

Fraud-related securities class actions and Hudson Labs' risk indicator scores

Executive summary

Hudson Labs' proprietary ability to quantify the severity of narrative disclosure in securities filings is a powerful tool in assessing the risk of future fraud-related securities class actions.

In this paper, we compare companies that were subject to a fraud-related securities class action from 2020 to 2022, henceforth referred to as the test group, to a control group who were not subject to such a claim since at least 2008.

We find that thirteen of Hudson Labs' risk indicator category scores have statistically significant associations with class action outcomes.

Overall, the test group had average risk scores that were 17 to 120 percent higher than the control group for all statistically significant categories. Notably, companies in the test group had 'Governance' risk scores that were 1.6 times higher than the control group, 'Internal controls' risk scores that were 1.5 times higher and 'Management turnover' scores that were 1.6 times higher.

Background

Hudson Labs is software that uses artificial intelligence to understand the meaning of narrative disclosure and assesses its severity in relation to specific outcomes and topics. We provide SEC filing navigation tools as well as forensic risk assessment through our unique web-based investment research platform. Learn more at www.hudson-labs.com.

Hudson Labs' forensic models are trained to identify language in securities filings that is predictive of fraud. Our technology relies on [large language models](#) to understand meaning and assess severity. We use SEC enforcement actions and related indicators of fraud to test the efficacy of our models. We also test against future stock price impact, also known as [backtesting](#). Finally, Hudson Labs identifies and extracts **corrective disclosure** in real-time, facilitating timely assessment and review..

Hypothesis

Given that Hudson Labs risk indicator category scores are highly predictive of both fraud and price decline, we hypothesise that these scores also have a strong association with succeeding fraud-related class action lawsuits.

Methodology

We compared companies that were subject to a class action lawsuit related to fraud from 2020 through the end of 2022 (test group) to a group of randomly sampled comparators with the same size and sector attributes (control group). We assessed whether there was an association between the Hudson Labs risk indicator scores and succeeding lawsuits.

Class action data source: The [Securities Class Action Clearinghouse \(SCAC\)](#) “provides detailed information relating to the prosecution, defense, and settlement of federal class action securities fraud litigation. The SCAC team maintains a [Filings](#) database of 6,323 securities class action lawsuits filed since passage of the Private Securities Litigation Reform Act of 1995.” For the purposes of this test, we analysed lawsuits related to the 1934 Securities Act claims - section 10(b) which were filed between 2020 and 2022.

Test group: The test group comprised 403 companies. Of the 534 fraud-related class action recipients between 2020 and 2022 identified through the SCAC database, 432 were covered by Hudson Labs during the relevant period. We further narrowed the group to only those companies trading on a domestic exchange.

Control group: The control group comprised 1171 companies who had not been subject to a fraud-related lawsuit since at least 2008. For each company in the test group, we selected 3 companies as “comparators”. These comparators were randomly sampled from domestic companies within the same sector and within the same market capitalization band as the test example.

Hudson Labs risk indicator scores by category: For the purposes of this paper, “risk indicator score” refers to the aggregation of the total risk conveyed by all red flags in a certain category e.g. related party risk for the previous twelve months for Company ABC.

The Hudson Labs software identifies narrative information in securities filings and assesses how important that information is in assessing/predicting fraud. We refer to individual sentences that have been identified as noteworthy as a “red flag”. Each red flag receives an importance score based on the sentence’s severity (according to a ranking model), the model’s confidence in its assessment of severity and the recency of the event disclosed, if relevant. The Hudson Labs risk indicator scores that are discussed herein, are an

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aggregation of importance scores across time for an individual company for each red flag category.

A Hudson Labs risk indicator score is a positive, continuous variable. It is possible and common for companies to have scores of zero in certain categories where they do not exhibit risk.

We assessed risk indicators for 19 categories (see list below). Risk indicator scores were calculated using only red flags that were available *prior* to the date that the class action lawsuit was filed. Risk indicator scores use red flags collected from the following SEC filing types: 10-K, 10-Q and 8-K. We use our own proprietary methodology to extrapolate in instances of missing filings and to normalise risk indicator scoring.

Risk indicator categories: 'Cash flow & credit', 'Internal Controls', 'Impairment', 'Operations', 'Compensation & perks', 'Governance', 'Regulatory & legal', 'Revenue', 'Reserves', 'Jurisdictional', 'Non-GAAP', 'Related party', 'Accounting', 'M&A', 'Bankruptcy', 'Unclassified', 'Jargon & buzzwords', 'Off-balance sheet', 'Management turnover'

Examples of red flags contributing to the risk indicator score: For the 'Cash flow & credit' category, high severity red flags might include disclosure such as a substantial doubt about going concern or a covenant breach and lower severity red flags might include a working capital deficiency description, for instance.

