



# **Nathan Associates Inc. Rule 10b-5 Assessment Report**

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*A semiannual industry report estimating investor losses in class action lawsuits alleging violations of section 10(b) of the Securities Exchange Act of 1934, covering July 2014–December 2015*

April 2016



**NATHAN**  
ASSOCIATES INC.

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## Disclaimer

The financial and econometric analysis presented in the Nathan Associates Rule 10b-5 Assessment Report is preliminary, based on facts and allegations presented in the first publicly filed securities class action complaint alleging a defendant violated the Securities Exchange Act of 1934. The results are therefore subject to revision. The analysis in this report is for informational purposes only. Nathan Associates Inc. is neither alleging nor implying wrongdoing by defendants.

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## The State of 10b-5 Securities Fraud Class Actions

Since the U.S. Supreme Court's June 2014 ruling in *Halliburton Co. v. Erica P. John Fund, Inc.* ("Halliburton II"), Nathan Associates has been tracking financial and economic data on new class action cases alleging violations of the Security and Exchange Commission's Rule 10b-5.<sup>1,2</sup> This issue of our semiannual Rule 10b-5 Assessment Report updates the metrics with data from cases filed through December 2015.<sup>3</sup> It also estimates the sensitivity of investor loss measurements to varying methodological judgments. Key findings from this issue of the 10b-5 report are summarized below:

- A total of 193 securities class action complaints alleging violations of Rule 10b-5 have been filed in the three half-year periods since Halliburton II.<sup>4</sup> Sixty-nine of those were filed in the second half of 2015 (2015 H2), compared with 58 in the first half of 2015 (2015 H1) and 66 in the second half of 2014 (2014 H2).
- Market capitalization and estimated Rule 10b-5 losses surged in 2015 H2:
  - Aggregate market capitalization losses totaled \$114.8 billion for cases filed in 2015 H2, compared with \$74.2 billion in 2014 H2 and 2015 H1 combined. Losses since Halliburton II total \$189 billion.
  - Aggregate Rule 10b-5 losses—investor losses attributable to alleged fraud—totaled \$25.4 billion for cases filed in 2015 H2, compared with a combined \$18.7 billion in the previous two half-years. Aggregate Rule 10b-5 losses since Halliburton II are \$44.1 billion.
- Average losses per case increased compared with average losses in the prior two half-year periods, and this increase was not due entirely to larger cases. For example, when the top 10 cases were excluded, the average market capitalization loss for 2015 H2 was \$307.2 million. This compares with \$176.4 million in 2015 H1.
- The portion of aggregate market capitalization losses attributable to large cases has not increased substantially since the previous half-year. In 2015 H2, the top 10 cases by market capitalization losses accounted for about 84 percent of aggregate market capitalization losses. That compares with 81 percent in 2015 H1 and 58 percent in 2014 H2.
- The portion of Rule 10-b losses attributable to large cases has not increased substantially since the previous half-year. In 2015 H2, 80 percent of aggregate Rule 10b-5 losses came from the 10 cases with the largest market capitalization losses, compared with 76 percent in 2015 H1 and 64 percent in 2014 H2.
- Estimated losses from statistically significant alleged corrective disclosures soared in 2015 H2. This applies to market capitalization losses and Rule 10b-5 losses. Average aggregate market capitalization losses per significant disclosure increased to \$1.2 billion during that period,

<sup>1</sup> Promulgated under Section 10(b), the antifraud provision of the Securities Exchange Act of 1934 ("Exchange Act").

<sup>2</sup> The U.S. Supreme Court, in *Halliburton Co. v. Erica P. John Fund, Inc.* ("Halliburton II"), cemented the ability of investors to recover losses incurred as a result of misstatements and misrepresentations by the directors and officers of U.S.-listed companies. At the same time, the Supreme Court introduced a new challenge for plaintiffs by providing defendants an opportunity to rebut claims of price impact at the class certification stage of litigation. Most important, the ruling left intact the presumption of reliance granted in 1988 in *Basic v. Levinson*.

<sup>3</sup> The statistics in this report are based on identified Rule 10b-5 cases filed against companies that trade on U.S. exchanges as common stock. Securities Act cases that do not allege violations of Rule 10b-5 or that are filed against companies that do not trade as common stock—for example, those that trade as ADRs or ADSs—are excluded.

<sup>4</sup> The number of identified initial Rule 10b-5 class action complaints filed against companies that trade on U.S. exchanges as common stock.

from \$573 million in 2015 H1. Estimated Rule 10b-5 losses per significant disclosure rose to \$267.1 million from \$120.9 million.

- The proportion of total market capitalization losses that are potentially 10b-5 losses increased slightly in 2015 H2 but was smaller than the average ratio since Halliburton II. We refer to this proportion as the Rule 10b-5 Market Capitalization Loss Percentage (RMC Ratio).
  - During 2015 H1, aggregate market capitalization losses were \$44.7 billion and estimated aggregate Rule 10b-5 losses were \$9.4 billion. The RMC Ratio for 2015 H1 was therefore 21.1 percent.
  - During 2015 H2, aggregate market capitalization losses were \$114.8 billion and estimated aggregate Rule 10b-5 losses were \$25.4 billion, for an RMC Ratio for 2015 H2 of 22.1 percent.
  - Aggregate market capitalization losses since Halliburton II (2014 H2 through 2015 H2) are \$189 billion, and estimated aggregate Rule 10b-5 losses are \$44.1 billion. The RMC Ratio since Halliburton II is therefore 23.3 percent.

