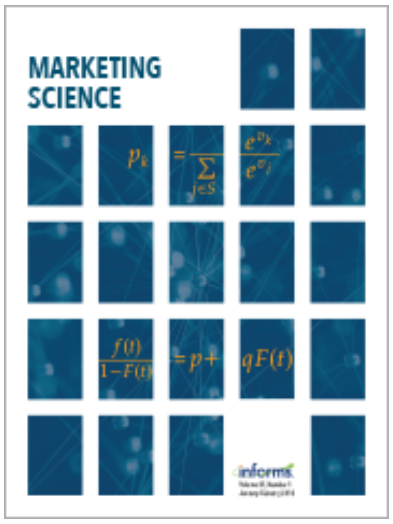

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Stock Market Response to Regulatory Reports of Deceptive Advertising: The Moderating Effect of Omission Bias and Firm Reputation

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Whereas a growing body of research has examined the consumer-related implications of deceptive advertising, the stock market consequences stemming from the regulatory exposure of such infractions remain largely unexplored. In a step to address this gap, the current research examines the effect of regulatory reports of misleading ads on firm stock prices. Results from an event study, focusing on the pharmaceutical industry as the empirical context, show an average abnormal return of −0.91% associated with regulatory reports of deceptive advertising. Analysis of the abnormal returns, however, reveals that the stock market response to these reports is shaped by omission bias, in that investors penalize commission violations more than omission violations. Furthermore, firm reputation is found to moderate the penalty for commission violations. In addition, two experiments examine the effect of such violations on investor beliefs. The first helps elucidate the process mechanism underlying the observed stock market effects and the second provides insights regarding the reputation-omission bias interaction for firms committing repeat violations. Overall, our findings provide important theoretical, managerial, and public policy implications regarding the role of financial markets in regulating deceptive ad practices.

Key words: deceptive advertising; omission bias; firm reputation; event study; experiment; pharmaceutical industry
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Introduction

According to the Federal Trade Commission (FTC), the number of deceptive ad claims made by firms has increased substantially in recent years (FTC 2009b). This is corroborated by the Better Business Bureau, which reports an increasing number of advertisements as misleading in its press releases each year (Darke et al. 2008). Prior research in the area of deceptive advertising has focused primarily on the consumer-related implications of such advertising, concentrating on how deceptive ads increase consumer skepticism for ad claims and brands (e.g., Darke and Ritchie 2007) and the consumer welfare implications of deceptive promotions (e.g., Gerstner and Hess 1990, Wilkie et al. 1998). However, to the best of our knowledge, no research to date has empirically examined the topic of deceptive advertising from an investor perspective, with an emphasis on financial market response to such behavior. This has important implications for both marketing practitioners and scholars in light of the recent interest in linking marketing actions to specific financial outcomes (Luo 2009, Rust et al. 2004). This is also an important topic given the increasing prevalence of deceptive ad practices and the recent theoretical debate over whether financial markets can be expected to discourage such behavior (Glaeser and Ujhelyi 2006, Shugan 2006).

The extant literature provides two broad theoretical perspectives on the efficacy of financial market

response to deceptive ad practices (Shugan 2006). The first perspective maintains that financial markets are not sensitive (e.g., as reflected by a decrease in stock price) to firm deceptive ad practices or firms would not spend so much on misinformation each year (Glaeser and Ujhelyi 2006). The second perspective maintains the opposite—that is, that markets are concerned and therefore punish firms for such actions (Bergen et al. 1996). Those who subscribe to the former view argue for heavier regulatory penalties of deceptive ads, whereas those who subscribe to the latter view argue for lighter regulatory penalties of such ads (Shugan 2006).

A fundamental question that arises, therefore, is whether investors impose significant financial punishment to firms that engage in deceptive advertising. In the current research, we attempt to answer this question by evaluating the abnormal stock returns, if any, associated with the public admonishment of firms for deceptive advertising by a regulatory agency. While focusing on the financial impact of regulatory exposure of deceptive advertising in general, we also recognize that firms may engage in different types of ad violations. Extant research reveals that consumer reactions to misleading ads are often contingent on the type of deception embodied in the ads (e.g., Johar 1995, Kopalle and Lehmann 2006). Thus, we examine investor reactions to two common types of ad violations: commission violations (e.g., misrepresenting required information) and omission violations (e.g., omitting required information). Furthermore, because evidence suggests that firm reputation serves as an important market signal (Chu and Chu 1994, Darke et al. 2008, Fombrun and Shanley 1990, Keller and Lehman 2006, Ofek and Sarvary 2003), we also explore the extent to which firm reputation moderates the financial consequences of these violation types. This offers firms and public policy officials the potential to better understand the financial impact of specific types of deceptive advertising and, hence, the ability to tailor their marketing actions and regulatory requirements and penalties accordingly.

In summary, we seek to answer the following questions: First, what is the financial market's reaction (i.e., the abnormal returns) to violative advertising? In particular, does the market encourage or penalize such activities? Second, how is this reaction shaped by (a) the type of advertising violation (omission versus commission) and (b) firm reputation? Finally, what is the explanation among investors for the pattern of effects?

To examine these issues, we focus on advertising violations in the pharmaceutical industry as our empirical context. When advertising violates Federal Drug Administration (FDA) guidelines, the FDA's Division of Drug Marketing, Advertising, and Communications (DDMAC) issues a letter to the errant firm, the content of which is made public. We utilize event study methodology (Brown and Warner 1985) to assess investors' reaction to these letters. Our hypotheses regarding the impact of advertising violation type and firm reputation are tested through an analysis of the abnormal returns. We then conduct two experiments: one with MBA students to provide process-level support for our arguments and a second that examines the effect of repeat violations. Although situated in the pharmaceutical sector, our findings may be relevant to any industry overseen by a federal agency which issues public pronouncements regarding firms' deceptive advertising practices (e.g., Federal Deposit Insurance Corporation 2008, FTC 2009a).

Our study offers multiple contributions. First, we find a significant stock market penalty associated with regulatory reports of firm advertising deception. This evidence helps to resolve the debate in the literature over financial market response to these practices, informing firms and public policy officials about the costs of such infractions. This finding may ease concerns that the current regulatory exposure mechanisms are ineffective and do not discourage deceptive ads (Government Accountability Office (GAO) 2006, Singer 2009). Second, we find that the magnitude of the stock market response is mitigated by omission bias and firm reputation. This provides important guidance about the limits of the market's ability to constrain specific types of deceptive advertising behavior. Finally, we provide evidence for the process mechanism underlying these effects. This offers new insight about how investors think about different types of advertising violations and when firm reputation is most likely to influence such thinking. In the next section, we present our theoretical framework, followed by the event study and two experiments. We close with concluding remarks that highlight the theoretical and practical implications of the research.

Conceptual Framework

The Advertising Violation's Impact on Abnormal Returns

From a general perspective, the efficient market hypothesis suggests that when unanticipated firm-related information becomes available, investors account for its impact on future firm cash flows by adjusting the firm's stock price accordingly (Fama 1970). Thus, according to theory on the marketing-finance interface, marketing activities that affect a firm's key stakeholders (i.e., consumers, regulators, investors, etc.) in ways that affect its prospective cash flows and actions that impact the efficiency of its marketing expenditures and resource deployments should affect the firm's stock price (e.g., Gruca and Rego 2005, McAlister et al. 2007, Rao and Bharadwaj 2008, Rust

et al. 2004, Srivastava et al. 1998). Ad violations are publicly exposed by regulatory agencies such as the FDA and the FTC, and these reports often receive substantial media coverage (Darke et al. 2008), increasing the likelihood that investors will become aware of a firm's advertising deception. It is important to note that there are two primary reasons to expect investors to account for such information.

First, firm social performance is thought to influence key stakeholders of the firm (i.e., consumers, regulators, and investors) (Godfrey 2005) and thus may affect the level and timing of the firm's prospective cash flows (Gupta and Zeithaml 2006, Luo and Bhattacharya 2009). Reports of ad deception may lower consumers' value perceptions of the firm's products and may increase consumers' negative voice toward the firm (Darke et al. 2008, Darke and Ritchie 2007), affecting the firm's future revenues (Bhattacharya and Sen 2003). In addition, the loss of "moral capital" or goodwill associated with ad deception may heighten the scrutiny the firm receives from regulators in advertising and other contexts (Bansal and Clelland 2004). Finally, investors are attuned to a firm's social performance (Luo and Bhattacharya 2006, Luo 2009) and react strongly to firm marketing activities that dilute the quality of the firm's associations (Aaker and Jacobson 2001, Lane and Jacobson 1995). There are thus strong reasons to expect reports of advertising violations to be associated with a deterioration in the violative firm's stock price.

