Determinants of the Stock Price Reaction to Allegations of Corporate Misconduct: Earnings, Risk, and Firm Size Effects

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ABSTRACT

Using the most extensive sample to date, we examine the source and magnitude of market-imposed penalties experienced by firms alleged to have committed illegal acts. Stratification of the sample by crime category reveals significant variation in the announcement-related wealth effects. Also examined are the linkages between the observed wealth effects and changes in reported and expected earnings, risk, firm size, and reputation. We find that allegations of misconduct are accompanied by statistically significant control-firm adjusted declines in reported earnings, increases in stock return variability, and a decline in concordance among analysts' earnings estimates. The magnitude of market imposed penalties accompanying allegations is systematically related to the type of misconduct, firm size, and increases in uncertainty. However, the statistical relationship between earnings changes around the allegations and the wealth effects of criminal allegations is ambiguous. Our results offer the strongest evidence to date regarding a link between market-imposed penalties associated with allegations of misconduct and the subsequent changes in the level or uncertainty of earnings.

I. Introduction

Corporate misconduct by the management and board of directors of publicly traded companies continues to concern both investors and government regulators. This concern may at least partially explain the fact that investment in socially responsible mutual fund offerings has doubled over the last decade, and in 2001 surpassed $2 trillion.[1] Securities and Exchange Commission concerns are manifested in its recent proposal of a $750 million payout to former shareholders of WorldCom Inc. (now MCI), a record-breaking penalty against a firm who has earned the distinction of perpetuating the largest accounting fraud in U. S. history.[2] However, while events such as the Enron and WorldCom debacles have recently heightened public awareness and sensitivity to news of corporate crime, research relating to corporate misconduct is not a new phenomenon.[3]

Prior research has generally focused on the direct costs associated with allegations of misconduct, i.e., those costs related directly to legal actions, fines, and restitution of damages. Many of these papers focused on specific categories of crime. A number of papers have studied the shareholder wealth effects of criminal allegations against corporations, finding significant market-imposed costs on shareholders. However, the linkage between public allegations of corporate crime and wealth losses is not clearly understood. For example, Jarrell and Peltzman (1985) address the issue of market-imposed costs on firms forced to recall defective products. They compare the magnitude of market-imposed costs to the direct costs of recalling defective products, focusing on the drug and automobile industries. They state the issue as: "An obvious question – and a test of capital market efficiency – would be whether the capital market internalizes these costs." (p. 513). They find that capital market imposed penalties far exceed the direct costs, and conclude that

[1] See the Social Investment Forum, *2001 Report On Socially Responsible Investing Trends in the United States*, http://www.socialinvest.org/areas/research/trends/2001-Trends.htm, visited March 24, 2003.
[2]For the complete article, see "Leading the News: MCI Boosts Payout to Shareholders – A Record $750 Million To Cover Investors' Losses Would Settle SEC Charges," by Young, Shawn, *The Wall Street Journal*, July 3, 2003, A3, C1.

market-imposed costs "may even exceed a plausible independent estimate of the relevant social costs." (p. 513).

Skantz, Cloninger and Strickland (1990) examine the stock price reaction to allegations that firms have engaged in price-fixing activities. They find that when an indictment against a firm for price-fixing is first announced, the result is a statistically significant two-day average abnormal return of -1.9% (41 observations). However, no market reaction is detected when either a plea or final resolution of the case is announced. They conclude that the only significant event is at the time of the announced indictment.

Karpoff and Lott (1993) focus on firms accused of engaging in fraudulent activities between 1978 and 1987 (132 observations). They find: a statistically significant 1.58% announcement period loss in firm value; that actual fines account for only 1.4% of this total loss; and, that only 6.5% of the loss in value is explained when civil penalties, court costs and criminal restitution are included. They find only weak evidence of a decrease in earnings growth in the five-year period after the allegation (115 observations), but do not investigate whether the earnings growth is related cross-sectionally to the estimated wealth effects of fraud allegations. No evidence of analysts' anticipation of bad news is found (15 observations). They conclude that the remaining 93% of the economically and statistically significant loss in shareholder wealth is due to a loss in "reputation," and define reputational loss as any loss in shareholder wealth not explained by the costs associated with legal action against the offending firm. Put another way, reputational loss is due to future earnings decreases above and beyond the costs associated with legal action against the offending firm.

In analyzing the issue of the magnitude of market-imposed costs of corporate crime, Reichert, Lockett and Rao (1996) investigate the impact of formal corporate indictments on shareholder returns during the decade of the 1980s. They document a two-day average abnormal return of -1.9% for the eighty-three firms they examine. Using cross-sectional regression methodology, they find that only firm size and a period

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[3] We use the term "corporate crime" broadly to denote all forms of illegal business behavior or misconduct, including both civil and criminal malfeasance.

dummy variable, interpreted as an indicator of changes in market attitudes toward illegal business activity, are weakly significant in explaining the negative stock price reaction. The potential fine reported at the time of the indictment is not found to be significant in explaining the loss in shareholder wealth.

