

Online Appendix

Short and Distort

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OA1. Are Reversals Driven by Provocative Article Content?

One question is whether pseudonymous authors simply induce a price overreaction by posting provocative content. It is difficult to explain the purchase of put options prior to the public posting of the article as a mere coincidence, and the analysis in Section 4.2.3 suggests an exploitation of the market's view that the author is non-liar. This Section provides additional evidence that evocative article content is unlikely to explain these findings.

I generate a document-term matrix following the text analysis literature (Grimmer & Stewart, 2013). First, I preprocess the raw text of each article by removing punctuation and numbers, converting to lowercase, removing "function" words (a, the, etc.), and stemming to merge different grammatical forms. As in Macey & Mitts (2014), I tokenize the preprocessed text by counting the frequencies of individual word, two-word phrases ("bigrams") and three-word phrases ("trigrams"). I discard words and phrases which occur in less than 0.1% of the sample, yielding a document-term matrix of 9,515 articles in the original sample \times 107,890 words and phrases. Restricting to the matched sample yields a final document-term matrix of 2,900 articles \times 104,495 words and phrases.

I utilize these data in two ways. First, to examine whether pseudonymous articles employ provocative phrases like "fraud", accounting restatements, and so forth, I extract those words and phrases containing the terms "fraud", "restatement" or "legal" (in stemmed form). For each article in my dataset, I count how often any of these terms appear, and examine whether this count differs between pseudonymous and real-name articles. The results of this balance test are shown in Table 3, which shows fraud-related text does not appear more frequently in pseudonymous articles. While the difference in means is statistically insignificant, the point estimate is slightly smaller for pseudonymous articles.

This test is intuitive but crude, and the ex-ante selection of a given set of terms may lead to biased inferences. As an alternative test, I utilize the entire vocabulary of 104,495 words and phrases in the matched sample, and employ logistic regression with elastic-net regularization (Zou & Hastie, 2005) to identify which words and phrases are most predictive of pseudonymous authorship. I choose the regularization parameter λ by ten-fold cross validation, maximizing the area under the ROC curve (the "AUC"). The in-sample accuracy of the model is 0.9000, with a sensitivity (true positive rate) of 0.7568 and a specificity (true negative rate) of 0.9983. The no-information rate is 0.5931.¹

¹The no-information rate is the accuracy rate if articles were randomly classified as pseudonymous or not, and is equal to the in-sample proportion of the most frequent class.

While the in-sample accuracy is likely biased upward, the goal of this exercise is simply to identify which words and phrases are most predictive of pseudonymous authorship. Among the 104,495 words and phrases in the model, only 620 are assigned nonzero coefficients by the elastic-net model, and only 163 positively predict a pseudonymous article. Table OA1 shows the top 100 words and phrases in this group that positively predict a pseudonymous article.

Table OA1. Words and Phrases Predicting Pseudonymous Attacks

This table presents the top 100 stemmed words and phrases which are most predictive of pseudonymous authorship, as estimated by a logistic regression with elastic-net regularization (Zou & Hastie, 2005). The elastic-net parameter λ is chosen by ten-fold cross-validation, maximizing the area under the ROC curve. The in-sample accuracy of the model is 0.9000, with a sensitivity (true positive rate) of 0.7568 and a specificity (true negative rate) of 0.9983. The words and phrases below seem to reflect idiosyncratic noise, suggesting that pseudonymous authors are manipulating markets by engaging in informed options trading, not by posting provocative content.

Term	Coefficient	Term	Coefficient	Term	Coefficient	Term	Coefficient
invest longshort	1.51	save stock	0.27	name stock	0.16	upsid potenti	0.09
short onli special	1.35	individu stock	0.27	financi media	0.16	tailor	0.09
invest follow	1.33	traderstop	0.26	secur mention thi	0.16	price valu	0.09
technician	0.73	equiti portfolio	0.24	competitor alreadi	0.16	current hold	0.09
thi articl wrien	0.70	thing chang	0.23	strategi data	0.16	segment also	0.08
firepow analyt	0.69	stock befor	0.23	hedg posit	0.15	hub stock	0.08
research longshort	0.65	investor long onli	0.22	alertstop	0.15	author stock	0.08
futur articl	0.64	represent made	0.22	larg corpor	0.15	world will	0.08
secur mention	0.55	razor	0.22	let take closer	0.14	luckili	0.07
onli special	0.50	pricelin nasdaqpcln	0.21	increas invest	0.14	august	0.07
valu valu special	0.47	disclosur amw short	0.21	higher qualiti	0.14	weigh machin	0.07
follow followingy	0.39	investor view	0.20	reason price longterm	0.13	sell rate	0.07
monei dure	0.38	comment short	0.20	demand product	0.13	ani secur mention	0.07
invest summari	0.37	research invest	0.20	asset return asset	0.11	qineqt	0.06
financi properti casualti	0.35	thi alon	0.20	believ look	0.11	captur oct	0.06
trader summari	0.33	bank unit state	0.19	next six	0.11	conflict interest	0.06
invest tech	0.33	valuat current	0.19	kraken	0.11	idea fund	0.06
investor summari	0.31	recap	0.19	pai premium	0.11	share yield	0.06
start point	0.30	technolog	0.19	consensu estim	0.10	financi servic	0.06
now good	0.30	trade rang	0.18	bid etc	0.10	doctorx	0.06
global economi	0.30	idea longshort	0.18	contact full	0.10	invest advisor thi	0.06
messagescout	0.29	follow two	0.18	thi articl inform	0.10	certain point	0.06
analyst longshort	0.28	valu investor	0.17	bearish view	0.10	takeov analyst	0.06
earn degre	0.28	abov fair	0.17	dividend yield	0.10	uncertain	0.06
market see	0.27	articl wrien	0.17	messag market	0.09	exponenti	0.05

As Table OA1 shows, none of the words and phrases that predict pseudonymous authorship seem particularly provocative or address fraud or similar claims. Rather, they seem to reflect idiosyncratic noise. This evidence suggests that pseudonymous authors manipulate markets by trading on the advance knowledge of a forthcoming article, and not by promulgating provocative content.