Testing statistical significance and measuring association: We used Welch's t-test to test the statistical significance of the differences between the two groups. We used a threshold of 0.1 to test significance. Welch's test was determined to be the most appropriate test because the two groups had unequal sizes and different distributions. We looked at the percentage difference between the mean risk scores of the two groups to assess the power of the association between Hudson Labs risk scoring and succeeding lawsuits.

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Results

The t-test shows a positive, statistically significant difference between the test and control groups for thirteen of the Hudson Labs risk indicator score categories at a 0.1 significance threshold.

Welch's t-test statistics

Hudson Risk Category	Statistic	P Value
Regulatory & legal	11.988	0
Accounting	6.612	0
Operations	5.739	0
Governance	5.176	0
Cash flow & credit	4.394	0
Management turnover	4.385	0
Compensation & perks	4.14	0
Internal controls	3.803	0
Jargon & buzzwords	2.95	0.003
Reserves	2.654	0.008
M&A	2.294	0.022
Off-balance sheet	2.028	0.043
Impairment	1.808	0.071
Bankruptcy	1.625	0.105
Jurisdictional	1.58	0.114
Revenue	1.206	0.228
Related party	0.835	0.404
Non-GAAP	0.744	0.457
Unclassified	-1.893	0.059

Association metrics

As shown in the table below, for all categories with a statistically significant difference, the average risk indicator score for the test group was 17 to 120 percent higher than it was for

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the control group. Notably, the ‘Governance’, ‘Internal controls’ and ‘Management Turnover’ categories saw average risk indicator scores that were at least 1.5 times higher than the control group. The ‘Regulatory & legal’ and ‘Jargon & buzzwords’ categories exhibited scores that were more than 2 times higher.

Note that the strength of the association of the ‘Regulatory & legal’ category in this test is not due to [“target leakage”](#). The class action lawsuits were filed after the date that these scores were collected and therefore could not have been disclosed in their filings. We manually checked a number of samples to ensure that this was true. However, we do find that different types of regulatory and legal risk tend to co-occur which would explain the results. For instance, SEC investigations are more likely at companies with ongoing FTC investigations etc.

Mean comparisons and ratios

Category	Stat	Control	Test	Diff	Percentage Difference	Ratio
Regulatory & legal	mean	1.069	2.354	1.285	120.2	2.2
Accounting	mean	1.606	2.115	0.51	31.7	1.3
Operations	mean	2.369	2.873	0.504	21.3	1.2
Cash flow & credit	mean	2.335	2.777	0.442	18.9	1.2
Internal controls	mean	0.784	1.168	0.384	49.1	1.5
Management turnover	mean	0.439	0.69	0.25	57.0	1.6
Governance	mean	0.432	0.676	0.245	56.8	1.6
Compensation & perks	mean	0.488	0.657	0.17	34.8	1.3
Reserves	mean	0.472	0.627	0.156	33.0	1.3
Impairment	mean	0.882	1.034	0.152	17.2	1.2
M&A	mean	0.511	0.62	0.11	21.5	1.2
Off-balance sheet	mean	0.194	0.257	0.064	32.8	1.3
Jargon & buzzwords	mean	0.034	0.068	0.034	101.5	2.0

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Median comparisons and ratios

Category	Stat	Control	Test	Diff	Percentage Difference	Ratio
Regulatory & legal	median	0.556	1.96	1.404	252.7	3.5
Operations	median	2.114	2.776	0.662	31.3	1.3
Accounting	median	1.365	1.854	0.489	35.8	1.4
Cash flow & credit	median	2.057	2.536	0.479	23.3	1.2
Internal Controls	median	0	0.255	0.255	inf	inf
Compensation & perks	median	0.285	0.451	0.166	58.2	1.6
Governance	median	0.207	0.346	0.139	67.2	1.7
Reserves	median	0	0.098	0.098	inf	inf
Impairment	median	0.315	0.405	0.091	28.8	1.3
M&A	median	0.131	0.207	0.076	58.0	1.6
Management turnover	median	0	0.049	0.049	inf	inf
Jargon & buzzwords	median	0	0	0		
Off-balance sheet	median	0	0	0		

Conclusion

Based on the marked differences between the two groups shown above, we can conclude that our hypothesis is correct. High Hudson Labs risk indicator scores tend to precede fraud-related class action litigation. There is a strong relationship between Hudson Labs' modelled assessment of risk in narrative disclosure and succeeding legal action.