Second, recent attention in the marketing literature has focused on how firm cash flows (and thus firm value) can be affected by the efficiency of the firm's marketing investments and resource deployments (Luo and Donthu 2006, Morgan and Rego 2009). Reports of deceptive advertising can be expected to diminish both firm credibility (Darke and Ritchie 2007) and ad credibility (Pollay 1986), and because both firm and ad credibility play an important role in shaping consumer response to ads (e.g., Mehta et al. 2008), this should have a commensurate impact on the efficiency of the firm's future marketing communications (e.g., Agrawal 1996, Slotegraaf and Pauwels 2008). Furthermore, regulators may require a firm to engage in corrective advertising following violative ads (Singer 2009). In addition to the direct costs of the corrective ads, such ads often accentuate consumer mistrust of the violative firm (Darke et al. 2008), which can therefore constrain the communication of more positive messages from the firm in the future (Mizik and Jacobson 2004, Van Heerde et al. 2007). Because reports of deceptive advertising are likely to hamper a firm's marketing productivity and impede the firm's marketing leverage, this serves as another reason why investors would adjust the stock prices of the errant firms downward after regulatory exposure of advertising deception. Stated formally,

Hypothesis 1 (H1). *Regulatory reports of deceptive advertising violations will be associated with a negative abnormal return.*

The Effect of Advertising Violation Type on Abnormal Returns

Thus far we have focused on investor reactions to regulatory exposure of ad violations by firms in general. We now focus on how stock market participants evaluate two common types of ad violations: commission violations and omission violations.

Because skepticism of ad claims and firm motives has been found to be high (Campbell 1995), investors should view ads that fail to mention required information (i.e., an omission-based violation) and ads that misrepresent required information (i.e., a commission-based violation) as equally likely to be intentional misrepresentations by firms for tactical reasons. However, will they perceive both types of violations to be equally egregious? To answer this, we must first consider key differences in how acts of omission and commission are perceived.

Acts of omission are perceived to be more routine or normal and to occur more frequently than acts of commission (Prentice and Koehler 2003, Spranca et al. 1991). A normal act is considered to be the typical behavior or norm of conduct for most people in a given domain (Schaeffer 1938). Thus, investors are likely to view omission-based ad violations as more commonplace and, hence, as more of an industry-wide issue than commission-based ad violations. On the other hand, research has shown that acts of commission are perceived to be more abnormal and to occur less frequently than acts of omission (Prentice and Koehler 2003, Spranca et al. 1991). An abnormal act is considered to be atypical and against the norm of conduct (Schaeffer 1938). Thus, investors are likely to view commission-based ad violations as less commonplace and, hence, as more of a firm-specific problem than omission-based violations. This perception should result in a greater reduction in firm stock price for a commission-based (versus omission-based) ad violation. Therefore,

Hypothesis 2 (H2). *The negative abnormal return associated with regulatory reports of advertising violations will be greater for commission-based advertising violations than for omission-based advertising violations.*

The Moderating Effect of Firm Reputation on the Advertising Violation's Abnormal Return

As investors are likely to view omission-based ad violations as more of an industry-wide issue, firm reputation should be less likely to influence how investors assign blame for omission-based ad violations. This expectation is supported by research that suggests that only relevant information considered to

be integral to a particular situation is utilized when making an evaluation (e.g., Beach et al. 1978, Mishra et al. 1993). For example, brand-related information is discounted when it is perceived to be irrelevant or nondiagnostic (Markman and Medin 1995).

In contrast, investors, in general, are more likely to view commission-based (versus omission-based) ad violations as a firm-specific problem. However, this should be contingent on firm reputation, as research has shown that the assignment of blame and negative reaction to firm behavior is mitigated for high-equity (versus low-equity) brands (Dawar and Pillutla 2000). Hence, high-reputation firms should enjoy a buffer in comparison to low-reputation firms when investors are leaning toward assigning blame for the ad violation to the firm (e.g., firm-specific problem versus industry-wide issue) as should be the case for commission-based ad violations.

Therefore, firm reputation should mitigate the penalty for commission-based ad violations but should not affect the reaction to omission-based ad violations. Hence, there should be a greater reduction in the stock price of a low-reputation (versus high-reputation) firm for a commission-based (versus omission-based) ad violation. Specifically,

Hypothesis 3 (H3A). *The magnitude of the abnormal returns associated with commission-based advertising violations will be attenuated by firm reputation.*

Hypothesis 3 (H3B). *The magnitude of the abnormal returns associated with omission-based advertising violations will not be affected by firm reputation.*

Method

This section provides our logic for the event study method as well as an overview of each of the steps in our analytical procedure.

Event Study Overview

The event study methodology has long been used by marketing scholars to quantify the economic returns associated with various firm marketing actions (e.g., Horsky and Swyngedouw 1987, Sood and Tellis 2009), and detailed descriptions of this technique can be found in the literature (e.g., Tellis and Johnson 2007). Like others in the literature, we utilize the event study methodology to assess the event's economic impact because it is extremely difficult to control for all of the other concomitant factors influencing accounting-based measures of firm financial performance (Geyskens et al. 2002). Given the conventional view that markets move quickly to fully and completely impound the profit performance implications into security prices at the event (Fama 1970), we focus primarily on the short-horizon abnormal returns at the event in our analysis. However, as a robustness check, we also check for evidence of mispricing, or anomalies in investors' reaction at the event, that might occur if investors underreact or underappreciate such information and its long-run profit implications (e.g., Fornell et al. 2009). Evidence for such anomalies in investors' response can be found through the event's long-horizon abnormal returns (Jacobson and Mizik 2009, Kimbrough and McAlister 2009).

Analytical Procedure

After detailing our data and our models, the analysis proceeds in four parts. First, we present the results of the short-horizon event study, which documents the negative abnormal returns associated with regulatory reports of deceptive advertising practices. Second, we present the results from the long-horizon event study analysis, which supports the notion that the investor reaction at the event is full and complete (i.e., there is no mispricing). Third, we test our hypotheses regarding the ability of firm reputation and violation type to affect investors' reaction to the advertising violation through an analysis of the short-horizon abnormal returns. Fourth, we report an experiment with MBA students to provide process-level support for our arguments in H2 and H3, followed by a second experiment that looks at the effect of repeat violations. Throughout, we conduct additional analyses to check the robustness of our findings.

Data

This section provides details on the event, our sample, and measures for the independent variables and the controls.

Description of the Event

Pharmaceutical promotional materials must include a summary of the drug's indication and any effectiveness claims must be balanced by adequate warnings, including the drug's major side effects (GAO 2006). When pharmaceutical drug advertising violates these requirements, DDMAC issues a letter to the firm detailing the violation. Since 1997, DDMAC has publicly posted its regulatory letters on its website (available at http://www.fda.gov/cder/warn/). This posting provides the first public indication of firms' FDA ad violations, and newspapers frequently report on these FDA letters, making this information widely available to investors. Other government agencies also issue such public reports of firms' deceptive advertising practices (e.g., FTC 2009a); however, we limit our examination to the pharmaceutical industry and the FDA's regulatory letters because focusing on a single industry in our empirical analysis allows us to mine industry-specific sources and therefore account for many of the idiosyncratic factors between events that may influence investor reactions.

Sample

Our event is the posting of the FDA's regulatory letter and our sample includes the brand violation letters posted through 2008. To avoid biased estimates of the expected returns (Strong 1992), events where the estimation period was contaminated by an earlier letter sent to the firm were not included. Furthermore, we used a Factiva database search to identify events where other material information was also present. Events found to have contaminating information pertaining to earnings announcements, mergers and acquisitions, spin-offs, stock splits, changes in key executives, joint ventures, stock buybacks, unexpected changes in the dividend, new drug approvals, or new drug application rejections within the two-trading-day window surrounding the release of the letter were removed from the sample. Eliminating these 47 contaminated events, we were left with 174 announcements of FDA advertising violations for 79 firms.[1]

Independent Variables

This section explains the measures for violation type and reputation.