OA2. Detecting Identity-Switching with Linguistic Stylometry

If pseudonymous authors switch identities after losing credibility with the market, it might be possible to detect the adoption of a new identity using methods of authorship attribution from the field of linguistic stylometry.² Stylometry is a technique to identify subtle aspects of an author's writing style that appear throughout documents he or she has written. Stylometric methods have been applied for decades to shed light on the authorship of historical and religious texts like the Federalist Papers (Mosteller & Wallace, 1964) and Book of Mormon (Holmes, 1992), as well as forensic applications (Iqbal *et al.*, 2010).

Stylometry bears many similarities to prior applications of the analysis of textual data (Grimmer & Stewart, 2013; Macey & Mitts, 2014; Varian, 2014). The key difference is that stylometric prediction exploits *non-content* features that are intended to capture the author's writing style rather than the subject matter of the document. Typical techniques in textual analysis such as "bag-of-words" features and discarding so-called function words (like "the", "a", etc.) will lead to effective prediction of a document's substantive content — e.g., a similar company or subject matter in another article. However, the goal of a stylometric analysis is to identify authorship *regardless* of the underlying content he or she has produced. That necessitates using a different set of predictors which are unrelated to document content.

Traditionally, stylometric analysis was performed on a small number of documents, with the goal of extracting a tremendous amount of nuanced detail from the author's available writing. The computational demands of the traditional approach are not well-suited to classifying thousands of documents produced online, such as the Seeking Alpha articles in my dataset. Narayanan *et al.* (2012) solve this problem by identifying predictors that can be used for rapid stylometric analysis on a large scale. I adopt the stylometric features identified in Narayanan *et al.* (2012) to predict authorship for the articles in my dataset.³

²Seeking Alpha may employ technology to prevent identity-switching, but it is unclear whether these methods are immune to sophisticated techniques like switching IP addresses or routing over Tor.

³These include the number of characters; Yule's K; the frequency of hapax legomena, dis legomena, and so forth; frequency of words with upper case, all lower case, only first letter upper case, camel case (CamelCase); frequency of words with 1-20 characters; frequency of a-z; frequency of 0-9; frequency of punctuation and other

The empirical design is simple. For each article in my dataset, I compare its stylometric features to those of articles written by “former authors,” i.e., those authors who had published their final article before that date.⁴ Just as before, I infer when an author has published their last article by observing ex post (as of May 2018) what the date of their last article was. The benefit of hindsight should pose no problem: nothing here assumes that market participants were contemporaneously aware of whether a given author would cease to publish.

I compare the stylometric similarity between a given article and this candidate set of articles by calculating the pairwise cosine similarity, defined as follows between article i and k :

$$similarity_{i,k} = \frac{x_i \cdot x_k}{\|x_i\| \|x_k\|}$$

where x_i denotes the stylometric feature vector for article i . I then derive an article-level similarity measure as the average of these pairwise similarities:

$$similarity_i = \frac{1}{N_k} \sum_{k=1}^{N_k} similarity_{i,k}$$

where N_k denotes the number of articles written by former authors as of the publication date of article i . I calculate this measure for every article in my dataset, not only the matched sample, but then just as before, I perform my analysis on the matched sample, regressing $similarity_i$ on an indicator equal to 1 if article i 's author was pseudonymous. Moreover, I examine whether pseudonymous authors hide their identities when first appearing, but eventually revert to their true writing style. I estimate the following specification:

$$similarity_i = \beta_0 + \beta_1 pseudo_j + \beta_2 authorcount_{i,j} + \beta_3 (pseudo_j \times authorcount_{i,j}) + \varepsilon_i$$

where $authorcount_{i,j}$ is the ordinal number of article i for author j , i.e., 1 corresponds to the first article, 2 corresponds to the second article, and so forth. Similarly, I consider specifications where $authorcount_{i,j}$ is replaced by an indicator equal to 1 if $authorcount_{i,j} < 5$ or $authorcount_{i,j} < 10$. The results are presented in Table OA2.

special characters; and frequency of function words.

⁴Clearly, the author of the current article cannot be included because the final date for that author is, by definition, on or after the publication date of the current article.

Table OA2: Stylometric Analysis of Pseudonymous Authorship

This table examines whether pseudonymous attacks are stylometrically more similar to articles written by “former authors.” The term “former authors” is defined as authors who had written their last article before the publication date of the attack, exploiting the benefit of hindsight to determine this date. Column (1) examines this link unconditionally. Column (2) examines whether pseudonymous authors hide their identities when first appearing, but eventually revert to their true writing style, i.e., whether similarity to former authors increases as an author writes more articles. Columns (3) and (4) consider discrete versions of the continuous interaction in Column (2) at the 5th and 10th article, respectively. All regressions are estimated with robust standard errors on the matched sample with treatment-control pairs using OLS regression weights and include year fixed effects. The number of observations is lower than prior tables because the full text of some articles was unavailable on the Internet Archive.