We add a section on sensitivity analysis for informative purposes. This section has two parts:

- First, in light of a ruling July 15, 2015, by the U.S. District Court for the Northern District of Texas, which is hearing the ongoing Halliburton case, we tested our aggregate-loss estimates against instances of multiple comparisons (i.e., multiple disclosures) using a Bonferroni “correction.” Our estimates of statistical significance and aggregate Rule 10b-5 losses before applying the Bonferroni corrections were found to be robust (i.e., consistent with estimates calculated after using the corrections).
- Second, we demonstrate the effects on estimated Rule 10b-5 losses of different mixes of investor groups (relatively passive “holders” versus more active “traders”) and trading propensities (i.e., the likelihood of buying or selling). Nathan Associates calculates Rule 10b-5 losses using empirically informed estimates of the proportion of common stock float held by holders and traders and their relative trading propensities.

**Table 1. Rule 10b-5 Class Action Cases Summary Statistics**

	2014 H1	2015 H1	2015 H2	Average <sup>a</sup>
Rule 10b-5 cases <sup>b</sup>	66	58	69	64
Market capitalization losses (\$ billion)	29.5	44.7	114.8	63.0
Rule 10b-5 losses (\$ billion)	9.3	9.4	25.4	14.7
RMC Ratio (%)	31.5	21.1	22.1	23.3
Market capitalization losses per case (\$ million)	446.9	770.5	1664.0	979.3
Rule 10b-5 Loss per case (\$ million)	140.5	162.5	367.7	228.4
% of market capitalization losses attributable to 10 largest cases	58.0	81.0	84.2	79.4
% of Rule 10b-5 losses attributable to 10 largest cases	64	76	80	76
Market capitalization losses per case (excl. top 10) (\$ million)	223.5	176.4	307.2	239.9
Rule 10b-5 losses per case (excl. top 10) (\$ million)	60.9	47.3	87.3	66.4

<sup>a</sup> Where applicable, the dollar-weighted average rather than the simple arithmetic average is given.

<sup>b</sup> The number of identified initial Rule 10b-5 class action complaints filed against companies that trade on U.S. exchanges as common stock—excluding companies that trade as ADRs or DSs and Securities Act complaints that do not allege 10b-5 violations.

## Aggregate Market Capitalization Losses: 2015 H2

Market capitalization on a given day is the product of the daily closing stock price and the number of reported shares of outstanding common stock.<sup>5</sup> Aggregate market capitalization losses equal the sum of the changes in market capitalization from the two trading days surrounding alleged corrective disclosures found to be statistically significant.<sup>6</sup> Although aggregate market capitalization losses are of interest to investors, additional metrics—such as market and industry returns and subsequent price recovery—are required to measure potential losses under Rule 10b-5 accurately.

Of the 69 cases analyzed for 2015 H2, aggregate market capitalization losses totaled \$114.8 billion, corresponding to 95 statistically significant alleged corrective disclosures. Figure 1 shows aggregate market capitalization losses of defendant companies found in the securities class action complaints filed in a given month.

## Aggregate Rule 10b-5 Losses: 2015 H2

Nathan Associates' estimated aggregate Rule 10b-5 losses are a more accurate gauge of potential investor losses due to securities fraud than are aggregate market capitalization losses. The alleged corrective disclosures from each filed complaint are evaluated according to a single-firm multivariate regression analysis that controls for market and industry-specific factors that also affect a company's stock price. Alleged corrective disclosures that exhibit statistical significance are used to construct an artificial inflation ribbon for the class period alleged in the initial complaint. Aggregate Rule 10b-5 losses are calculated for each initial complaint by using the estimated artificial inflation ribbon in conjunction with a matrix-based multitrader model. This approach makes it possible to track cohorts of bought and sold shares throughout the class period and evaluate them for possible price declines due to alleged fraud.

Estimated aggregate Rule 10b-5 losses were \$25.4 billion for the 69 cases analyzed for 2015 H2.

## Rule 10b-5 Market Capitalization Loss Percentage—the RMC Ratio

Nathan Associates has developed a metric of the proportion of total market capitalization losses that are potentially 10b-5 losses. The Rule 10b-5 market capitalization loss percentage—the RMC Ratio—equals the quotient of aggregate Rule 10b-5 losses and aggregate market capitalization losses.

$$\text{RMC Ratio} = \frac{\text{Aggregate Rule 10b-5 Losses}}{\text{Aggregate Market Cap Losses}}$$

<sup>5</sup> Closing stock prices and shares outstanding are as reported by Bloomberg L.P.

<sup>6</sup> The alleged corrective disclosures used to compute aggregate market capitalization losses and aggregate Rule 10b-5 estimated losses are compiled from the first securities class action complaints filed for each case. Aggregate market capitalization losses and aggregate Rule 10b-5 losses may change materially after amended complaints are filed and new corrective disclosures are identified by lead counsel or original corrective disclosures are no longer alleged. Only alleged corrective disclosures that exhibit a statistically significant daily logarithmic residual return are used to calculate aggregate estimates.