Violation Type. A content analysis of the FDA's letters revealed nine different violations. Definitions for the violations were developed based on the content analysis and by utilizing the statutory requirements governing prescription drug advertising (21 CFR 200.1, 21 CFR 202.1) (see Table 1 for definitions and sample text from the letters). Two independent coders recorded the violations mentioned in the letters using a binary coding scheme (agreement > 80%), and discrepant codings were resolved through discussion. To distinguish the violations as *omission*- or *commission*-based, they were sorted by five professors and five graduate students (results were consistent across sorters). Five violations were classified as omission-based because they involved omitting required information. The other four violations were classified as commission-based because they involved misrepresenting required information. The number of omission and commission violations contained in each letter was included in the model.

Further confirmation of the omission–commission distinction was provided by the results of a rating task with 38 undergraduate students. To confirm that the ad violations did not differ in terms of seriousness, we collected additional data from MBA and law students regarding perceived seriousness from both a consumer and legal perspective. Details on our procedure, data, and results for this rating task and the seriousness confound checks are available in Web Appendix 1 (see the electronic companion to this paper, available as part of the online version that can be found at http://mktsci.pubs.informs.org). Results showed no differences in perceived seriousness across violation type.

Firm Reputation. Firm reputation was measured using *Fortune*'s list of most admired companies (Fombrun and Shanley 1990). In addition, firm global reputation rank was modeled as a binary variable following the procedure outlined by Houston and Johnson (2000).

Control Variables

We actively accounted for the violation-, product-, and firm-level factors that might also influence how key audiences, and hence investors, may react to a violation letter. Table 2 provides definitions and sources for these variables and the logic for their inclusion, following the arguments in H1. Descriptive statistics and correlations for the data used in this study, as well as additional context for the selection of the control variables, are presented in Web Appendix 2 (see the electronic companion).

Analysis

Model: Derivation of Short-Horizon Abnormal Returns

Because of developments in the asset pricing literature, recent approaches have incorporated the other known determinants of returns (i.e., size, book-to-market, and momentum) into the standard market portfolio benchmark model. This provides a more complete model for expected security returns (e.g., Kothari and Warner 2007, Sood and Tellis 2009, Srinivasan and Hanssens 2009). Therefore, we generate the abnormal, or excess, return for the stock i on day t, (AR_{it}), as the difference between the stock's actual return (R_{it}) and the expected return based on general market movement and the Fama-French (1993) and momentum (Carhart 1997) factors:

$$AR_{it} = R_{it} - (\hat{\alpha}_i + \hat{\beta}_i R_{mt} + \hat{s}_i SMB_t + \hat{h}_i HML_t + \hat{u}_i UMD_t), \quad (1)$$

where $\hat{\alpha}_i$, $\hat{\beta}_i$, $\hat{s}_i$, $\hat{h}_i$, and $\hat{u}_i$ are ordinary least squares estimates of the factors used in the model. We follow the standard Fama-French four-factor (FF4) methodology and additional details on this, our estimation parameters and the construction of cumulative abnormal returns (CAR_{it}) are provided in Web Appendix 3 (see the electronic companion). When

[1] The pattern of event contamination does not suggest that there is a strategic effort on the part of firms to mitigate or manage these FDA announcements. Most of the event contamination was the result of regulatory announcements (e.g., FDA drug approval or rejection) or due to previously scheduled firm announcements (e.g., quarterly earnings reports). The data largely suggest that the excluded events seem to be contaminated at random.

Table 1 FDA Advertising Violations, Grouped by Type of Violation

Violation	Definition	Example
Omission violations		
Lack of fair balance	When the firm fails to disclose required safety or risk information in a manner comparable to the presentation of efficacy information	• "The advertisement includes claims for Levothroid, but fails to provide any information regarding side effects and contraindications. Therefore, the advertisement lacks fair balance" (12/27/2000 letter to Forest Labs, p. 1)
Failure of adequate provision	When the firm does not adequately disseminate the approved product labeling in connection with a broadcast advertisement	• "In the absence of the brief summary, the advertisement fails to make adequate provision for disseminating the approved product labeling" (2/2/2000 letter to Pfizer, p. 1)
Inadequate communication of the indication	When the firm omits the indication for use or when the firm does not present the indication with sufficient prominence	• "The TV ads omit the indication for the drug (namely, the treatment of erectile dysfunction)" (11/10/2004 letter to Pfizer, p. 2)
Omission of material information	When the firm fails to present pertinent facts relating to the use of the product in the advertisement	• "[The ad] omits material facts in light of the representations made about Caverject. Specifically, the fact that Caverject is a prescription medication that must be injected via a needle…" (11/25/1998 letter to Pharmacia & Upjohn, p. 1)
Failure to submit a postmarketing report	When the firm fails to submit the advertisement to the FDA at the time of its first use	• "The DHCP letter was not submitted to FDA on Form 2253 at the time of initial dissemination, as required by the post-marketing reporting requirements" (4/19/2004 letter to Janssen, p. 4)
Commission violations		
Promotion of unapproved uses	When the firm indicates or implies that the product is useful in new conditions or patients not included on the product's approved label	• "These claims imply that Pravachol has been approved to decrease the risk of cardiovascular (CV) events and 'deliver powerful CV protection' to 'patients with diabetes and borderline-high LDL-C'. Pravachol has not been approved for CV risk reduction in patients with diabetes" (8/7/2003 letter to Bristol-Myers, p. 5)
Promotion of unapproved doses	When the firm suggests a dosing regimen that is not included on the product's approved label	• "The dosage regimen being promoted is more frequent than that recommended in the Xopenex approved product labeling" (3/23/2000 letter to Sepracor, p. 2)
Overstatement of benefits	When the firm suggests that the product is safer or more effective than has been demonstrated by available evidence	• "The visual aid suggests claims that are not supported by substantial evidence, thereby overstating the efficacy of Cedax" (8/22/2002 letter to Biovail, p. 1)
Reminder ad	When the firm's reminder advertisement makes a suggestion or indication about the product's use	• "Your advertisement is misleading because the audio statement, 'Celebrate, Celebrate. Do what you like to do,' makes a representation or suggestion about the efficacy of Celebrex" (11/14/2000 letter to G. D. Searle, p. 1)

events share common dates, cross-sectional dependence in the returns may bias the standard deviation estimates downward (MacKinlay 1997), inflating the associated test statistics. We correct for this bias using the Jaffe (1974) portfolio method.

Model: Analysis of the Short-Horizon Abnormal Returns

Because the advertising violation events are nested within 79 firms, individual observations in our sample may not be completely independent. When these dependencies are ignored, as in ordinary least squares regression (OLS), the parameter estimates are not efficient, leading to incorrect test statistics. We account for the nested data structure using a variance components model.

Thus, we use the following model to test the relationship between our hypotheses and the short-horizon (cumulative) abnormal returns (CAR_{ij}):

$$\begin{aligned} Y_{ij} &= CAR_{ij} \\ &= \gamma_{00} + \beta_1 N\_OM_{ij} + \beta_2 N\_COM_{ij} \\ &\quad + \beta_3 REPUT_{ij} + \beta_4 REPUT_{ij} * N\_COM_{ij} \\ &\quad + \beta_5 REPUT_{ij} * N\_OM_{ij} + \beta_6 TITLED_{ij} \end{aligned}$$