	(1)	(2)	(3)	(4)
Pseudonymous Author	0.0065* (1.67)	-0.0026 (-0.56)	0.0179*** (3.59)	0.0215*** (3.77)
Pseudonymous × Article #		0.0006*** (5.74)		
Pseudonymous × Article # < 5			-0.0218*** (-2.74)	
Pseudonymous × Article # < 10				-0.0213*** (-2.74)
Article #		0.0000 (0.47)		
Article # < 5			-0.0023 (-0.36)	
Article # < 10				-0.0051 (-0.82)
(Intercept)	0.0588*** (7.23)	0.0598*** (7.25)	0.0601*** (7.08)	0.0619*** (6.80)
Observations	2,518	2,518	2,518	2,518

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

As Table OA2 shows, pseudonymous authors are unconditionally more similar to former authors, but this difference is only marginally significant at the 10% level. However, there is a striking heterogeneity: as pseudonymous authors write more articles, they become far more similar to authors who had published their final article.⁵ The specifications with indicators for the author’s 5th or 10th article show that pseudonymous authors are significantly more likely to write in a style similar to former authors after the first few articles.

These stylometric findings should be interpreted with caution, as the sample size underlying these estimates is limited and thus we have limited confidence that the results have not arisen by random chance. Nonetheless, they may shed light on an additional mechanism by which pseudonymous authors persuade the market to view their initial article as non-liar. By

⁵This calculation excludes the current author, so the result is not driven by a mechanical correlation.

adopting a writing style distinct from prior identities, new pseudonymous authors reinforce investors' belief that they are unrelated to prior manipulators. However, after establishing credibility under a new identity, pseudonymous authors no longer find it necessary to write unnaturally. Instead, they may be able to exploit their existing credibility to profitably manipulate markets.

OA3. Legal Implications

One of the challenges with addressing the sort of market manipulation documented here is that pseudonymous attacks are not easily captured by either the anti-manipulation or anti-fraud provisions of the securities laws, as discussed in the following Sections.

OA3.1. Market Manipulation

Section 9 of the 1934 Act prohibits a specific set of manipulative trading practices, such as wash sales and matched orders, which reflect artificial trading activity designed to mislead investors as to the underlying interest in the security.⁶ Section 9(a)(2) also prohibits "effect[ing] . . . a series of transactions in any security . . . creating actual or apparent active trading in such security, or raising or depressing the price of such security, for the purpose of inducing the purchase or sale of such security by others."⁷ Similarly, subpart (c) of Rule 10b-5 provides that it is unlawful "To engage in any act, practice, or course of business which operates or would operate as a fraud or deceit upon any person, in connection with the purchase or sale of any security."⁸ Market manipulation can run afoul of both Section 9(a)(2) and Rule 10b-5(c).

The Supreme Court has defined market manipulation as "intentional or willful conduct designed to deceive or defraud investors by controlling or artificially affecting the price of securities."⁹ Similarly, the Second Circuit has identified the "gravamen of manipulation" as "deception of investors into believing that prices at which they purchase and sell securities are determined by the natural interplay of supply and demand, not rigged by manipulators."¹⁰ Nonetheless, the most challenging question is when trading on the open market is "artificial,"

⁶*See, e.g.*, *Ernst & Ernst v. Hochfelder*, 425 U.S. 185, 205 n.25 (1976); *Edward J. Mawod & Co. v. S. E. C.*, 591 F.2d 588 (10th Cir. 1979)

⁷15 U.S.C. § 78i (1970)

⁸17 CFR § 240.10b-5

⁹*Ernst & Ernst v. Hochfelder*, 425 U.S. 185, 198 (1976).

¹⁰*Gurary v. Winehouse*, 190 F.3d 37, 45 (2d Cir.1999).

absent specific behavior like wash sales or matched orders which are clearly manipulative.¹¹

Lower courts disagree on whether open-market trading can violate Section 9(a).¹² It is clear that a large volume of short sales is not per se manipulative because a short seller's bearish view does not, on its own, "mislead investors by artificially affecting market activity."¹³ In *SEC v. Masri*, the U.S. District Court for the Southern District of New York held that "an investor conducts an open-market transaction with the intent of artificially affecting the price of the security, and not for any legitimate economic reason, it can constitute market manipulation."¹⁴

In circuits that decline to follow *Masri*, it may be harder to establish that pseudonymous attacks violate Section 9(a).¹⁵ And while *Masri* represents an expansive view of market manipulation, plaintiffs must still establish intent to artificially affect the price of the security. This presents an evidentiary challenge. Suppose the SEC were able to identify a single individual who authored the attack, purchased put options immediately prior to publication, and similarly bought call options a day or two after the price decline. Even that sort of well-timed trading exploiting these price changes may be insufficient. The author-trader could argue that he or she opened a position consistent with the view articulated in the article that the firm was overvalued, but upon recognizing that investors had overreacted (i.e., the price had declined too far), purchased the stock at that point to take advantage of its return to its fundamental value. Aggressive options trading accompanying the publication of the article may be insufficient, *absent more*, to establish intent to artificially depress the price of the security.

One way to establish that sort of intent is to show that the options trading was not merely directionally correct but actually had the effect of distorting the price at the time of publication. In the words of the Second Circuit in *ATSI*, "short selling — even in high volumes — is not, by itself, manipulative. . . . To be actionable as a manipulative act, short selling must be willfully combined with something more **to create a false impression of how market**

¹¹The Seventh Circuit has held that plaintiff bringing a claim under Section 9(a) must establish: "(1) a series of transactions in a security created actual or apparent trading in that security or raised or depressed the market price of that security; (2) the transactions were carried out with scienter; (3) the purpose of the transactions was to induce the security's sale or purchase by others; (4) the plaintiffs relied on the transactions; and (5) the transactions affected the plaintiff's purchase or selling price." *AnchorBank, FSB v. Hofer*, 649 F.3d 610, 616-17 (7th Cir. 2011) But these tests do not shed light on what constitutes "artificial" trading.