Figure 1. Aggregate Market Capitalization Losses by Company

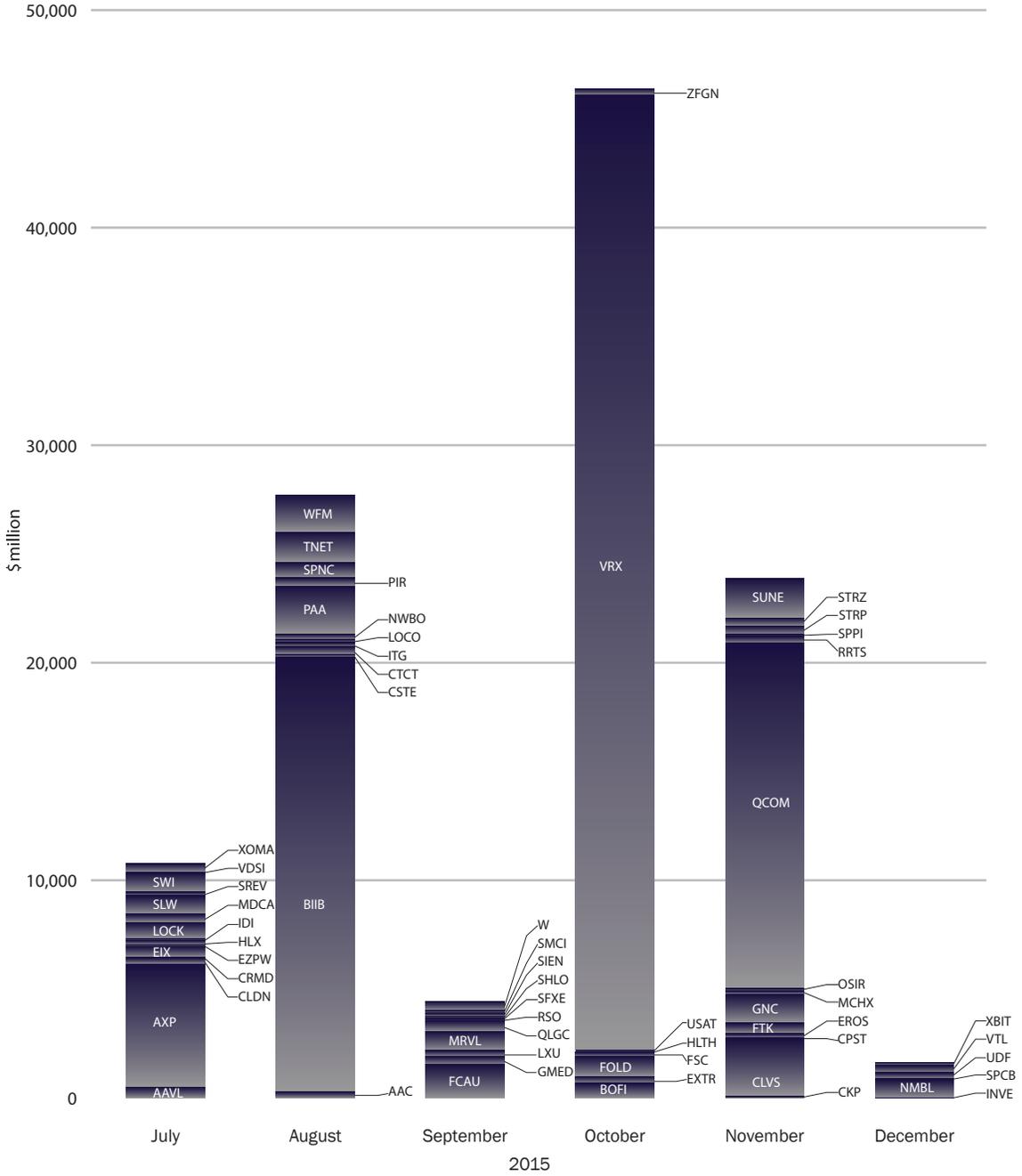