Table 2 Variable Operationalization

Variable description	Variable symbol	Rationale for inclusion/ Why this may impact the abnormal return	Definition/source
Violation characteristics			
No. of omission violations in letter	*N_OM*	Affects whether violation is viewed as an industry-wide issue vs. firm-specific problem.	Number of commission violations in the letter, as identified by independent coders.
No. of commission violations in letter	*N_COM*	Affects whether violation is viewed as an industry-wide issue or firm-specific problem.	Number of omission violations in the letter, as identified by independent coders.
Titled letter	*TITLED*	May affect the level of regulatory scrutiny; may produce costs (corrective ads).	Binary variable equal to 1 if letter was a titled letter.
Directed at consumers (patients)	*CONS*	May affect the level of customer reaction (physicians, patient) and regulatory scrutiny.	Binary variable equal to 1 if the firm was cited for violations in its consumer (patient) advertising.
Democratic administration	*DEM*	May affect the level of regulatory scrutiny.	Binary variable equal to 1 if violation was posted before January 20, 2001.
Repeat (vs. initial) violation	*REPEAT*	May affect whether violation is viewed as an industry-wide issue or firm-related problem.	Binary variable equal to 0 if first violation and equal to 1 for each successive violation.
Whether the firm was fined	*FINE*	May affect future regulatory scrutiny; investors may anticipate costs of fine.	Binary variable equal to 1 if the firm paid a fine because of the violations in the letter, as identified by a Factiva search.
Product characteristics			
Product age (years on market)	*AGE*	May affect the magnitude of customer response to the report of the violation.	The time difference between the violation posting date and FDA approval date.
Long-term maintenance therapy	*LTMTN*	May affect the level of customer response (switching) to the report of the violation.	Binary variable equal to 1 if product is indicated for long-term therapy, according to the drug's indication.
Undifferentiated product	*UNDIFF*	May affect the level of customer switching.	Drug approved under standard review (Sorescu et al. 2003).
Product is a strategic focus of firm	*STFOCUS*	May affect the level of customer and regulatory salience; such products may disproportionately claim firm resources.	Binary variable equal to 1 if product was mentioned in the CEO's letter to shareholders in the annual report (D'Aveni and MacMillan 1990).
Disease severity: HIV treatment	*HIV*	Disease severity may affect the magnitude of customer and regulatory response to the violation. Controlled for these two because the FDA has separate mechanisms to expedite these treatments to market (Friedman 1997).	Binary variable if the drug is a treatment for HIV, as identified from the drug's indication.
Disease severity: Cancer treatment	*CANCER*		Binary variable if the drug is a cancer treatment, as identified from the drug's indication.
Firm characteristics			
Firm reputation	*REPUT*	Compensatory firm resource.	Global reputation rank according to *Fortune*, modeled as a binary variable (Houston and Johnson 2000).
Firm size (ln of market value)	*SIZE*	Compensatory firm resource.	Stock price × shares outstanding from CRSP.
No. of products on market	*N_PROD*	Compensatory firm resource.	Identified from annual reports.

$$+\beta_7 CONS_{ij}+\beta_8 DEM_{ij}+\beta_9 REPEAT_{ij}+\beta_{10} FINE_{ij}$$
$$+\beta_{11} AGE_{ij}+\beta_{12} LTMTN_{ij}+\beta_{13} UNDIFF_{ij}$$
$$+\beta_{14} STFOCUS_{ij}+\beta_{15} HIV_{ij}+\beta_{16} CANCER_{ij}$$
$$+\beta_{17} SIZE_{ij}+\beta_{18} N\_PROD_{ij}+\mu_{0j}+\varepsilon_{ij}, \quad (2)$$

where γ_{00} is the grand mean, μ_{0j} is the random firm-level effect, ε_{ij} is the random error term associated with the ith event of the jth firm, $\mu_{0j} \sim N(0, \tau_{00})$, $\varepsilon_{ij} \sim N(0, \sigma^2)$, and the independent and control variables are as previously defined (Table 2 includes the symbols used for each variable).

Model: Derivation of Long-Horizon Abnormal Returns

Long-horizon abnormal returns associated with an event, if present, provide evidence for investor mispricing, indicating that investors do not fully and completely impound the effects of the event in a timely manner. Given the robust debate over the appropriateness of the calendar-time portfolio

method versus buy-and-hold returns (see Kothari and Warner 2007), we follow recent finance practice and generate the long-horizon abnormal returns using both approaches (Savor and Lu 2009). We now discuss these two methods.

Calendar-Time Portfolio Method. This method, also known as the Jensen's alpha approach (e.g., Sorescu et al. 2007), constructs portfolios of firms experiencing the event in the previous T months (e.g., a year), which are rebalanced monthly to add firms experiencing an event and to drop all firms reaching the end of their one-year period. Abnormal performance over the T postevent months is assessed by the significance of the estimated intercept, or alpha, of these monthly portfolio returns in a multifactor regression incorporating the Fama-French (1993) and momentum factors (Carhart 1997):

$$R_{pt} - R_{ft} = a_p + b_p(R_{mt} - R_{ft}) + s_p SMB_{pt} + h_p HML_{pt} + m_p UMD_{pt} + e_{pt}, \quad (3)$$

where b_p, s_p, h_p, and m_p are the sensitivities of the event portfolio to the four factors (constructed for a portfolio of firms), and the intercept a_p gives the average monthly abnormal return of the event portfolio. One concern about the calendar-time portfolio method is that it overweights (underweights) periods with few (many) events. To account for this, we use weighted least squares regressions, where weights are given by the number of stocks in the portfolio that month.

Matched Sample, Buy-and-Hold Returns. Others argue for the buy-and-hold method, as this better approximates investors' experience (Kothari and Warner 2007). Here, the returns of firms experiencing the event, held for a period of time after the event (e.g., a year), are adjusted against a matched sample of similar firms to assess the abnormal performance associated with the event; the matched characteristics are assumed to proxy for the expected return of the stock. We follow the procedure of Savor and Lu (2009) and construct a portfolio of firms, matched on the basis of industry, size, and book-to-market ratio (Fama and French 1993). Matching by industry implicitly allows us to account for any industry-specific economic shocks that may affect returns during this period. The advantage of using a portfolio is that this lessens the risk that such calculations may be overly sensitive to outperformance from a single matched firm.

For each firm in the sample, we first identified all firms within the same two-digit Standard Industrial Classification code that had market values in the preceding month from 50% to 150% of that of the firm. From this list, we then selected the 10 firms that had the most similar book-to-market ratios to serve as the matched portfolio; if there were not enough firms meeting this criterion, the matched portfolio contains less than 10 firms. The book-to-market ratio for each firm was derived from the firm's book equity (from Cohen et al. 2003) and its market value at the end of the previous month. Buy-and-hold compounded abnormal returns (BHAR) for security i are then given by

$$BHAR_i(t, T) = \Pi_{t=1\,\text{to}\,T}(1 + R_{it}) - \Pi_{t=1\,\text{to}\,T}(1 + R_{B,t}), \quad (4)$$

where R_B is the return of the matched portfolio (the average of the individual firm BHARs).

Results

Short-Horizon Abnormal Return Results: Test of H1

The daily and cumulative average abnormal returns for windows surrounding the event are presented in Table 3. All statistical tests are two-tailed. The event date was the day that the letter was posted on the FDA's website. When there is uncertainty as to whether the information was released before or after the market's close on the event day, guidelines (Srinivasan and Bharadwaj 2004) suggest that the event window should be expanded to the following day (i.e., $[0, 1]$); this is to ensure the appropriate specification of the event. Accounting and finance scholars similarly suggest that when the specific time of the event cannot be pinpointed exactly, the days surrounding the event date should be scrutinized for evidence of "abnormal" performance (Kothari and Warner 2007). Empirically, we find that investor reaction is concentrated on this $[0, 1]$ period, and the results prior to the event provide little indication that there is any leakage or anticipation of the event. Thus, our choice of $[0, 1]$ is well supported.

As predicted, the posting of a violation letter is associated with a significant stock price decrease of 0.91%, on average, during the $[0, 1]$ window ($t_{\text{Jaffe portfolio test}} = -3.15$, $p < 0.01$). Hence, H1 is supported. Corrado's rank test, corrected for the serial correlation in the abnormal returns, is significant ($Z = -2.61$, $p < 0.05$). Over the two-day window, 102 of the 174 abnormal returns were negative.

Robustness Tests for the Short-Horizon Abnormal Returns

Sensitivity analysis indicated that these $[0, 1]$ results were robust to alternative expected return models, benchmark indices, and statistical tests.

Alternative benchmark models. Results are similar using the Fama-French (1993) three-factor (FF3) model. Similar results are also obtained using market-adjusted returns, mean-adjusted returns, and the traditional OLS market model (Brown and Warner 1985).