¹²*Compare, e.g., GFL Advantage Fund, Ltd. v. Colkitt*, 272 F.3d 189 (3d Cir. 2001) to *SEC v. Masri*, 523 F. Supp. 2d 361 (S.D.N.Y. 2007).

¹³*In re Scattered Corp. Sec. Litig.*, 844 F. Supp. 416, 420 (N.D. Ill. 1994) (citing *Santa Fe Indus., Inc. v. Green*, 430 U.S. 462, 476 (1977)).

¹⁴523 F. Supp. 2d at 372.

¹⁵*See, e.g., ScripsAmerica, Inc. v. Ironridge Glob. LLC*, 56 F. Supp. 3d 1121, 1162 (C.D. Cal. 2014) ("[*Masri*] is an out-of-circuit district court case that is not binding on the court.").

participants value a security.”¹⁶ When options trading is so intense and well-timed with the release of an attack article that the trading gives “a false impression of how market participants value a security,” this sort of conduct may constitute market manipulation.¹⁷

Establishing this sort of manipulative intent requires detailed evidence as to the nature of this sort of trading behavior over time, especially in relation to publication of the attack article. Pseudonymity can make it more difficult for enforcement authorities to determine the identity of the author, as they must subpoena account records, trace IP addresses, and link the author to his or her trading activity. Technologies like Tor can make it harder to “connect the dots.” And because the enforcement action will require affirmative evidence of manipulative intent, pseudonymity makes it more likely that regulators will allocate limited resources elsewhere, unless direct evidence of manipulative trading can be brought to bear.

OA3.2. Misstatement Fraud

An alternative basis for holding pseudonymous authors accountable is the general anti-fraud rule under subpart (b) of Rule 10b-5, which prohibits “mak[ing] any untrue statement of a material fact.”¹⁸ To be sure, the procedural hurdles to bringing a misstatement claim are higher. The Second Circuit has held that misrepresentation claims that do not involve manipulative trading may not be brought under subparts (a) or (c) of Rule 10b-5, and are thus subject to the heightened pleading requirements of the Private Securities Litigation Reform Act (the “PSLRA”).¹⁹ The PSLRA mandates that plaintiffs bringing an action for misstatement fraud under subpart (b) of Rule 10b-5 must “specify each statement alleged to have been misleading, the reason or reasons why the statement is misleading, and, if an allegation regarding the statement or omission is made on information and belief, the complaint shall state with particularity all facts on which that belief is formed.”²⁰ While the heightened pleading standard under the PSLRA only applies to private plaintiffs, the SEC must still “stat[e] with particularity

¹⁶ATSI Commc’ns, Inc. v. Shaar Fund, Ltd., 493 F.3d 87, 101 (2d Cir. 2007).

¹⁷See *Sharette v. Credit Suisse Int’l*, 127 F. Supp. 3d 60, 82 (S.D.N.Y. 2015) (“[O]pen-market transactions that are not, in and of themselves, manipulative or illegal, may constitute manipulative activity within the meaning of Section 10(b) when coupled with manipulative intent.”)

¹⁸17 C.F.R. § 240.10b-5(b).

¹⁹*Lentell v. Merrill Lynch & Co., Inc.*, 396 F.3d 161, 177 (2d Cir.2005) (“[W]here the sole basis for such claims is alleged misrepresentations or omissions, plaintiffs have not made out a market manipulation claim under Rule 10b-5(a) and (c), and remain subject to the heightened pleading requirements of the PSLRA.”) (citing *Schnell v. Conesco, Inc.*, 43 F.Supp.2d 438, 447-48 (S.D.N.Y.1999)); accord *In re Alstom SA*, 406 F.Supp.2d 433, 475 (S.D.N.Y.2005) (“[I]t is possible for liability to arise under both subsection (b) and subsections (a) and (c) of Rule 10b-5 out of the same set of facts, where the plaintiffs allege both that the defendants made misrepresentations in violations of Rule 10b-5(b), as well as that the defendants undertook a deceptive scheme or course of conduct that went beyond the misrepresentations.”).

²⁰15 U.S.C. § 78u-4(b)(1).

the circumstances constituting fraud” under Rule 9(b) of the FRCP.

There are two challenges with applying Rule 10b-5(b) to pseudonymous attacks. The first is that authors are often careful to avoid making factual claims directly. Consider SkyTides’ attack on Insulet. The statement that Insulet “allegedly directed employees to bribe physicians” is not a claim that Insulet in fact directed those employees in that manner; rather, it is simply a report of allegations by another. The report refers to a lawsuit filed by one of Insulet’s former employees who alleged that the firm’s CEO instructed him to “bury” any data that would make the firm look bad. SkyTides could argue that merely reporting a claim made by another is not the same as making the claim. And to the extent that a pseudonymous attacker is merely expressing a negative opinion about a firm, it will be difficult for the SEC to establish that such a view was not “sincerely held.”²¹

One possibility, which I have written on elsewhere with my colleague John C. Coffee, Jr., is that “traders who anticipate a market rebound and buy ahead of it (after selling short heavily only a day or two earlier) are conceding that they did not believe their earlier purchases were truly establishing a new price equilibrium. We do not suggest that this reversal in trading supplies irrebuttable evidence of manipulation, but it could be given presumptive weight. One way to justify our position is to look to *Omnicare*, which held that an expression of opinion can contain ‘embedded’ factual assertions, both that the speaker sincerely holds the view stated and did some minimal research. The sudden reversal in position by the trader in the new “V” pattern strongly suggests it never believed in the adverse news or rumors that it cited.”²²

Another possibility is that the pseudonymous attacker lacks a factual basis for the opinions expressed in the piece, such that the attack is “a misstatement of the psychological fact of the speaker’s belief in what he says.”²³ The Court in *Omnicare* referred to this as an “embedded statement[] of fact,”²⁴ that is, by authoring a short attack on a firm, the author is implying that they have some reason to believe in the truthfulness of the underlying claim. The complete absence of any factual basis whatsoever could thus give rise to liability, even if the author’s statement consists solely of opinion.