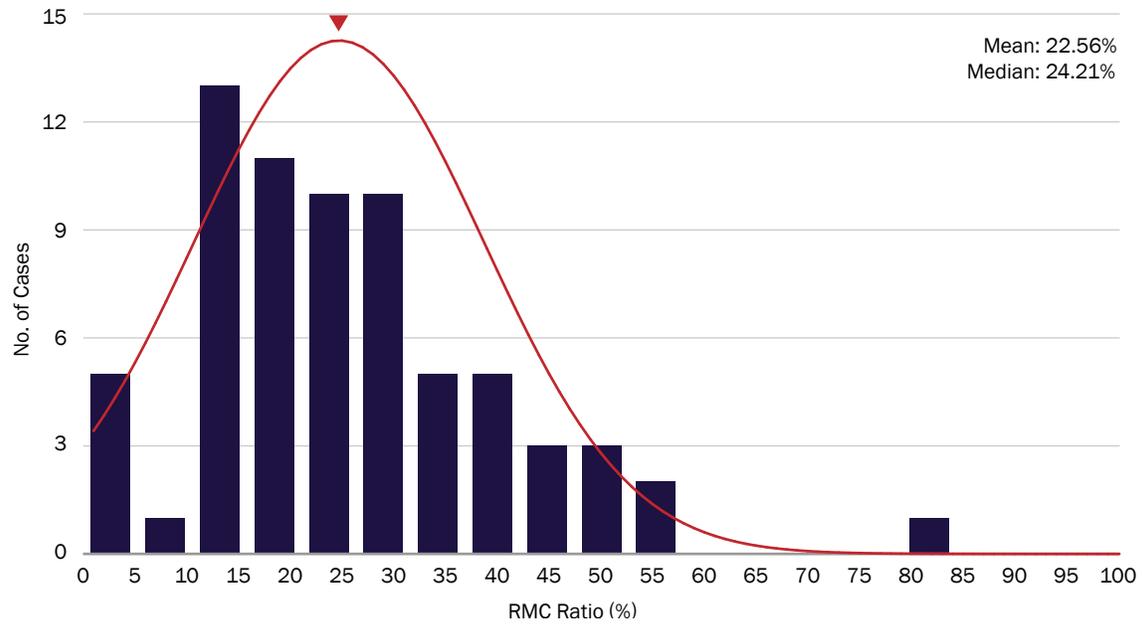
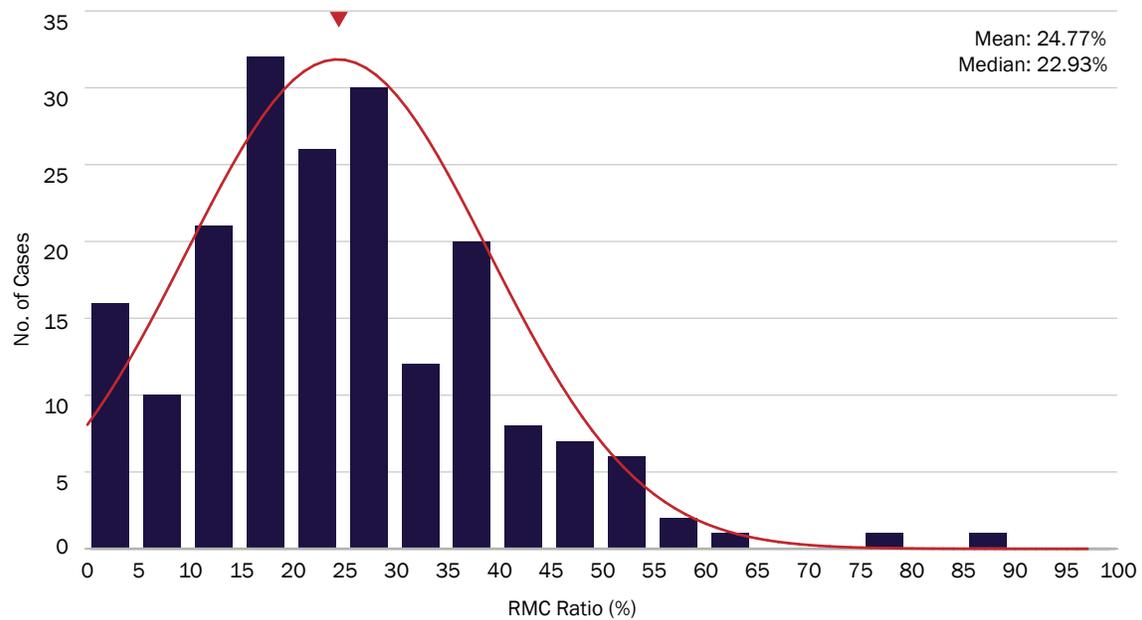