Table 3 Daily Abnormal Returns Associated with FDA Advertising Violation Letters

Event day	Average abnormal return (%)	Jaffe (1974) portfolio *t*-statistic	Sample size (*n*)	Number with negative abnormal returns (%)	Corrado rank test	Wilcoxon signed rank test
Panel A: FF4 abnormal returns for FDA advertising violation letters by day						
−5	0.23	0.53	174	83 (48)	0.94	604.50
−4	−0.09	0.86	174	90 (52)	0.17	−184.50
−3	−0.15	−0.73	174	90 (52)	0.10	−248.50
−2	0.27	0.98	174	83 (48)	0.74	515.50
−1	−0.04	0.47	174	85 (49)	0.44	−96.50
0	−0.44	−2.59**	174	99 (57)	−1.91*	−1,758.50***
1	−0.47	−1.73*	174	102 (59)	−1.79*	−1,778.50***
2	0.06	0.26	174	89 (51)	−0.03	189.50
3	−0.30	−1.49	174	102 (59)	−1.58	−1,340.50**
4	−0.13	−0.78	174	96 (55)	−1.26	−647.50
5	0.10	0.14	174	86 (49)	0.64	159.50
Panel B: Cumulative FF4 abnormal returns for FDA advertising violation letters						
−1, −1	−0.04	0.47	174	85 (49)	0.44	96.50
−1, 0	−0.47	−1.45	174	91 (52)	−1.04	−1,037.50
−1, 1	−0.94	−2.17**	174	94 (54)	−1.89*	−1,543.50**
0, 0	−0.44	−2.59**	174	99 (57)	−1.91**	−1,758.50***
0, 1	−0.91	−3.15***	174	102 (59)	−2.61**	−2,461.50***
1, 1	−0.47	−1.73*	174	102 (59)	−1.79*	−1,778.50***

*$p \leq 0.10$; **$p \leq 0.05$; ***$p \leq 0.01$.

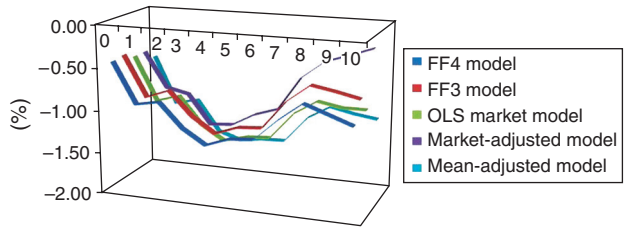
Alternative market index. Results for [0, 1] are similar if the value-weighted index is used.

Alternative statistical test. The significance of our results remains unchanged if the time-series standard deviation test statistic is employed (Brown and Warner 1985).

Nonparametric test. Furthermore, the Wilcoxon rank test, a test that takes into consideration the sign and magnitude of abnormal returns, was also significant ($Z_{\text{Wilcoxon}} = -2461.50$, $p < 0.01$), suggesting outliers did not overly influence our results (McWilliams and Siegel 1997).

Durability of results. We provide some evidence for the stability of our results following the procedure of Tellis and Johnson (2007). Plots of average post-event medium-term buy-and-hold returns for the 10 days following the event show no evidence that the negative abnormal return at the event reverts, or dissipates, indicating the durability of the violation's negative impact on firm stock returns (see Figure 1).

Figure 1 Medium-Term Buy-and-Hold Abnormal Returns from 0 to +10 Days After the Violation



This finding is robust across the FF4, FF3, OLS market, mean-adjusted, and market-adjusted models.

Supporting Evidence for Why the Abnormal Return Occurs

This section presents (1) information collected from pharmaceutical stock analysts and also (2) evidence for the violation's ultimate effects on other firm outcomes, providing some data for what spurs the negative investor response.

Pharmaceutical Stock Analyst Data. We contacted 16 buy-and-sell–side pharmaceutical stock analysts to gather evidence on what motivates investors' reactions at the event. The analysts pointed to the anticipated effects that such violations may have on consumer and regulatory audiences as key drivers of investor reaction. Specifically, a majority of the analysts suggested that investors would react negatively to reports of ad violations, as such reports can lower consumers' perceptions of the firm, thereby reducing the future firm sales growth. In addition, a number of analysts also felt that investors penalize such firms because ad violations can lead consumers to become more skeptical, making the firm's future ad campaigns less effective. Finally, almost all analysts highlighted that ad violations may result in a loss of goodwill for the errant firms in the marketplace and may lead to fines and increased regulatory scrutiny of these firms in the future. These insights help to provide greater confidence in the theoretical account supporting H1 and, along with the analyses discussed next, present strong arguments as to why regulatory

exposure of ad violations elicits a negative investor response.

Impact on Product Revenue Growth. To evaluate the argument that investor responses to ad violations are partly driven by the potential negative influence of such violations on the future revenue growth of the advertised products, we collected information on the U.S.-based revenues of the products covered in our sample from firm 10-K reports and SEC filings, corporate websites, and Factiva. A random effects panel data regression of product revenue growth for the 28 products for which we could find revenue information confirmed that a citation by the FDA in quarter t results in a significant negative impact on the advertised product's revenue growth in quarter $t+1$ ($b_{\text{violation}} = -0.12$, $p = 0.03$).[2]

Impact on Product Quality Perceptions. In addition, for a subset of drugs, we were able to obtain annual product quality ratings from 2001 to 2005 from an established provider reflecting the views of approximately 1,200 nationally representative consumers. A random effects panel data regression of product quality perceptions for these 19 drugs on their prior 12 month advertising violations indicates such violations have a long-run negative impact on product quality perceptions ($b_{\text{violation}} = -0.31$, $p = 0.08$).[3] Taken together, these results (on product quality perceptions and product revenue growth) provide evidence for the violation's ultimate impact on a key stakeholder group, consumers, and such results provide strong justification for the negative abnormal returns witnessed at the event (as investors anticipate these effects).[4]

Long-Horizon Abnormal Return Results

These are calculated for the 6- and 12-month postevent periods. Following Savor and Lu (2009), the calendar-time portfolios are estimated on monthly returns, and the buy-and-hold returns are estimated using daily returns for the equivalent number of days.[5] We focus on the one-year period because the impact of the violation on accounting-based measures of firm performance would likely manifest itself within this period. Results are presented in Table 4. The long-horizon abnormal returns—calendar-time portfolio and buy-and-hold—are observed to be nonsignificant over both 6- and 12-month postevent periods across the sample overall and also across the reputation–violation type pairings.

Discussion

Market Efficiency. Failing to observe abnormal long-horizon abnormal returns in both approaches suggests that the reason for this may not be simply the result of a measurement problem but rather that the market correctly prices the effects of the violation in a timely manner when such events are reported (as investors anticipate the effect of the violation on other firm outcomes). This serves to indicate that markets respond efficiently to these events, and the full and complete effect of the violation is reflected in the short-horizon abnormal returns. Therefore, the remainder of the analysis is focused on the $[0, 1]$ window, as this is where investor reaction is concentrated.

Economic Impact. In absolute dollar terms, the posting of a violation letter was associated with an average loss of \$114 million dollars of shareholder value. This amount is comparable to the \$161 million negative change in market value associated with pharmaceutical product liability lawsuits (Prince and Rubin 2002) but smaller than the \$441 million drop observed for drug withdrawals (Ahmed et al. 2002).

Analysis of the Short-Horizon Abnormal Returns: Tests of H2 and H3

This section provides our tests of H2 and H3. The analysis is focused on the $[0, 1]$ abnormal return, following the model given by Equation (2), and results are presented in Table 5. Random effects estimates are fit using restricted maximum likelihood estimation, but maximum likelihood estimation is employed for the nested model tests. The likelihood ratio test showed a significant improvement over the null model consisting of no random effects and a homogeneous residual error ($\chi^2 = 11.40$, $p < 0.05$), indicating that a random effects specification is preferable to OLS.

Control model. The nested comparison to null model indicated that the model composed of only the control variables does not provide a good fit for the data ($\chi^2 = 15.40$, $p = 0.35$).

[2] In addition, in line with H2, we also observed that the product revenue growth in quarter $t+1$ is lowered by commission violations ($b_{\text{commission}} = -0.09$, $p = 0.06$) but is not affected by omission violations ($b_{\text{omission}} = 0.00$, $p = 0.92$).

[3] Furthermore, we observe that this relationship is negative for commission violations ($b_{\text{commission}} = -0.51$, $p = 0.02$) but not omission violations ($b_{\text{omission}} = 0.10$, $p = 0.65$), consistent with the logic for H2.

[4] We also examined whether the violation has a commensurate impact on *Fortune*'s measure of firm reputation. We do not find support for this in our data, potentially because firms have ample opportunity to fix and repair their reputations after the violation. Because of the wide variety of factors that may influence firm reputation (e.g., innovative new products, human resource practices, donations, asset use, etc.), it is likely easier for firms to fix this than it is to recover the damage to product-level perceptions. This does not imply that the violation has no effect on stakeholders' perceptions of the firm; rather, various other factors that influence firm reputation mitigate our ability to observe this in the secondary data.

[5] The right-truncation in this analysis does not affect our results. Results remain essentially the same if the 2008 events are removed.