To be sure, litigants have not been very successful on bringing similar claims under

²¹*Omnicare, Inc. v. Laborers Dist. Council Const. Industry Pension Fund*, 135 S.Ct. 1318 (2015)).

²²John C. Coffee, Jr. & Joshua Mitts, *Short Selling and the New Market Manipulation*, Mar. 3, 2018, <https://clsbluesky.law.columbia.edu/2019/03/18/short-selling-and-the-new-market-manipulation/>

²³*Virginia Bankshares, Inc. v. Sandberg*, 501 U.S. 1083, 1095 (1991). While *Virginia Bankshares* was decided under section 14(a) of the Exchange Act, the *Omnicare* court applied its reasoning to misstatement claims under Section 11 and thus by extension to Rule 10b-5. *Omnicare*, 135 S.Ct. at 1326 n.2.

²⁴*Id.* at 1327. (quoting *Virginia Bankshares*, 501 U.S. at 1109 (Scalia, J., concurring in part and concurring in judgment) (“a statement can sometimes be most fairly read as affirming separately both the fact of the [speaker’s] opinion and the accuracy of the facts given to support or explain it.”)).

defamation law against Seeking Alpha. In *Nanoviricides, Inc. v. Seeking Alpha, Inc.*, the New York Supreme Court for New York County rejected a discovery motion brought against Seeking Alpha to reveal the identity of a pseudonymous author “The Pump Terminator,” concluding that “the alleged defamatory statements identified in the petition constitute protected opinion and are not actionable as a matter of law.”²⁵ That said, the decision in *Nanoviricides* was premised on defamation law, not securities fraud, and the court did not undertake an analysis of embedded facts under *Omnicare*.

The second challenge is that establishing a violation of Rule 10b-5 requires proof that the defendant acted with scienter,²⁶ which in most jurisdictions may be satisfied either by showing an intent to defraud or recklessness.²⁷ As with market manipulation, it will be difficult to prove an affirmative intent to defraud. And rarely will any factual misrepresentation rise to the level required to establish recklessness, i.e., “a danger of misleading buyers or sellers that is either known to the defendant or is so obvious that the actor must have been aware of it.”²⁸

On the one hand, the difficulty with bringing an enforcement action on the basis of pseudonymous online postings was highlighted by the SEC’s 2007 investigation of John Mackey, CEO of Whole Foods.²⁹ From 1999-2007, Mr. Mackey posted positive comments on online forums using a fake pseudonyms, including a reference to a company that Whole Foods was considering acquiring. The SEC ultimately closed its investigation into Mr. Mackey’s postings without commencing an enforcement action.³⁰ While the SEC did not state the reasons for dropping its investigation, and Mr. Mackey’s case implicated Regulation FD because he was a corporate insider, the difficulties highlighted here likely played a role. The mere use of a pseudonym is unlikely to render authentic expressions of opinion (whether positive or negative) subject to misstatement liability under Rule 10b-5, absent a false factual claim or clear deception.

One enforcement action in 2017 — the matter of *Lidingo Holdings* — suggests that the SEC may be willing to take action when such deception can be clearly established. Lidingo Holdings hired writers to publish articles on investment websites like Seeking Alpha under pseudonymous names like “VFC’s Stock House.” These articles sought to portray certain

²⁵ 2014 WL 2930753 (N.Y. Sup. Ct., Jun. 26, 2014.)

²⁶ *Aaron v. SEC*, 446 U.S. 680, 691 (1980)

²⁷ *See, e.g.*, *IIT v. Cornfeld*, 619 F.2d 909, 923 (2d Cir.1980); *S.E.C. v. Platforms Wireless Int’l Corp.*, 617 F.3d 1072, 1093 (9th Cir. 2010).

²⁸ *S.E.C. v. Platforms Wireless Int’l Corp.*, 617 F.3d 1072, 1094 (9th Cir. 2010) (quoting *Hollinger v. Titan Capital Corp.*, 914 F.2d 1564, 1568-69 (9th Cir. 1990)

²⁹ *See, e.g.*, Kara Scannell, SEC Opens Informal Inquiry Of Whole Foods CEO Postings, *Wall St. J.*, Jul. 14, 2007.

³⁰ Stephen Taub, Whole Foods “Blogging Probe Dropped by SEC, CFO.com, Apr. 28, 2008.

publicly traded firms in a positive light — namely, those clients of Lidingo who paid for this sort of stock promotion service. The authors did not disclose that they were being compensated by Lidingo for this purpose, nor did they disclose that Lidingo was compensated by the target firms of the articles seeking promotion of their stock.

The SEC brought suit claiming a violation of Section 17(b) of the Securities Act of 1933, which prohibits describing a security for consideration “without fully disclosing the receipt . . . of such consideration and the amount thereof.” The SEC also alleged a violation of Rule 10b-5 for the misleading disclosure.³¹ The *Lidingo* action shows that when specific factual misstatements or omissions can be established — such as misleading compensation disclosure — the SEC is more willing pursue an anti-fraud enforcement action under Rule 10b-5. But that is a fairly narrow basis on which to impose liability against pseudonymous attackers.