In summary, prior research clearly shows that allegations of misconduct by publicly traded firms result in economically and statistically significant losses in shareholder wealth. Additionally, it has been shown that neither direct legal (nor operating) costs nor announced potential penalties explain these wealth losses, and that the only statistically significant stock price reaction occurs when the allegation is first announced. In the case of fraud allegations, Karpoff and Lott (1993) find weak evidence of decline in reported earnings subsequent to the allegations, but do not present evidence on a relationship between earnings changes and the magnitude of stock price response to allegations. Due to the small samples analyzed to date, generalizing the results regarding the link between shareholder wealth losses and analysts' anticipation of bad news is difficult. Thus, while financial theory would posit that "loss of goodwill" or "reputational loss" is nothing other than the reflection of shareholders' expectations regarding future reductions in earnings or cash flows to the firm, no significant relation between various allegations and changes in corporate earnings has been found.

Our study extends the work of Skantz, Cloninger and Strickland (1990), Karpoff and Lott (1993), and Reichert, Lockett and Rao (1996) by examining the magnitude and determinants of the capital market-imposed costs associated with allegations of corporate misconduct. Using the most extensive sample to date, we examine the variation in shareholder wealth effects associated with five subcategories of alleged misconduct. We also examine the possible linkages between the shareholder wealth effects of misconduct and investors' perception of risk. We address the problem of identifying the determinants of the cross-sectional variation in the magnitude of the market imposed penalties by investigating categories of crime, changes in both reported and forecasted earnings, changes in investment risk as reflected in both stock return volatility

and concordance among analysts' earnings forecasts, and the significance of firm size, growth opportunities, and reputation. Control firm methodology is used to check the robustness of our results. The following section describes the hypotheses, data, and methodology. Section III presents empirical results, and section IV, our conclusions.

II. Hypotheses, Data and Methodology

A. Hypotheses

We test the following hypotheses as potential explanations for the market's reaction to allegations of corporate misconduct:

H1: Shareholder wealth effects of allegations of corporate misconduct vary according to the type of crime alleged. Consistent with the work of Klein and Leffler (1981), an allegation of fraud against consumers, for example, may elicit a larger penalty than an allegation of copyright violations if expectations are that the allegation of fraud leads to a consumer boycott of the firm's products. Our sample is large enough to permit stratification by the type of alleged misconduct, and to perform statistical analyses on these subsets.

H2: Shareholder wealth effects of allegations of corporate misconduct are (partially) due to adverse implications for the level of future corporate earnings. While Karpoff and Lott (1993, p. 790) convincingly establish that the combination of court-imposed costs, penalties, and criminal fines accounted for only 6.5% of the estimated wealth losses experienced by firms accused of criminal fraud, they do not conclusively link shareholder wealth losses and earnings growth. We reevaluate the potential statistical link between allegation-related changes in earnings and the loss in shareholder wealth by examining both *ex ante* and *ex post* measures of changes in earnings for a much larger and broader sample. Our *ex post* measure is based on changes in *reported* earnings in the years surrounding the year of the announced allegation. The *ex ante* measure is based on the difference in analysts' consensus forecasts of annual earnings in the months surrounding the announcement. We test for differences in our *ex ante* and *ex post* measures of earnings

change among the various categories of corporate misconduct, and the hypothesis that the wealth effects associated with allegations of crime are directly related to either *ex post* or *ex ante* measures of earnings change.

H3: Shareholder wealth effects of allegations of corporate misconduct are (partially) due to adverse implications for risk. We analyze the impact of criminal allegations on uncertainty regarding firm value and earnings in two ways. We use the single index market model, applied to periods before and after the allegation, to ascertain changes in market-related volatility arising from the allegation. Since this approach utilizes post-announcement information not available until well after the announcement period, we refer to this as an *ex post* measure of the announcement-related change in risk. Next, we examine the change in the range of analysts' forecasts for the months immediately before and after the month in which each allegation is announced. An increase in the range of forecasts represents a decline in concordance among analysts regarding the future earnings of the firm. If the event induces more firm specific risk, we would expect the concordance among analysts to decrease. Since this data is based on information from professional analysts, taken at a point in time roughly contemporaneous with the announcement date, and prior to any post-announcement date earnings releases, we regard this as an *ex ante* measure of the announcement-related change in risk. One would expect to find increases in uncertainty associated with more negative announcement-period returns.

H4: The magnitude of an adverse impact of alleged corporate misconduct on shareholder returns is inversely proportional to firm size. There are two explanations for a systematic influence of firm size on the wealth effects associated with announced allegations. One is a simple economy of scale argument: if a given criminal act imposes fixed costs in terms of legal expenses, fines, and loss of goodwill, then the percentage wealth decline will be smaller, the larger the firm's capitalization. Another possible influence of firm size is via its association with corporate “reputation,” that is, the value of brand-name

capital that has been accumulated by the firm against which an allegation is lodged. On the one hand, firms with greater reputational capital have more to lose from a loss of reputation, but on the other hand, they are also in a position to counter the reputational damage created by an allegation.[4] These competing arguments can be tested by examining the statistical link between the size of the firm and the changes in shareholder wealth resulting from the announced allegation. We employ market capitalization, exchange listing, and number of analysts following a firm as metrics for assessing firm size and reputation effects on changes in shareholder wealth.