Figure 2 shows the RMC ratio for the 69 cases filed during 2015 H2. Figure 3 shows the RMC Ratio for all 193 cases filed since Halliburton II.

**Figure 2. RMC Ratio for 2015 H2**



**Figure 3. RMC Ratio for All Cases Filed since Halliburton II**

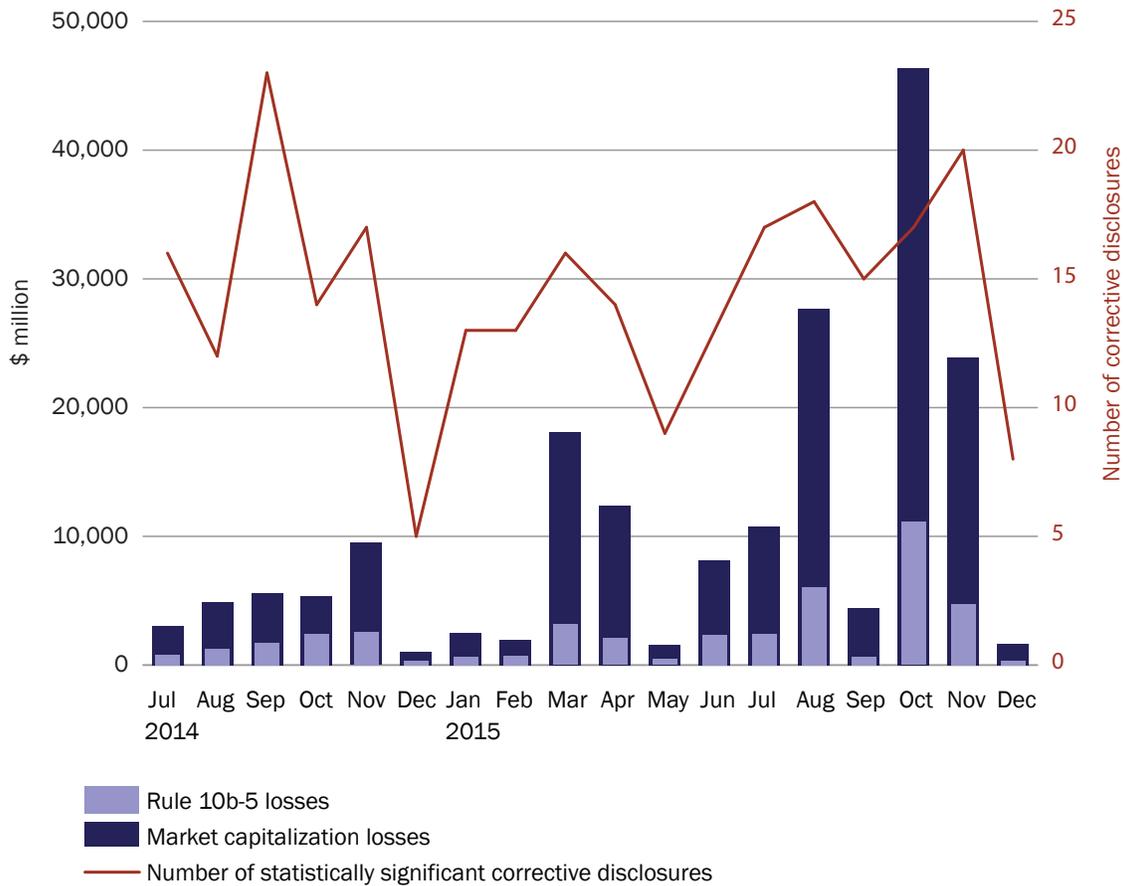


## The Year since Halliburton II Compared with 2015 H2

For the 124 cases filed from 2014 H2 through 2015 H1, 165 of the alleged corrective disclosures exhibited statistically significant investor losses. Aggregate market capitalization losses and aggregate Rule 10b-5 losses per corrective disclosure for these two halves were \$450 million and \$113 million, respectively.

Both loss measures increased dramatically during 2015 H2: Ninety-five corrective disclosures were statistically significant, and aggregate market capitalization losses and aggregate Rule 10b-5 losses per corrective disclosure amounted to \$1.21 billion and \$267 million, respectively.

**Figure 4. Estimated Losses per Corrective Disclosure**



## Sensitivity Analysis

Nathan Associates determines the statistical significance of alleged corrective disclosure dates and estimates Rule 10b-5 losses on the basis of commonly accepted methodologies.<sup>7</sup> Nevertheless, it can be an informative exercise for stakeholders in securities litigation to examine the effects of varying underlying inputs on loss estimates. This section of the report describes how loss estimates would change with different methods or inputs.

### *Adjusting the Standard of Statistical Significance for Multiple Corrective Disclosures*

The U.S. District Court for the Northern District of Texas, which is hearing the ongoing Halliburton case, issued a ruling in July 2015 following up on the Supreme Court decision in Halliburton II. The District Court devoted considerable attention to adjudicating experts' differing opinions about whether or not tests for statistical significance of corrective disclosures in Rule 10b-5 cases should adjust for the problem of multiple comparisons (i.e., multiple disclosures).<sup>8</sup> Adjustments for multiple comparisons are sometimes warranted when multiple statistical tests are carried out at once. As the number of tests being conducted increases, the probability of finding false positives (i.e., Type I errors) increases if the rejection criterion is based on the conventional 5 percent critical value of a single statistical test.<sup>9</sup>

One way to adjust for this possible bias is with the Bonferroni correction, which divides the conventional 5 percent threshold by the number of statistical hypotheses being tested.<sup>10</sup> For instance, whereas the threshold for the test of a single hypothesis would usually be 5 percent, using the Bonferroni correction, the threshold for two hypotheses tested at once would be 2.5 percent for each tested hypothesis. For securities class action cases that allege multiple corrective disclosures, applying the Bonferroni correction makes it more unlikely to obtain statistically significant results because the critical value associated with the conventional 5 percent threshold is always lower than the critical value associated with the threshold of 5 percent divided by the number of alleged corrective disclosures.

When the Bonferroni correction is applied to determine the statistical significance of the corrective disclosures from the pool of cases in 2015 H2, it is found to have little practical effect. For the 30 cases alleging corrective disclosures on multiple days during the class period, 56 alleged disclosures are significant by the ordinary 5 percent criterion, and 53 are still significant even when the Bonferroni correction is applied. That is, the Bonferroni correction removed less than 6 percent of the total sample of alleged disclosures. When the effects of these three disclosures on aggregate Rule 10b-5 losses for 2015 H2 are removed, aggregate losses drop from \$25.4 billion to \$25.3 billion, a decrease of less than 1 percent. Nathan Associates' estimates of statistical significance and aggregate Rule 10b-5 losses are therefore robust to adjustments for multiple comparisons.

<sup>7</sup> See the technical notes for a detailed explanation of the methodology used in this report.

<sup>8</sup> Case No. 3:02-CV-1152-M, 2015 WL 4522863 (N.D. Tex. July 25, 2015).