However, the SEC very recently has taken enforcement action under a misstatement theory in the matter of *Ligand Pharmaceuticals*.³² The SEC has alleged that hedge-fund adviser Gregory Lemelson and Lemelson Capital Management sought to manipulate the price of Ligand’s stock by “orchestrating a public campaign” against Ligand consisting of false statements of material facts “intended to shake investor confidence in the company, drive down the price of Ligand’s stock, and consequently, increase the value of Ligand’s short positions.”³³ The Ligand case does not involve allegations of derivatives trading, which may strengthen the inference of manipulative intent, indicating both that the SEC may be taking a more aggressive stance against short-and-distort campaigns as well as suggesting that cases with manipulative options trading may be especially ripe for SEC review.

OA3.3. Intermediary Liability for Manipulative Attacks

While it might be difficult to hold pseudonymous attackers directly accountable, the same cannot be said for intermediaries like Seeking Alpha. Seeking Alpha not only hosts the content of pseudonymous attacks but also holds the keys to fictitious accounts. By requiring that these accounts be password-protected and linked to some external point of contact (e.g., e-mail address), Seeking Alpha keeps pseudonymous accounts from being hijacked by anonymous impersonators, claiming that they “insist on receiving the author’s real name and contact

³¹SEC v. Lidingo, Case 1:17-cv-02540, Apr. 10, 2017, <https://www.sec.gov/litigation/complaints/2017/comp-pr2017-79-a.pdf>

³²SEC v. Lemelson, Case No. 1:18-cv-11926, D. Mass, <https://www.sec.gov/litigation/complaints/2018/comp-pr2018-190.pdf>

³³*Id.*

information (which we keep confidential) and maintain a correspondence with the author.”³⁴ Moreover, Seeking Alpha presumably records the IP address of the pseudonymous poster in its web logs, though that address may be unreliable if the author uses a service like Tor.

As gatekeepers of the link between pseudonymous accounts and underlying authors, intermediaries like Seeking Alpha are well-suited to punish systematic manipulators without chilling pseudonymity itself. One could easily imagine a policy whereby Seeking Alpha prohibits authors from opening new pseudonymous accounts after demonstrating a history of price reversals or options trading in excess of a given threshold. That sort of rule would promote the benefits of pseudonymity while holding authors accountable for price-distorting behavior, even when manipulative intent cannot be directly proven.

Could intermediaries like Seeking Alpha be induced to adopt this sort of policy by existing law? Much of the policy conversation around online intermediaries has focused on Section 230 of the Communications Decency Act, which provides that “[n]o provider or user of an interactive computer service shall be treated as the publisher or speaker of any information provided by another information content provider.”³⁵ This statute immunizes intermediaries from defamation liability, and indeed one court has already rejected a defamation claim against Seeking Alpha on the basis of Section 230.³⁶ It is likely that Section 230 would also foreclose a direct claim of securities fraud or market manipulation against Seeking Alpha, because Seeking Alpha would not be considered the “speaker” of any misstatement.

However, it is less clear that Seeking Alpha would be immune from secondary liability for aiding and abetting the manipulation documented here. In *SEC v. Apuzzo*, the Second Circuit delineated the elements of aiding and abetting liability: “(1) the existence of a securities law violation by the primary (as opposed to the aiding and abetting) party; (2) knowledge of this violation on the part of the aider and abettor; and (3) ‘substantial assistance’ by the aider and abettor in the achievement of the primary violation.”³⁷ The knowledge element was relaxed by the Dodd-Frank Act to encompass recklessness.³⁸ An aiding-and-abetting claim

³⁴https://seekingalpha.com/page/policy_anonymous_contributors

³⁵47 U.S.C. § 230.

³⁶*Nordlicht v. Seeking Alpha, Inc., et al.*, No. 64319/15 (N.Y. Sup. Ct., May 2, 2016).

³⁷689 F.3d 204, 211 (2d. Cir. 2012).

³⁸15 U.S.C. § 78t(e) (“For purposes of any action brought by the Commission under paragraph (1) or (3) of section 78u(d) of this title, any person that knowingly or recklessly provides substantial assistance to another person in violation of a provision of this chapter, or of any rule or regulation issued under this chapter, shall be deemed to be in violation of such provision to the same extent as the person to whom such assistance is provided.”).

may only be brought by the SEC, not a private plaintiff,³⁹ and in the Second Circuit, the SEC need not prove that the aider and abettor proximately caused the primary securities law violation.⁴⁰

Suppose the SEC were able to establish existence of a securities law violation by a pseudonymous author — a nontrivial challenge to be sure, but this burden may be met in some cases. Does Seeking Alpha have knowledge of the manipulation, or at least a mens rea rising to the level of recklessness? It is unclear whether a court will hold Seeking Alpha to have knowledge of stock-price reversals like the ones documented in this article or even that the reversals “were so obvious that [Seeking Alpha] must have been aware.”⁴¹ On the one hand, this information is publicly available, and as this article has shown, it is not difficult to find anecdotal examples of reversals induced by pseudonymous attackers.

On the other hand, it is unclear that a court will effectively require Seeking Alpha to monitor stock prices for the hundreds if not thousands of publicly traded firms that are the subject of both positive and negative articles. It would seem that the technological barriers to this sort of monitoring are low, but legitimate questions might be raised concerning, for example, the degree of statistical confidence that is required to conclude that a given author is engaging in this sort of manipulation. Must Seeking Alpha demonstrate that the price reversal was unlikely to have been caused by random chance at, say, the 5% significance level? Courts might hesitate to rule in such a manner that would effectively impose this sort of affirmative monitoring mandate absent SEC rulemaking or legislative action.

