.025	0.028	0.035	0.030	0.034	0.030	0.041
Squared Error in Mean Forecast	0.045	0.061	0.096	0.075	0.064	0.075	0.118
Uncertainty	0.073	0.087	0.151	0.112	0.095	0.115	0.178
Consensus	0.398	0.367	0.370	0.383	0.387	0.379	0.399
Public	16.825	14.926	13.862	14.117	12.114	12.977	12.503
Private	29.027	27.552	22.926	23.626	20.517	19.189	17.820

Panel B: Selected Accounting Measures Around Restatement Announcement

Variables	Yr-3	Yr-2	Yr-1	Yr0	Yr1	Yr2	Yr3
Size	6.724	6.821	6.886	6.919	7.067	7.162	7.141
ROA	0.041	0.039	0.038	0.040	0.042	0.032	0.048
Asset Turnover	0.937	0.911	0.912	0.904	0.918	0.818	0.805
Debt to Total Assets	0.538	0.535	0.558	0.560	0.581	0.605	0.593
Current Ratio	2.925	2.927	2.679	2.658	2.375	2.543	2.468

This table presents mean values of measures of information properties and selected accounting measures around the restatement announcement year. Variables are defined as in Appendix A. Yr0 is the restatement announcement year derived from Audit Analytics. Yr1 is the first year, Yr2 is the second year, and Yr3 is the third year after the restatement announcement year. Yr-1 is the first year, Yr-2 is the second year, and Yr-3 is the third year before the restatement announcement year.

Uncertainty is one of the four information property measures we focus on in this study. Apparently, it increases from Yr-3 to Yr-1, and slightly decreases in Yr0 and Yr1, but increases again in Yr2 and Yr3. Consensus measure is surprisingly stable over the testing period. The precision of common information, Public, monotonically decreases from Yr-3 to Yr-1 and remains at its lowest level after the restatement announcement year. The precision of private information, Private, also monotonically decreases from Yr-3 to Yr-1, slightly increases in Yr0, and again monotonically decreases from Yr1 to Yr3.

Panel B of Table 2 reports selected accounting measures around the restatement announcement year. The average size of restatement firms increases from Yr-3 to Yr3. This trend is probably driven by restatement firms' increased liabilities given that the ratio of debt to total assets for these firms also increases from Yr-3 to Yr3. Return on assets is fluctuating over the testing period. Asset turnover and current ratio are all decreasing from Yr-3 to Yr3.

In sum, Table 2 shows that the information environment of restatement firms is deteriorating before the restatement announcement year. The uncertainty perceived by market participants increases dramatically from Yr-3 to Yr-1 (the uncertainty measure in Yr-1 is almost double of that in Yr-3). Further analysis shows that these changes are driven by restatement firms' deteriorating financial performance

and financial positions. Over the analysis period, these restatement firms become less profitable and less liquid. The debt ratio of these firms also increases.

Primary Results

The Pearson correlation analysis shows that the precision of analysts' common information (Public) is positively correlated with the precision of analysts' idiosyncratic information (Private), and that both of them are negatively correlated with the absolute forecast error (abs_ferror), dispersion (dis), squared error in analysts' mean forecast (se), and uncertainty (u). These two measures are negatively correlated with the loss and debt ratio, positively correlated with ROA, sales, and current ratio. This indicates that these two measures are correlated with firm performance. Interestingly, consistent with accounting theory and intuition, the measure of consensus (ρ) is positively correlated with the precision of common information and negatively correlated with the precision of private information. However, the measure of firm size is negatively correlated with both Public and Private. One conjecture is that information asymmetry is higher for large restatement firms.

The number of analysts following these firms is positively correlated with the precision of analysts' idiosyncratic information, but not correlated with the precision of common information. It is negatively correlated with the absolute forecast error, squared error in mean forecast, uncertainty, and consensus, and positively correlated with size, growth, and ROA. In general, the correlations among those accounting measures are relatively low.

Table 3 reports results of multivariate analyses. All regressions, except for Regression (3), are estimated using OLS with Newey and West robust standard errors to correct for heteroscedasticity and first-order autocorrelation. Regression (3) is estimated using a random-effect Poisson regression with robust standard errors to correct for the heteroscedasticity and the serial correlation.