<sup>9</sup> See Hervé Abdi, Bonferroni and Šidák, Corrections for Multiple Comparisons in *Encyclopedia of Measurement and Statistics*, ed. N. J. Salkind (Thousand Oaks, CA: Sage 2007). Page 1 begins: "The more tests we perform on a set of data, the more likely we are to reject the null hypothesis when it is true (i.e., a Type I error). This is a consequence of the logic of hypothesis testing: We reject the null hypothesis if we witness a rare event. But the larger the number of tests, the easier it is to find rare events and therefore the easier it is to make the mistake of thinking that there is an effect when there is none."

<sup>10</sup> Ibid.

## Effects on Rule 10b-5 Losses of Different Trading Model Estimates

This section examines how aggregate Rule 10b-5 loss estimates can vary depending on the inputs used with the multitrader model that calculates which traded shares were affected by the alleged corrective disclosures. Two important inputs for the model are the percentage of stock float held by different groups of equity investors and those groups' relative propensities to trade. Nathan Associate's aggregate Rule 10b-5 losses are estimated with standard, well-accepted parameters, but experts differ in their judgments of the appropriate inputs.<sup>11</sup>

Table 2 illustrates the extent to which Aggregate Rule 10b-5 Loss estimates change given different modeling inputs about investor-group percentages of float and relative trading propensities. The model on which the figure is based assumes that all float shares are held by holders or traders. The table shows the results of varying input model parameters to reflect the ranges seen in the published research:<sup>12</sup> The top row assumes traders have 15 percent of the float, the middle row assumes that traders have 30 percent of the float, and the bottom row assumes traders have 45 percent of the float. The left column shows the results when traders are 30 times more likely to trade than holders, the middle column shows the results when traders are 20 times more likely to trade, and the right column when traders are 10 times more likely to trade than holders.

**Table 2. Relative Rule 10b-5 Losses Given Different Modeling Inputs**

Percentage of Traders	Relative Propensity of Traders		
	30x	20x	10x
15%	81.3%	93.2%	115.7%
30%	93.1%	100.0%	115.2%
45%	114.2%	117.5%	125.5%

Note: The assumed market makers' percentage of reported volume is held constant at 50 percent.

Rule 10b-5 losses are assigned a value of 100 as the reference point for comparisons. Losses drop to 81.3 percent when traders have 15 percent of the float and are 30 times more likely to trade than are holders. Losses are at their highest, 125.5 percent, when traders have 45 percent of the float and are 10 times more likely to trade than are holders.

Aggregate Rule 10b-5 loss estimates can therefore vary widely depending on the modeling inputs. The highest estimate of losses (bottom cell on the right) is 54 percent higher than the lowest loss estimate (top cell on the left), i.e., 125.5 percent compared to 81.3 percent.

This sensitivity analysis leads to two conclusions. First, keeping traders' share of float constant, Rule 10b-5 loss estimates increase as the relative trading propensity of traders decreases. This is an intuitive result, since a greater relative trading propensity of traders implies more intraday trading, and shares bought and sold on the same day cannot be counted as being exposed to decreases in artificial inflation. Also, in general, but not always, investor loss estimates decrease as the trader percentage of the float decreases, all else held constant. These results are consistent with

Thus, Table 2 shows the sensitivity of Rule 10b-5 losses to varying input estimates. Each cell in the table shows the estimated aggregate Rule 10b-5 losses as a percentage relative to the center cell. The results come from a sample of the 2015 H2 cases.

In the center cell, where traders have 30 percent of the float and are 20 times more likely to trade, estimated aggregate

<sup>11</sup> These estimates can be based on company- or industry-specific information given appropriate trading data and analysis of other relevant statistics. For example, see Dr. Marcia Mayer, Best-Fit Estimation of Damaged Volume in Shareholder Class Actions: The Multi-Sector, Multitrader Model of Investor Behavior, NERA Economic Consulting, October 1, 2000 (<http://www.nera.com/publications/archive/2000/bestfit-estimation-of-damaged-volume-in-shareholder-class-actio.html>).

<sup>12</sup> See John Finnerty and George Pushner, An Improved Two-Trader Model for Measuring Damages in Securities Fraud Class Actions, *Stanford Journal of Law, Business & Finance* 8, no. 2 (Spring 2003): 213–263. Table 1, page 232, reports the estimates of holder and trader percentages from various papers.

observations from the empirical literature, which reports that potential investor losses generally increase with trader proportions of the float and decrease with greater intraday trading.<sup>13</sup>