Table 4 Long-Horizon Abnormal Returns Associated with FDA Advertising Violation Letters

	Calendar-time portfolio method postevent abnormal returns for the period {6-month, 12-month}		Matched sample, buy-and-hold method postevent abnormal returns for the period {6-month, 12-month}	
	Average $AR_{+1,+6\text{ months}}$	Average $AR_{+1,+12\text{ months}}$	Average $AR_{+2,+125\text{ days}}$	Average $AR_{+2,+250\text{ days}}$
		Panel A: All events		
Mean	3.96	4.44	0.59	1.93
[t-statistic]	[1.64]	[1.03]	[0.35]	[0.51]
		Panel B: Low-reputation firms, omission violation (only) events		
Mean	0.96	6.24	−0.68	9.85
[t-statistic]	[0.17]	[0.48]	[−0.15]	[0.54]
		Panel C: Low-reputation firms, events with commission violations		
Mean	4.56	4.92	0.97	0.90
[t-statistic]	[1.37]	[0.86]	[0.37]	[0.16]
		Panel D: High-reputation firms, omission violation (only) events		
Mean	1.44	5.64	−0.37	3.25
[t-statistic]	[0.32]	[0.74]	[−0.07]	[0.44]
		Panel E: High-reputation firms, events with commission violations		
Mean	3.78	2.64	0.52	0.86
[t-statistic]	[1.26]	[0.63]	[0.22]	[0.26]

$^{*}p \le 0.10$; $^{**}p \le 0.05$; $^{***}p \le 0.01$.

Violation type (H2). The model which includes violation type fits the data better than the control model ($\chi^2 = 11.5,\ p < 0.01$), displaying a lower Bayesian information criterion (BIC). As predicted, a significant negative relationship exists between number of commission violations and size of the abnormal return ($b_{\text{commission}} = -1.24,\ p < 0.01$), whereas a significant negative relationship does not exist between number of omission violations and size of the abnormal return ($b_{\text{omission}} = -0.22,\ p = 0.40$). Hence, H2 is supported.[6, 7]

Violation type × firm reputation (H3). We mean-centered the number of commission and omission violations before creating the interaction term. This helps to ease interpretation of these results (Echambadi and Hess 2007). Results from a nested model likelihood ratio test indicate that including the firm reputation–violation type interactions results in a significant improvement in model fit ($\chi^2 = 9.6,\ p < 0.01$), with a lower BIC value (despite additional parameters). The negative effect for commission violations is still present in this model ($b_{\text{commission}} = -1.31,\ p < 0.01$). As predicted, we also find a significant firm reputation–commission interaction ($b_{\text{commission}\times\text{firm reputation}} = 2.25,\ p < 0.01$), demonstrating that firm reputation mitigates the penalty for commission violations. Investor reaction to omission violations, however, is not contingent on firm reputation ($b_{\text{omission}\times\text{firm reputation}} = 0.57,\ p = 0.27$). H3A and H3B are therefore supported. Relationships between the control variables and the abnormal return generally fail to emerge.

[6] We also explored whether the effect for the number of omission and the number of commission violations is curvilinear. In neither the second nor the third model (the one with the violation type–reputation interaction) do the squared terms become significant, suggesting that curvilinear effects are not present.

[7] Given the growing incidence of deceptive advertising practices, we investigated whether investor reaction to these violations has changed over time. Analysis of the sample abnormal returns following model 2, using indicator variables for the most recent violations (i.e., the last half, 2003–2008, and the last quarter of the sample period, 2006–2008), found no evidence for any attenuation in investor reaction for the more recent violations ($b_{\text{lasthalf}\times\text{omission}} = -0.18,\ p = 0.73;\ b_{\text{lasthalf}\times\text{commission}} = 0.26,\ p = 0.73;\ b_{\text{omission}} = -0.26,\ p = 0.34;\ b_{\text{commission}} = -1.26,\ p < 0.01;\ b_{\text{lasthalf}} = 0.80,\ p = 0.30$; Model 2: $b_{\text{lastquarter}\times\text{omission}} = -0.13,\ p = 0.84;\ b_{\text{lastquarter}\times\text{commission}} = 0.51,\ p = 0.58;\ b_{\text{omission}} = -0.23,\ p = 0.39;\ b_{\text{commission}} = -1.28,\ p < 0.01;\ b_{\text{lastquarter}} = 0.37,\ p = 0.56$), suggesting that investors do not habituate to these practices.

Test of Robustness

Sensitivity analysis indicated that these results were robust to alternative expected return models and the influence of outliers.

Alternative model specifications. We replicated this analysis with the abnormal returns from the Fama–French (1993) three-factor model as the dependent variable and continue to find support for these hypotheses. Support for H2 and H3 is also found with the abnormal returns generated through the traditional OLS market, market-adjusted, and mean-adjusted models, and when an alternative market

Table 5 Factors Affecting the Abnormal Return as a Result of the Regulatory Report of the Advertising Violation: Firm Reputation Attentuates the Penalty for Commission Violations

	Model 1: Controls		Model 2: Controls + Type of violation		Model 3: Controls + Type of violation + Interactions	
Predictor variable	Parameter estimate	*t*-value/ *Z*-value	Parameter estimate	*t*-value/ *Z*-value	Parameter estimate	*t*-value/ *Z*-value
Fixed effects						
Intercept	−1.44	−1.51	0.01	0.01	0.26	0.25
Violation characteristics (violation type)						
No. of omission violations			−0.22	−0.85	−0.27	−1.04
H_2: No. of commission violations			−1.24***	−3.27	−1.31***	−3.52
Violation type × reputation interaction						
H_{3a}: No. of commission viols. × reputation					2.25***	2.88
H_{3b}: No. of omission viols. × reputation					0.57	1.10
Violation and product-level controls						
Titled letter	0.41	0.73	0.75	1.32	0.75	1.35
Directed at consumers (patients)	−0.06	−0.11	0.27	0.48	0.11	0.19
Democratic administration	−0.40	−0.77	−0.35	−0.68	−0.43	−0.85
Repeat (vs. initial) violation	−0.77	−1.29	−0.64	−1.10	−0.74	−1.30
Whether the firm was fined	−2.50	−0.82	−1.85	−0.63	−1.58	−0.55
Product age (years on market)	−0.01	−0.36	−0.01	−0.29	−0.01	−0.18
Long-term maintenance therapy	1.80**	2.09	1.52*	1.78	1.39*	1.66
Undifferentiated product	−0.38	−0.70	−0.40	−0.73	−0.26	−0.46
Product is a strategic focus of the firm	0.41	0.86	0.39	0.84	0.42	0.92
Disease severity: HIV treatment	0.54	0.49	0.31	0.29	0.61	0.57
Disease severity: Cancer treatment	−0.27	−0.30	−0.38	−0.44	−0.44	−0.52
Firm controls						
Firm reputation	0.45	0.67	0.36	0.55	0.61	0.94
Firm size (ln of market value)	0.27	1.53	0.20	1.11	0.18	1.04
Number of product on market (in year *t*)	0.02	1.44	0.02	1.38	0.01	1.02
Random Effects						
Intercept τ_{00}	5.87***	2.75	5.27***	2.59	5.09***	2.61
Residual σ^2	5.99***	5.79	5.80***	5.65	5.54***	5.63
Observations	174		174		174	
−2 log likelihood	870.8		859.3		849.7	
BIC	881.2		871.7		861.3	

Note. Dependent variable: abnormal return in percent for the window [0, 1].
*$p \leq 0.10$; **$p \leq 0.05$; ***$p \leq 0.01$.

index (i.e., value weighted) is used. Results also remain the same if only stocks trading above \$5 are considered, indicating that our results are also not sensitive to the influence of less liquid stocks (Zhang 2006).

Outlier trimming. Results remain unchanged if we repeat this analysis after controlling for outliers in the dependent variable by capping each tail at the 1% and 2.5% levels.