TABLE 3
CHANGES OF ANALYST INFORMATION ENVIRONMENT AROUND RESTATEMENT ANNOUNCEMENT

	(1) **Public**			(2) **Private**			(3) **N**		
Variables	Coefficient	t-statistics	p-value	Coefficient	t-statistics	p-value	Coefficient	t-statistics	p-value
lagyr3	3.675	3.00	0.003	10.551	5.05	0.000	0.117	4.50	0.000
lagyr2	1.977	1.66	0.097	9.371	4.68	0.000	0.087	3.39	0.001
lagyr1	0.993	0.85	0.395	4.778	2.46	0.014	0.038	1.50	0.133
yr0	0.282	0.25	0.806	2.013	1.08	0.280	0.008	0.30	0.767
yr1	-0.469	-0.40	0.691	2.738	1.39	0.163	0.027	1.04	0.298
yr2	0.519	0.42	0.671	1.449	0.70	0.482	0.006	0.21	0.831
Size	-1.698	-11.30	0.000	-2.191	-8.86	0.000	0.195	26.72	0.000
Growth	-0.052	-0.43	0.666	0.345	1.32	0.185	0.019	5.43	0.000
Loss	-4.115	-5.71	0.000	-8.457	-7.06	0.000	-0.074	-3.77	0.000
Litigation	6.642	1.65	0.098	16.091	2.69	0.007	0.080	0.57	0.569
Constant	25.302	15.64	0.000	34.175	12.73	0.000	0.560	9.41	0.000
N		5,944			5,944			5,944	
F-Statistics		17.840			16.050			803.290	

	(4) Uncertainty			(5) Consensus			(6) Dispersion		
Variables	Coefficient	t-statistics	p-value	Coefficient	t-statistics	p-value	Coefficient	t-statistics	p-value
lagyr3	-0.086	-1.45	0.147	-0.004	-0.14	0.891	-0.012	-0.95	0.343
lagyr2	-0.078	-1.31	0.189	-0.035	-1.10	0.273	-0.010	-0.82	0.414
lagyr1	-0.016	-0.26	0.794	-0.031	-0.97	0.334	-0.003	-0.25	0.806
yr0	-0.040	-0.63	0.531	-0.005	-0.14	0.890	-0.014	-1.16	0.245
yr1	-0.081	-1.31	0.191	-0.014	-0.40	0.690	-0.007	-0.51	0.608
yr2	-0.064	-1.12	0.265	-0.020	-0.52	0.600	-0.012	-0.94	0.348
Size	0.052	5.64	0.000	-0.006	-1.86	0.063	0.011	5.88	0.000
Growth	-0.001	-0.15	0.879	-0.004	-1.43	0.152	0.001	0.56	0.579
Loss	0.136	4.43	0.000	-0.011	-0.62	0.539	0.019	3.12	0.002
Litigation	-0.089	-3.50	0.000	0.038	0.88	0.377	-0.015	-1.90	0.058
Constant	-0.212	-2.68	0.007	0.452	11.43	0.000	-0.043	-2.56	0.010
N		5,944			5,944			5,944	
F-Statistics		4.330			1.080			3.770	

	(7) Squared Error			(8) Forecast Error			(9) Absolute Forecast Error		
Variables	Coefficient	t-statistics	p-value	Coefficient	t-statistics	p-value	Coefficient	t-statistics	p-value
lagyr3	-0.061	-1.46	0.143	0.057	2.33	0.020	-0.079	-3.45	0.001
lagyr2	-0.049	-1.18	0.238	0.041	1.66	0.097	-0.064	-2.75	0.006
lagyr1	-0.016	-0.36	0.716	-0.040	-1.50	0.133	0.017	0.68	0.495
yr0	-0.021	-0.48	0.631	-0.022	-0.82	0.410	0.002	0.07	0.941
yr1	-0.053	-1.21	0.228	0.009	0.33	0.744	-0.018	-0.70	0.483
yr2	-0.044	-1.05	0.293	-0.023	-0.76	0.445	0.002	0.09	0.930
Size	0.033	5.41	0.000	0.002	0.65	0.516	0.011	4.13	0.000
Growth	-0.001	-0.21	0.832	0.003	0.99	0.322	0.000	0.21	0.837
Loss	0.095	4.59	0.000	-0.061	-4.09	0.000	0.087	6.31	0.000
Litigation	-0.060	-3.37	0.001	0.078	4.91	0.000	-0.091	-5.15	0.000
Constant	-0.130	-2.39	0.017	-0.077	-2.39	0.017	0.073	2.41	0.016
N		5,944			5,944			5,944	
F-Statistics		4.470			9.910			15.460	