The final question is whether Seeking Alpha provided “substantial assistance” in the achievement of the primary violation. The Second Circuit has defined this term as requiring that the aider-and-abettor “in some sort associate[d] himself with the venture, that he participate[d] in it as in something that he wishe[d] to bring about, [and] that he [sought] by his action to make it succeed.”⁴² It is unclear whether merely publishing manipulative pseudonymous attacks constitutes the provision of substantial assistance. Note, however, that Seeking Alpha also maintains identification information and password protects these accounts, preventing anonymous impersonators from usurping these pseudonyms. This may very well constitute the provision of substantial assistance under *Apuzzo*.

³⁹15 U.S.C. § 78t(e); *Central Bank v. First Interstate Bank*, 511 U.S. 164 (1994).

⁴⁰689 F.3d at 213.

⁴¹*SEC v. Wey*, 246 F.Supp. 3d 894 (2017) (quoting *Novak v. Kasaks*, 216 F.3d 300, 308 (2d Cir. 2000)).

⁴²*Id.* at 206 (quoting *United States v. Peoni*, 100 F.2d 401, 402 (2d Cir.1938)).

OA3.4. SEC Rulemaking and Pseudonymous Attacks

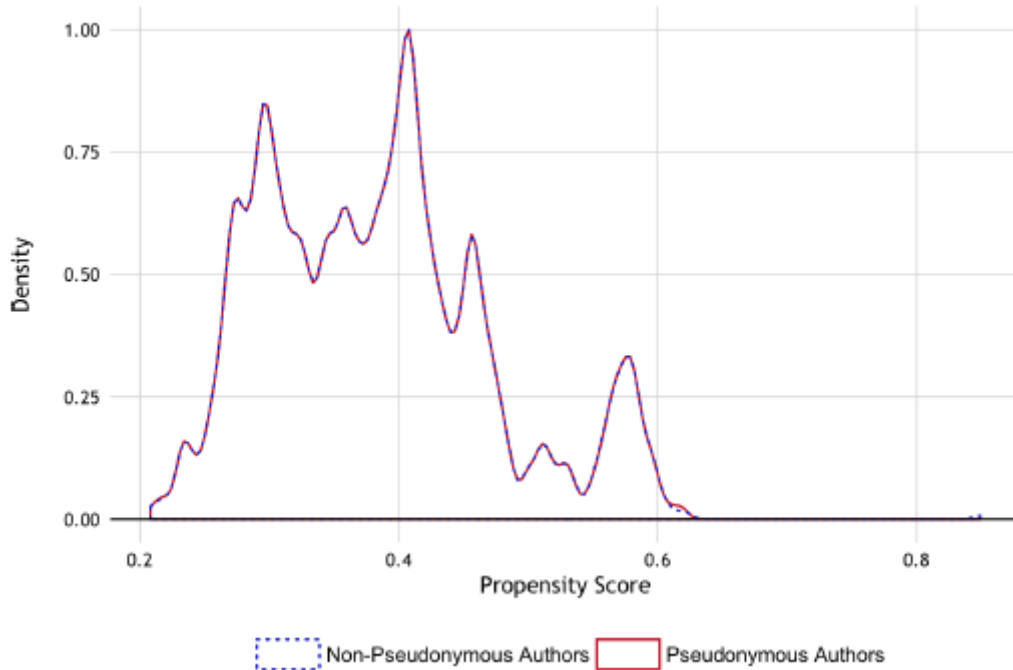
There are two ways that SEC rulemaking could mitigate this sort of short-and-distort without chilling pseudonymous speech more generally. The first is for the SEC to promulgate a safe harbor for intermediaries like Seeking Alpha. This safe harbor would provide that an intermediary which bans authors who have repeatedly published attacks followed by reversals, and engaged in account-switching, would not be liable for the provision of substantial assistance to any underlying violation. Such a safe harbor would not prohibit identity-switching outright but encourage online intermediaries to discipline pseudonymous manipulation.

The second is for the SEC to impose an affirmative duty on online intermediaries like Seeking Alpha to maintain identifying information for pseudonymous accounts. This would ease the burden on enforcement authorities to prosecute these sort of manipulative attacks. Indeed, Seeking Alpha already claims that they “insist on receiving the author’s real name and contact information” which is kept in confidence, and they “maintain a correspondence with the author, forwarding the author any questions or concerns that may emerge about their articles.”⁴³ It is unclear how accurate these records are, so SEC rulemaking here would likely enhance the effectiveness of enforcement investigations against pseudonymous short sellers.