**Table 3. 10b-5 Cases that Make up the Aggregated Data for 2015 H2, by Filing Date**

Company Name	Company Ticker	Filing Date	Class Period Start Date	Class Period End Date
Celladon Corp.	CLDN	7/2/2015	7/7/2014	6/25/2015
CorMedix Inc.	CRMD	7/6/2015	3/12/2011	6/29/2015
Edison International	EIX	7/6/2015	7/31/2014	6/24/2015
Silver Wheaton Corp.	SLW	7/8/2015	3/30/2011	7/6/2015
Scout Analytics Inc.	SREV	7/8/2015	1/22/2014	5/1/2014
Avalanche Biotechnologies Inc.	AAVL	7/9/2015	7/31/2014	6/15/2015
EZ Corp. Inc.	EZPW	7/20/2015	10/27/2014	7/16/2015
IDI Inc.	IDI	7/22/2015	4/30/2015	7/21/2015
LifeLock Inc.	LOCK	7/22/2015	7/30/2014	7/20/2015
XOMA Corp.	XOMA	7/24/2015	11/6/2014	7/21/2015
Vasco Data Security International Inc.	VDSI	7/28/2015	2/18/2014	7/21/2015
Advanced Drainage Systems Inc.	WMS	7/29/2015	9/5/2014	7/14/2015
American Express Co.	AXP	7/30/2015	10/16/2014	2/11/2015
Helix Energy Solutions Group Inc.	HLX	7/31/2015	10/21/2014	7/21/2015
MDC Partners Inc.	MDCA	7/31/2015	9/24/2013	4/27/2015
SolarWinds Inc.	SWI	7/31/2015	4/28/2015	7/16/2015
Investment Technology Group Inc.	ITG	8/5/2015	2/28/2011	7/29/2015
Whole Foods Market Inc.	WFM	8/5/2015	8/9/2013	7/30/2015
Constant Contact Inc.	CTCT	8/7/2015	10/23/2014	7/23/2015
TriNet Group Inc.	TNET	8/7/2015	5/5/2014	8/3/2015
Plains All American Pipeline L.P.	PAA	8/14/2015	10/16/2013	8/4/2015
Biogen Inc.	BIIB	8/18/2015	1/29/2015	7/23/2015
AAC Holdings Inc.	AAC	8/24/2015	10/2/2014	8/3/2015
Ei Pollo Loco Holdings Inc.	LOCO	8/24/2015	5/15/2015	8/13/2015
Caesarstone Sdot-Yam LTD.	CSTE	8/25/2015	3/25/2013	8/18/2015
Northwest Biotherapeutics Inc.	NWBO	8/26/2015	3/8/2013	8/20/2015
The Spectranetics Corp.	SPNC	8/27/2015	2/19/2015	7/23/2015
Pier 1 Imports Inc.	PIR	8/28/2015	12/19/2013	2/10/2015
Wayfair Inc.	W	9/3/2015	10/2/2014	8/31/2015
Super Micro Computer Inc.	SMCI	9/4/2015	9/15/2014	8/31/2015
Resource Capital Corp.	RSO	9/9/2015	3/2/2015	8/4/2015
Fiat Chrysler Automobiles N.V.	FCAU	9/11/2015	8/1/2014	7/24/2015
Marvell Technology Group Ltd.	MRVL	9/11/2015	11/20/2014	9/10/2015
SFX Entertainment Inc.	SFXE	9/11/2015	2/25/2015	8/17/2015
Shiloh Industries Inc.	SHLO	9/21/2015	3/9/2015	9/14/2015
LSB Industries Inc.	LXU	9/25/2015	5/8/2015	8/7/2015
Sientra Inc.	SIEN	9/25/2015	3/18/2015	9/24/2015
QLogic Corp.	QLGC	9/28/2015	4/30/2015	7/30/2015

<sup>13</sup> Finnerty and Pushner (2003) report that total damages generally decrease with greater proportions of the float held by holders and greater intraday trading.

Table 3. (continued)

Company Name	Company Ticker	Filing Date	Class Period Start Date	Class Period End Date
Globus Medical Inc.	GMED	9/29/2015	2/26/2014	8/5/2014
Fifth Street Finance Corp.	FSC	10/1/2015	7/7/2014	2/6/2015
USA Technologies Inc.	USAT	10/1/2015	9/29/2014	9/29/2015
Amicus Therapeutics Inc.	FOLD	10/7/2015	9/15/2015	10/1/2015
Bofl Holding Inc.	BOFI	10/15/2015	9/4/2013	10/13/2015
6D Global Technologies Inc.	SIXD	10/15/2015	11/3/2010	9/10/2015
Nobilis Health Corp.	HLTH	10/21/2015	4/2/2015	10/8/2015
Zafgen Inc.	ZFGN	10/21/2015	1/12/2015	10/16/2015
Extreme Networks, Inc.	EXTR	10/23/2015	11/4/2013	4/9/2015
Valeant Pharmaceuticals International, Inc.	VRX	10/23/2015	2/28/2014	10/21/2015
Spectrum Pharmaceuticals Inc.	SPPI	11/3/2015	5/7/2015	10/23/2015
Starz	STRZ	11/9/2015	8/1/2014	10/29/2015
Checkpoint Systems Inc.	CKP	11/11/2015	3/5/2015	11/3/2015
Eros International PLC	EROS	11/13/2015	11/12/2013	11/12/2015
Straight Path Communications Inc.	STRP	11/13/2015	10/29/2013	11/5/2015
Capstone Turbine Corp.	CPST	11/16/2015	11/7/2013	11/5/2015
Flotek Industries Inc.	FTK	11/17/2015	10/23/2014	11/9/2015
Marchex Inc.	MCHX	11/17/2015	3/19/2014	9/18/2014
Roadrunner Transportation Systems Inc.	RRTS	11/17/2015	7/30/2015	10/26/2015
Clovis Oncology Inc.	CLVS	11/19/2015	5/20/2014	11/13/2015
GNC Holdings Inc.	GNC	11/19/2015	11/28/2011	10/28/2015
Osiris Therapeutics Inc.	OSIR	11/23/2015	5/12/2014	11/16/2015
Qualcomm Inc.	QCOM	11/30/2015	11/6/2014	7/22/2015
SunEdison Inc.	SUNE	11/30/2015	6/16/2015	10/6/2015
Vital Therapies Inc.	VTL	12/2/2015	4/27/2014	8/21/2015
XBiotech Inc.	XBIT	12/2/2015	4/15/2015	11/23/2015
Identiv Inc.	INVE	12/7/2015	11/7/2013	11/23/2015
SuperCom Inc.	SPCB	12/9/2015	6/1/2015	11/27/2015
United Development Funding IV	UDF	12/21/2015	6/4/2014	12/10/2015
Nimble Storage Inc.	NMBL	12/23/2015	5/27/2015	11/19/2015
Anavex Life Sciences Corp	AVXL	12/30/2015	5/17/2013	12/28/2015