This Table reports empirical results of changes of properties of analysts' information environment around the restatement announcement year. Regressions (1), (2), (4), (5), (6), (7), (8), and (9) report results of OLS estimations with Newey-West robust standard errors to correct for heteroscedasticity and first-order autocorrelation. Regression (3) reports results of random effect Poisson Regression with robust standard errors to correct for heteroscedasticity and serial dependence. For each estimation, we report coefficients, t-statistics (z-statistics for Poisson), and p-values. In addition, yr0 is the restatement announcement year derived from Audit Analytics; yr1 is the first year after restatement; and yr2, the second. lagyr1 is the first year, lagyr2 is the second year, and lagyr3 is the third year before the restatement announcement year. All other variables are defined as in Appendix.

In regression (1), we use the precision of analysts' common information as the dependent variable. The coefficient of lagyr3 is 3.675 and significant at the 1% level, and the coefficient of lagyr2 is 1.977 and significant at the 10% level. The other year dummy variables are not significant. In regression (2), we use the precision of private information as the dependent variable. The coefficient of lagyr3 is 10.55 and the coefficient of lagyr2 is 9.37, and both of them are significant at the 1% level. The coefficient of lagyr1 is 4.78 and still significant at the 5% level. The coefficient of Size is -1.70 in the first regression, and -2.19 in the second regression. Both of them are significant at the 1% level. The coefficient of Loss is -4.12 in the first regression and -8.46 in the second regression, and both of them are significant at the 1%

level. The coefficient of Litigation is positive in both regressions, and significant at the 10% level in the first regression and at the 1% level in the second regression.

In regression (3), we fit a Poisson regression to the number of analyst following these firms. The coefficient of lagyr3 is 0.117 and significant at the 1% level. The coefficient of lagyr2 is 0.087 and is significant at the 1% level. The other year dummy variables are not significant. The coefficient of Size is 0.195 with a Z-statistics of 26.72, indicating that the number of analyst following these firms is mainly affected by firm size. The coefficient of Growth is 0.019 and also significant at the 1% level, indicating that growth firms have more analysts following. The coefficient of Loss is -0.074 and significant at the 1% level, indicating that loss firms have fewer analysts following.

Results show that the precision of private information is much higher in years prior to the restatement announcement year, consist with the story that analysts place more weight on their private information when uncertainties increase and the informativeness of firm-provided disclosures decreases. After restatement announcements, the uncertainties decrease and the year effect becomes insignificant. The precision of common information is also higher in prior years, but this effect has disappeared in the year just before the restatement announcement year. The number of analysts following these firms is also higher in prior years, but this effect also disappears in the year just before the restatement. Results indicate that the informativeness of firm-provided financial disclosures is decreasing and the number of analysts following these firms is also decreasing before the restatement announcement, consistent with the argument in prior studies that analyst following is affected by the informativeness of firm-provided financial disclosures. Results suggest that some information in analyst forecasts is systematically associated with restatement firms, and might be used to predict financial restatements. Results also show that large restatement firms and loss firms are associated with lower precision of both private information and common information. Results also suggest that analysts tend to follow firms with better financial performance.

In regressions (4), (5), and (6), we use uncertainty, consensus, and dispersion as dependent variables to test whether these measures are different in the pre- and post- restatement periods. However, none of these years-based dummy variables are significant. In regressions (7), (8), and (9), we use squared error, forecast error, and absolute forecast error as dependent variables to reestimate the model. Results show that forecast error is relatively higher in prior years. The coefficient of lagyr3 is 0.057 and significant at the 5% level. The coefficient of lagyr2 is 0.041 and significant at the 10% level. The absolute forecast error is relatively lower in years prior to restatement announcements. The coefficient of lagyr3 is -0.079 and the coefficient of lagyr2 is -0.064, and both of them are significant at the 1% level. These results suggest that restatement firms are more likely to just beat analyst forecasts prior to the restatement announcement year. However, this propensity is not significant in the year just before the restatement announcement year, indicating that these firms might have limited resources to manipulate earnings.

DISCUSSION AND CONCLUSIONS

The purpose of this study is to examine how investors react to the increased uncertainties in firm-provided financial disclosures associated with restatement firms. Specifically, we look at how the analysts' information environment changes around restatement announcement. We find that the precision of analysts' idiosyncratic information is significantly higher in the three years prior to the restatement announcement year, and the precision of public information is also higher in the years before the restatement announcement year. We further find that the number of analysts following these firms decreases before the restatement announcement year, and remains at this lower level in years after the restatement announcement year. We also document that the financial performance of restatement firms is deteriorating in years before restatement announcement. Analyses of accounting measures, such as ROA, debt ratio, assets turnover, and current ratio, are consistent with this conclusion.