Discussion of the Short-Horizon Return Analysis

Analysis of the magnitude of the abnormal return suggests that investor reaction is affected by omission bias (Spranca et al. 1991), leading omission violations to be punished less than commission violations (even though both violations were perceived to be equivalent in terms of seriousness). In addition, our results suggest a boundary condition to the market penalty for commission violations as high-reputation firms are punished less severely than low-reputation firms. A limitation to the event study is that it provides little information about investors' direct beliefs and attitudes associated with the ad violations in question. Such information is critical to understanding investor response and also in allowing for falsification or support of the theoretical explanation for the pattern of effects obtained in the event study—namely, that (1) investors are likely to view omission ad violations as more of an industry-wide issue than commission ad violations, which investors are likely to view as more of a firm-specific problem; and (2) firm reputation should serve as a buffer when investors are leaning toward assigning blame for the ad violation to the firm. We used MBA students as a proxy

for investors (e.g., Camerer and Weigelt 1991) in an experiment to test this explanation.

Experiment 1: Examining the Reputation–Violation Type Interaction

Experiment 1 examines the effect of ad violation type and firm reputation on investors' assignment of blame (firm-specific problem versus industry-wide issue) and investors' attitudes regarding postviolation firm reputation. Postviolation firm reputation is reflective of the goodwill that the firm may lose with key stakeholders as a result of an ad violation.

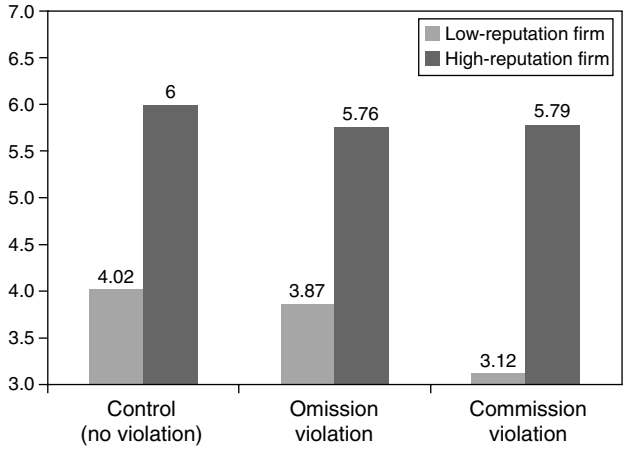
Experiment 1 Procedure

One hundred forty-three MBA students at a large Midwestern university participated in an experiment that utilized a 3 (violation type: control, omission, commission) × 2 (firm reputation: low versus high) full-factorial, between-subjects design. All participants first saw a press release and then a cold sore product ad with either the high (J&J)- or low (IMC)-reputation firm (see Web Appendix 4 in the electronic companion for pretests and stimuli). Control group participants then responded directly to questions designed to assess postviolation reputation while experimental group participants viewed a *Wall Street Journal* excerpt highlighting either a commission or omission violation. The control group structure allows us to utilize reputation both as a dependent variable and a moderator. Before being dismissed, all participants responded to a suspicion probe (to detect hypothesis guessing).

Experiment 1 Results

Firm Reputation. No hypothesis guessing was detected. In addition, none of the covariates interacted with the independent variables ($p > 0.1$). Contrasts revealed that postviolation firm reputation was lower for participants in the experimental (ad violation) conditions versus control condition ($t(1, 133) = 2.04,\ p = 0.04$). Also, postviolation firm reputation was punished more severely for a commission (versus omission) violation ($t(1, 133) = 2.03$, $p = 0.04$). These two findings mirror the event study results for H1 and H2. In addition, the interaction between previolation firm reputation and violation type was significant ($F_{\text{firm reputation} \times \text{violation type}}(2, 133) = 3.74$, $p = 0.03$). Comparisons between the commission violation and control condition showed that postviolation firm reputation is punished more severely for a low-reputation firm than a high-reputation firm (low-reputation firm: ($t(1, 133) = 3.46$, $p < 0.01$); high-reputation firm: ($t(1, 133) = 0.44,\ p = 0.66$). However, comparisons between the omission violation and control condition showed postviolation reputation to be similar across reputation type (low-reputation firm: $t(1, 133) = 0.54,\ p = 0.59$; high-reputation firm: $t(1, 133) = 0.78$, $p = 0.44$). This is consistent with what we find in the event study for H3. Results from this analysis are presented in Figure 2.

Figure 2 **Experiment 1: Investor-Proxy Evaluation of the Firm After the Advertising Violation; Firm Reputation Attenuates the Penalty for Commission Violations**



Explanation for Violation—Firm-Specific Problem vs. Industry-Wide Issue. Investors are more likely to view a commission-based ad violation as a firm-specific problem in comparison to an omission-based ad violation, which investors are more likely to view as an industry-wide issue ($M_{\text{commission}} = 4.16$, $M_{\text{omission}} = 3.56$; higher numbers indicate firm-related perceptions; $F(1, 98) = 4.39,\ p = 0.04$). Hence, the theoretical account for H2 is supported.[8] Furthermore, a Sobel test ($p = 0.04$) indicated that the perceived reason for the violation mediates the interaction of previolation reputation and violation type on postviolation reputation. Hence, the theoretical account for H3A and H3B is supported (see Web Appendix 4 in the electronic companion for full mediation analysis details).

Experiment 1 Discussion

The laboratory experiment conceptually replicates the results found in the event study, using an attitudinal measure of investor reaction (postviolation firm reputation). We find support for our theoretical account as participants are, in general, more likely to view commission (versus omission) ad violations as a firm-specific problem. However, this finding is moderated by firm reputation as high-reputation firms enjoy a buffer in comparison to low-reputation firms when investors are leaning toward assigning blame for the ad violation.

[8] As expected, intentionality perceptions were equivalent across both types of ad violations ($M_{\text{commission}} = 5.35$, $M_{\text{omission}} = 5.63$, $F(1, 98) = 0.85$, $p > 0.1$).

Experiment 2: Examining the Impact of Repeated Violations

Experiment 2 follows up by looking at the effect of repeat violations on investor perceptions. A second violation, even in the case of an omission ad violation, is more likely to be seen as atypical and something that does not occur to a majority of firms (e.g., similar to an act of commission). Thus, a repeat omission ad violation is apt to be viewed as more of a firm-specific problem (versus an industry-wide issue). As seen in Experiment 1, high-reputation firms enjoy a buffer in comparison to low-reputation firms when the violation is considered to be more of a firm-specific problem than an industry-wide issue. Hence, our theoretical framework would predict an asymmetrical negative effect for low-reputation firms committing repeat omission ad violations.

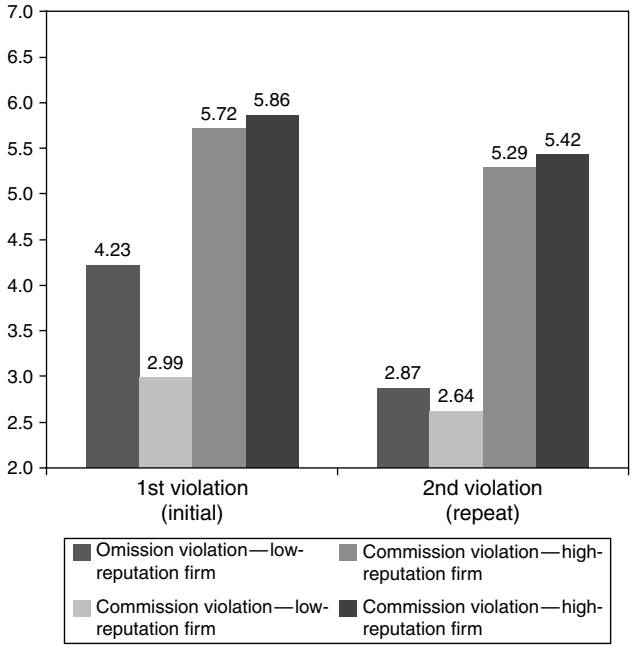
Experiment 2 Procedure

One hundred three working adults in the United States and Canada completed a repeated measures task using modified versions of the prior stimuli designed to assess the impact of an initial versus repeat advertising violation (see Web Appendix 5 in the electronic companion for stimuli). The experiment utilized a 2 (violation type: omission versus commission) × 2 (firm reputation: low versus high) × 2 (violation number: 1st, 2nd) mixed-factorial design with the violation number serving as the repeated measures factor and postviolation reputation serving as the dependent measure. Postviolation reputation was assessed after participants were exposed to the first ad violation and again after participants were exposed to the second ad violation. Participants then responded to the covariate questions and a suspicion probe.