## Technical Notes

1. Sources for the data that support this issue of the Nathan Associates Rule 10b-5 Assessment Report include Bloomberg Finance L.P., Dow Jones & Co., class action complaints, court dockets, corporate filings with the Securities Exchange Commission, and other public press releases.
2. Nathan Associates Inc. actively tracks securities class action cases that have been filed alleging violations of Federal Securities Laws. The data for this report are based on filed securities class action cases alleging Rule 10b-5 violations from July 1, 2015, through December 31, 2015. The case population consists of securities class action cases that allege Rule 10b-5 violations by defendant companies that trade on NYSE and NASDAQ exchanges, excluding those that trade as ADRs and ADSs. Securities class action complaints that allege only violations of the Securities Act, or Section 11, are not included.
3. Aggregate market capitalization losses measure a company's decline in value corresponding to the statistically significant dates of public disclosures that purportedly reveal alleged violations of the Securities Exchange Act's Rule 10b-5 fraud section ("corrective disclosures"). A company's market capitalization is equal to the product of the daily closing stock price and the reported shares of outstanding common stock. Aggregate market capitalization losses are equal to the sum of the market capitalization declines corresponding to statistically significant alleged disclosures.
4. Aggregate Rule 10b-5 losses are an estimate of investor losses, controlled for extraneous market factors (general and industry-specific) affecting the price declines corresponding to each alleged corrective disclosure. Rule 10b-5 losses are regression-based and allegation-specific loss estimates that may be attributable to the dissemination of news that corrected alleged misstatements and misrepresentations by directors and officers of the defendant companies.
5. Rule 10b-5 losses are estimated by conducting single-firm multivariate regression analysis for each defendant company based on allegations presented in the first filed securities class action complaint against it. The updated estimates in this report are based on the defined population of 69 securities class actions filed in 2015 H2. The multivariate regression analysis incorporates adjustments for the general stock market and industry-specific price movements that affect a company's stock price at the time of the alleged corrective disclosures. Those adjustments are calibrated using general stock market indexes and industry-specific indexes according to each defendant company's line of business.
  - a. A constant-dollar artificial inflation ribbon is constructed for the alleged class period for each defendant company stock price on the basis of the results of a single-firm multivariate regression analysis and the application of a single-trading-day event window.<sup>14, 15</sup> The regression analysis makes it possible to estimate the residual returns and evaluate the statistical significance of the stock price declines that followed alleged corrective disclosures (correcting the artificially inflated price). Statistical significance is measured using a 95 percent confidence interval. Alleged corrective disclosures where the daily logarithmic

<sup>14</sup> The effects of the general stock market are represented by either the S&P 500 Total Return Index or the NASDAQ Composite Total Return Index. Industry-specific effects are represented by selecting a preestablished index, according to the defendant company's line of business. If a preestablished industry index is an inadequate fit, Nathan Associates analysts devise a custom industry index. All indexes and constituent index data are as reported by Bloomberg L.P.

<sup>15</sup> When the first filed securities class action complaint alleges a consecutive multi-trading day interval as the alleged disclosure(s), only single trading days that exhibit a statistically significant residual return, within the alleged consecutive corrective window, are included in the inflation ribbon.

residual return did not exhibit a statistically significant variation are excluded from the cumulative artificial inflation ribbon and are therefore excluded from estimates of Rule 10b-5 losses.

- b. Rule 10b-5 losses are calculated by using a matrix-based multitrader model to estimate the total number of shares affected by the price inflation ribbon during the class period. Multitrader models are well-accepted quantitative methods for estimating affected (i.e., damaged) shares, because financial experts do not have access to the entire universe of trading records of all investors who may have been harmed through violations of the federal securities laws.<sup>16</sup>

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<sup>16</sup> “In-and-out” shares, bought and sold before the first alleged corrective disclosure, are excluded from the aggregation of total damaged shares attributable to each case.





For more information about the Nathan Associates Rule 10b-5 Assessment Report and securities litigation services, contact Doug Young at 703-516-7746 ([dyoung@nathaninc.com](mailto:dyoung@nathaninc.com)) or Stephen Sigrist at 949-474-4203 ([ssigrist@nathaninc.com](mailto:ssigrist@nathaninc.com)).

1777 North Kent Street,  
Suite 1400  
Arlington, Virginia 22209

3 Park Plaza  
Suite 1980  
Irvine, California 92614

Kirkaldy House  
99 Southwark St.  
London, England  
SE1 0JF

1604, 16th Floor Ambadeep  
Bldg  
K.G. Marg  
Barakhamba Delhi, India