Our primary finding is that the financial performance of restatement firms decreases in the years before their restatement announcements. This decrease leads to decreased informativeness of firm-provided financial disclosures and decreased number of analyst following. Furthermore, the decreased

informativeness of firm-provided financial disclosures forces the remaining analysts to place greater weight on their idiosyncratic information.

Another related finding is that the financial performance of these restatement firms is not getting better even three years after the restatement announcement year, and the precision of common information and idiosyncratic information has not improved in the post-announcement period.

ENDNOTE

1. Following prior studies, we define the following industries as high litigation industries: biotechnology (SIC codes 2833-2836, 8731-8734), computers (3570-3577, 7370-7374), electronics (3600-3674), and retail (5200-5961).
2. The fiscal year classification in Audit Analytics is different from that in Compustat. If a company's fiscal year ends after January 15, Audit Analytics uses the current calendar year as its fiscal year. On the other hand, if a company's fiscal year ends between January 1 to 15, Audit Analytics uses the previous year as its fiscal year. For example, if a company's fiscal year ends on January 2 in 2005, its fiscal year is 2004. If its fiscal year ends on January 28 in 2005, its fiscal year is 2005. Audit Analytics use a similar scheme to define fiscal month. When a company's fiscal year ends on any day between the 1st and the 15th of any months, Audit Analytics uses the previous month as its fiscal month. For example, if a company's fiscal year ends on January 2 in 2005, Audit Analytics uses December as its fiscal month. If its fiscal year ends on January 28 in 2005, Audit Analytics uses January as its fiscal month.
3. Please see Table 1 in Francis and Yu (2007) for a detailed description of these categories.

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APPENDIX – DEFINITIONS OF VARIABLES

Variable Name	Definition	Sources
Information Properties		
N of analysts following	The number of last annual earnings forecasts issued by individual analysts before a firm disclosure its annual earnings (EPS)	I/B/E/S
Forecast Error	The difference between actual EPS and the mean of individual analysts' last forecasts derived from the detail file, Error = Actual - Mean	I/B/E/S
Absolute Forecast Error	The absolute value of Forecast Error defined as above	
Dispersion	The observed dispersion among the number of last annual earnings forecasts issued by individual analysts derived from the detail file. We use the following formula to calculate this measure: $D = (1 / (N - 1)) \sum^{N}_{a=1} (F_a - F_{mean})^2$	I/B/E/S
Squared Error in Mean	The squared difference of actual EPS and the mean of individual analysts' last forecasts, $SE = (A - F_{mean})^2$	I/B/E/S
Uncertainty	A measure that represents a lack of precision in individual analysts' total information, and is measured as the squared error in individual forecasts averaged across analysts, $U = (1 - (1/N)) D + SE$	I/B/E/S
Consensus	A measure that represents the degree to which individual analysts' forecasts contain the same information: $\rho = (SE - (D/N)) /U$	
Public	The precision of analysts' common information as derived in Barron, Kim, Lin, and Stevens (1998): $h = (SE - (D/N)) / U^2$	
Private	The precision of analysts' idiosyncratic information as derived in Barron, Kim, Lin, and Stevens (1998): $s = D / U^1$	
Accounting Measures		
Size	Natural log of total assets (data6)	Compustat Annual
ROA	Return on assets, defined as operating income after depreciation (data178) deflated by total assets (data6)	Compustat Annual
Asset Turnover	Sales (data12) deflated by total assets (data6)	Compustat Annual
Debt to total assets	Total liabilites (data181) deflated by total assets (data6)	Compustat Annual

Current Ratio	Current Assets (data4) deflated by current liabilities (data5)	Compustat Annual
Growth	Natural log of market to book ratio. Market value is defined as common shares outstanding (data25) times stock close price at fiscal year end (data199). Book value of equity is defined as total assets (data6) minus total liabilities (data181).	Compustat Annual
Loss	A dummy that takes the value of 1 if operating income after depreciation (data178) is negative, and zero otherwise.	Compustat Annual
Litigation	A dummy that takes the value of 1 if an observation is in one of the following industries: biotechnology (SIC codes 2833-2836, 8731-8734), computers (3570-3577, 7370-7374), electronics (3600-3674), and retail (5200-5961), and zero otherwise.	Compustat Annual