Experiment 2 Results

No hypothesis guessing was detected. In addition, none of the covariates interacted with the independent variables ($p > 0.1$). Whereas the effect of a repeat violation in general was in the negative direction, but not significant ($M_{\text{1st violation}} = 4.59$, $M_{\text{2nd violation}} = 3.92$; $F(1, 97) = 1.74$, $p = 0.19$), a significant three-way interaction was found for violation number × violation type × firm reputation ($F(1, 97) = 3.99$, $p < 0.05$). Specifically, contrasts showed that the drop in postviolation firm reputation between the first and second violation for an omission-based ad violation was significant for the low-reputation firm ($M_{\text{1st violation}} = 4.23$, $M_{\text{2nd violation}} = 2.87$; $F(1, 97) = 32.57$, $p < 0.001$) but not for the high-reputation firm ($M_{\text{1st violation}} = 5.72$, $M_{\text{2nd violation}} = 5.29$; $F(1, 97) = 2.58$, $p > 0.1$). The drop in postviolation firm reputation between the first and second violation for a commission-based ad violation was not significant for either firm[9] (low reputation: $M_{\text{1st violation}} = 2.99$, $M_{\text{2nd violation}} = 2.64$; $F(1, 97) = 1.97$, $p > 0.1$; high reputation: $M_{\text{1st violation}} = 5.86$, $M_{\text{2nd violation}} = 5.42$; $F(1, 94) = 2.65$, $p > 0.1$). Results from this analysis are presented in Figure 3.

Figure 3 **Experiment 2: Investor-Proxy Evaluation of the Firm After Repeat Advertising Violation; Asymetrical Negative Effect for Low-Reputation Firms Comitting Repeat Omission-Based Ad Violations**



Robustness Check

Our analysis of the [0, 1] abnormal returns, following the approach laid out in Equation 2, provides evidence consistent with the findings in the aforementioned experiment. We observe an interaction such that there is a greater penalty for successive omission violations for low-reputation firms ($b_{\text{repeat×low-reputation firm, omission violations}} = -1.43$, $p = 0.03$), but no commensurate interaction is observed for successive low-reputation commission, high-reputation commission, or high-reputation omission violations. These results are detailed in Web Appendix 6 (see the electronic companion).[10]

Discussion

Experiment 2 and the foregoing analysis of the [0, 1] abnormal returns provide corroborating evidence for the impact of repeat violations. It would appear

[9] Cell means and pattern of effects for the first ad violation did not differ between Experiments 1 and 2.

[10] We also examined whether the effect of repeat violations may be linear or curvilinear, or that there would be a diminishing effect. Linear, quadratic, or ln-based operations of violation number (e.g., 1, 2, 3) were found not to have a significant effect on the [0, 1] abnormal return.

that once investors begin leaning toward assigning blame for an omission-based ad violation to the firm (e.g., after a repeat violation), low-reputation firms experience a precipitous penalty for this and high-reputation firms do not.

Concluding Remarks

Summary of Findings

Our objective was to examine the financial market response to deceptive advertising practices in general and, by situating our investigation in a pharmaceutical context, provide helpful guidance to firms and regulators on the effectiveness of regulatory exposure of deceptive ads. Our investigation utilizes multiple methods and provides convergent evidence regarding the effect of regulatory exposure of such ad violations on firm stock prices and investor beliefs.

Our event study of firm stock prices shows that an FDA ad violation results in a decrease, on average, of 0.91% in firm market value. This provides new insight to firms and regulators about the magnitude of the penalty to firms from such infractions. Second, the analysis of the event study results and investor perceptions from Experiment 1 indicate the following: (1) Commission violations are penalized more than omission violations (e.g., omission bias)—even though both types of violations are perceived to be equivalent in terms of seriousness. (2) Firm reputation mitigates the penalty for commission-based advertising violations, but reputation has no commensurate effect for omission-based ad violations. (3) Experiment 1 findings indicate this to be the case because although investors are more likely to view commission-based (versus omission-based) ad violations as a specific firm-related (versus industry-wide) problem, high-reputation firms enjoy a buffer in comparison to low-reputation firms when investors are leaning toward assigning blame for the ad violation to the firm.

The second experiment and its follow-up analysis explored the effect of repeat ad violations. Our evidence (vis-à-vis the event study analysis and the first experiment) indicates that investors give firms the benefit of the doubt for the initial omission-based ad violation (e.g., investors are more likely to view it as an industry-wide versus a specific firm-related problem). Unfortunately for low-reputation firms, this does not appear to hold for successive omission-based ad violations—as both stock prices and investor attitudes decline precipitously for low-reputation firms for repeat omission advertising violations. This is in contrast to high-reputation firms, who continue to enjoy a relative buffer for such transgressions.

Implications for Theory

The current research encourages scholars to consider deceptive advertising from a strategic perspective (Kopalle and Lehmann 2006) and offers a number of key implications for researchers. This is the first research, to our knowledge, to establish a theoretical connection between omission and commission-based behavior and firm reputation. By integrating research on omission bias, information alignability/relevance, and negative information attribution, a framework was developed that resulted in novel predictions for the effect of firm reputation and type of advertising violation on stock prices and investor beliefs. Such a framework has relevance for many areas in marketing and business that involve prior, reputation-based associations and communicating equivalent (but differentially framed) negative information.

Implications for Firms

The substantial penalty imposed by the financial markets for an initial ad violation should make pharmaceutical firms and other firms, in general, more hesitant to infringe on advertising regulations. However, the firm-specific implications of the current research are different for low-reputation and high-reputation firms. Our findings are especially critical for low-reputation firms, who should be particularly guarded when it comes to committing an initial commission-based ad violation or a repeat omission-based ad violation, given their lack of a reputational buffer against the assignment of investor blame and, hence, stock price and postviolation reputation dips. In contrast, high-reputation firms appear to be more sheltered against both types of violations, leading to a potential moral hazard that may be of regulatory concern.

Furthermore, for firms' competitive research efforts, these findings suggest that devoting more resources to patrolling competitors' advertising may be a wise practice. First, reporting competitors' violations to the appropriate regulatory agency for enforcement ensures a level playing field in the product marketplace. Second, the issuance of a regulatory letter can damage the competitor's "moral capital" or goodwill, affecting its relationships with key stakeholders. Third, this also can deteriorate a competitor's stock price, which can subsequently hamper the competitor's ability to pursue strategic objectives (e.g., Luo 2009).

Implications for Public Policy

Significant concerns have been raised about the effectiveness of regulatory agencies (such as the FDA and the FTC) in the curtailment of deceptive ad practices. Specifically, in the context of pharmaceutical advertising, a recent report from the GAO questioned the FDA regulatory letter's ability to discourage ad violations by pharmaceutical firms (GAO 2006). Regulators can thus be heartened by our results, which

suggest that investors are concerned about reports of such advertising violations, indicating that the FDA's current enforcement mechanism provides a strong disincentive against such behavior. This should ease concerns that the current FDA regulatory mechanism is ineffective. However, given that investor perceptions (and stock prices) appear to be more forgiving of an initial omission-based ad violation and of high-reputation firms, policy makers may need to strengthen their regulatory efforts in these areas to minimize the degree of transgressive behavior.

Limitations and Future Research

Finally, although our theoretical framework is industry agnostic, our empirical analysis is centered on deceptive advertising activities in the pharmaceutical industry. Further research in other contexts is necessary to confirm the generalizability of these results. This would also have the advantage of identifying potential boundary conditions to the current research, one of which may be the potential welfare that stakeholder groups stand to lose from an ad violation.

Another limitation of the current study is the utilization of MBA students in lieu of investors in the first experiment. Although finance scholars have typically used MBA students as a proxy for seasoned investors (e.g., Camerer and Weigelt 1991), a fruitful course for future research would be to conceptually replicate the results of the current study using actual investors.

Similarly, although we observe a negative impact for violations on firm reputation in both experiments, this is not observed in the secondary data. Documenting the connections between ad violations and more contemporaneous measures of firm reputation, or customer satisfaction data, would strengthen the process-level account that we have identified for these effects. Circularity is likely not to be an issue in our analysis, however, as both in the experiment and the secondary data analysis, each firm implicitly serves as its own control.

Finally, although our research takes a first step in highlighting the impact of advertising violations on errant firms' stock market performance, a potentially important avenue for future research would be to extend this analysis to examine whether these violations have positive spillover effects on firms' competitors. Similarly, researchers could attempt to understand appropriate competitive reactions to a rival's advertising infractions (Steenkamp et al. 2005).

Electronic Companion

An electronic companion to this paper is available as part of the online version that can be found at http://mktsci.pubs.informs.org/.

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