⁴³https://seekingalpha.com/page/policy_anonymous_contributors

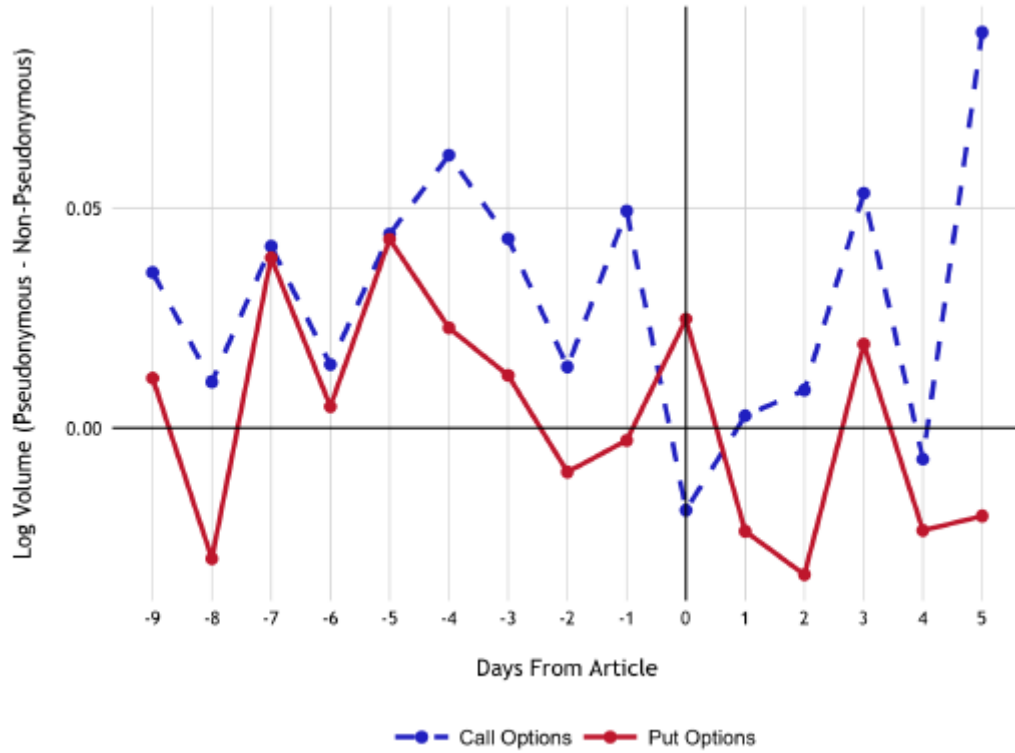
OA4. Additional Figures

Figure OA1. Density of Propensity Score: Pseudonymous vs. Non-Pseudonymous



This figure shows the density of the propensity score for articles written by pseudonymous and non-pseudonymous authors. As the figure shows, the two groups are almost exactly balanced on the propensity score, consistent with the variable-by-variable balance tests in Table 3.

Figure OA2. Log Volume (Pseudonymous - Non-Pseudonymous Difference)



This figure plots, on the y-axis, the average difference in log volume between pseudonymous and non-pseudonymous articles, and on the x-axis, the day relative to the date of publication. The blue dashed line plots the average pseudonymous vs. non-pseudonymous difference in open interest for call options and the red solid line plots the average pseudonymous vs. non-pseudonymous difference in volume for put options. Both are the residuals from a fixed effect specification, i.e., after subtracting the average pseudonymous vs. non-pseudonymous difference in log volume for calls and puts written on each firm-article in the interval $[t_0 - 9, t_0 + 5]$.

OA5. Additional Tables

Table OA3. Pseudonymous and Non-Pseudonymous Authors

This table presents selected examples of pseudonymous and non-pseudonymous authors in my estimation dataset.

Pseudonymous Authors	Non-Pseudonymous Authors
Midnight Trader	Kevin Quon
Bargain Bin	Cliff Wachtel
Alpha Generator	Citron Research
Follow The Data	Josh Young
Tweakerlabs	Gary Weiss
AlchemyOfFinance	Akshay Kaul
Disruptive Investor	Philip Davis
Vatalyst	David Urban
Efficient Alpha	Larry MacDonald
BumbleBayGoombeeFluor	Joseph Bohm

Table OA4. Stock Price Reversals: Simple Returns

This table examines whether pseudonymous articles are followed by greater stock-price reversals than non-pseudonymous articles by examining four different specifications. The specifications are identical to Table 4 but use simple daily returns rather than log returns. All regressions employ propensity-score matching with treatment-control pairs as OLS regression weights and robust standard errors.

	car_{i,j,t_0+2,t_0+5}	car_{i,j,t_0+2,t_0+5}	$rev_{i,j,t}$	$rev_{i,j,t} > 0$	$rev_{i,j,t} > 0.02$
Pseudonymous ×	-0.1114**	-0.2348***			
car_{i,t_0-1,t_0+1}	(-2.31)	(-2.82)			
Pseudonymous Author	0.0059*** (2.95)	-0.0008 (-0.23)	0.0085*** (2.82)	0.0465** (2.28)	0.0436** (2.26)
car_{i,t_0-1,t_0+1}	0.1007*** (2.83)	0.1279** (2.49)			
(Intercept)	-0.0014 (-0.86)	0.0020 (0.80)	0.0020 (0.82)	0.5047*** (30.50)	0.3244*** (21.05)
Observations	2,899	1,523	2,899	2,900	2,900

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

References

- GRIMMER, JUSTIN, & STEWART, BRANDON M. 2013. Text as data: The promise and pitfalls of automatic content analysis methods for political texts. *Political analysis*, **21**(3), 267–297.
- HOLMES, DAVID I. 1992. A stylometric analysis of Mormon scripture and related texts. *Journal of the Royal Statistical Society. Series A (Statistics in Society)*, 91–120.
- IQBAL, FARKHUND, BINSALLEEH, HAMAD, FUNG, BENJAMIN CM, & DEBBABI, MOURAD. 2010. Mining writeprints from anonymous e-mails for forensic investigation. *digital investigation*, **7**(1-2), 56–64.
- MACEY, JONATHAN, & MITTS, JOSHUA. 2014. Finding order in the morass: The three real justifications for piercing the corporate veil. *Cornell L. Rev.*, **100**, 99.
- MOSTELLER, FREDERICK, & WALLACE, DAVID. 1964. Inference and disputed authorship: The Federalist.
- NARAYANAN, ARVIND, PASKOV, HRISTO, GONG, NEIL ZHENQIANG, BETHENCOURT, JOHN, STEFANOV, EMIL, SHIN, EUI CHUL RICHARD, & SONG, DAWN. 2012. On the feasibility of internet-scale author identification. *Pages 300–314 of: Security and Privacy (SP), 2012 IEEE Symposium on*. IEEE.
- VARIAN, HAL R. 2014. Big data: New tricks for econometrics. *Journal of Economic Perspectives*, **28**(2), 3–28.
- ZOU, HUI, & HASTIE, TREVOR. 2005. Regularization and variable selection via the elastic net. *Journal of the Royal Statistical Society: Series B (Statistical Methodology)*, **67**(2), 301–320.