H5: Shareholder wealth losses associated with allegations of misconduct will be greater in firms with a high ratio of growth opportunities to assets-in-place. The reputational effects of criminal allegations may be related to the extent to which corporate value depends upon future growth opportunities. Intuitively, one would expect (even among large firms) reputational damage to be greater for firms with a relatively high percentage of value based on growth opportunities, since much of the value of these firms relies upon introducing new products or entering new markets where they have not yet established a base of goodwill, or "track record," with customers and suppliers. The lack of a base of goodwill will exacerbate the negative impact of criminal allegations. Book-to-market ratios are frequently used as metrics for the relative importance of growth opportunities, with lower book-to-market ratios associated with the presence of higher growth opportunities relative to the value of assets-in-place. Therefore, lower book-to-market firms are expected to suffer greater shareholder wealth losses.

B. Data and Methodology

We examine all announced allegations of corporate crime appearing in the *Wall Street Journal* and *FACTIVA* (formerly *The Dow Jones Interactive Data Base)* between January 1, 1982 and December 31, 1996. Announcements were discovered utilizing keywords such as, antitrust, breach of contract, bribery, business

[4] These potentially conflicting effects may explain the apparent inconsistencies in management or board turnover discussed by Agrawal, Jaffe and Karpoff (1999, pp. 309-310).

ethics, copyright/patent infringement, fraud, conflict of interest, price-fixing, securities fraud, and white-collar crime. For a given allegation against a firm, the first appearance of the announcement is used as the announcement date (denoted t=0). To minimize confounding events, once an initial announcement date is found, the firm is screened to ensure that no additional announcements (or new allegations) appear within two-years of the announced allegation. The intersection of firm-specific announcements and daily return availability in the Center for Research in Security Prices (CRSP) daily returns data tape resulted in a final sample of 464 events. Additional analyses that require Standard & Poors COMPUSTAT, Ins*titutional Brokers Estimate System* (IBES) data, and daily returns (CRSP data) subsequent to the announcement further reduce the sample. Some analyses require data for matched control firms. All analyses are conducted using the maximum number of observations available given the data constraints, hence the number of observations reflected in the accompanying tables varies considerably. Since the primary focus of the paper is on analyses requiring either COMPUSTAT or IBES data, the potential for a survivorship bias is of some concern. We address this concern and its potential implications for our findings in the results section of the paper.

To analyze the impact of the allegation on subcategories of corporate misconduct, we stratify the full sample into the following five crime categories (the number of cases is given parenthetically): antitrust violations (88), bribery and kickbacks (24), fraud (142), copyright and patent infringement (68), and all other (142). The category "Other" includes cases where the number of observations in a specific category is less than 20 (such as breach of contract disputes), or where the announcement included multiple allegations (such as simultaneous charges of breach of contract, patent infringement and fraud).

We employ standard event study methodology using the Single Index Market Model (SIMM) as discussed in Brown and Warner (1985) to evaluate the stock price reaction to the announced allegations. Abnormal returns are computed for single-day (AR_t) and several multi-day event windows (*CAR(r,s)*, where r

and s indicate days relative to the announcement date). The abnormal return for firm *i* on day *t*, is defined in the event window as

$$R_{it} = r_{it} - \alpha_i - \beta_i r_{mt} \qquad (1)$$

where r_{it} and r_{mt} are the returns on firm *i*'s common stock on day *t* and the CRSP value-weighted index of market returns on day *t*, respectively. The coefficient α_i and β_i are estimated from an ordinary least square regression of r_{it} on r_{mt} using a 250-day period consisting of days -260 to -11 relative to the announcement day.[5] We report results for 2-day (days *t*=-1 plus *t*=0 relative to announcement date), 7-day (days *t*=-3 to +3 relative to announcement date), and 21-day event windows (days *t*=-10 to +10 relative to announcement date). The average abnormal return for each day *t* in the event window is computed as

$$AR_t = \frac{1}{N_t}\left[\sum_{i=1}^{N_t} R_{it}\right] \qquad (2)$$

where N_t is the number of firms over which abnormal returns are averaged on day *t*. The cumulative average abnormal return for day *r* through *s* is thus defined as

$$CAR(r,s) = \sum_{t=r}^{s} AR_t \qquad (3)$$

In examining the statistical link between allegation-related changes in earnings (H2), risk (H3), and firm size and reputation (H4 and H5), we employ cross-sectional multivariate regression analysis relating the abnormal returns during various intervals in the event window (CAR(*r,s*)) to the variables of interest. Our *ex post* measure of earnings change is the change in income before extraordinary items (COMPUSTAT data item 18) divided by total assets (COMPUSTAT data item 6). By scaling reported earnings by assets, we adjust for cross-sectional size variation. This measure serves to minimize the confounding effects of some earnings management strategies, such as the sale of property, plant and equipment or discretion over

[5] In calculating the abnormal returns, firms are required to have a minimum of 150 consecutive daily stock returns during the pre-announcement estimation period.

extraordinary items, which might influence "bottom line" earnings.[6] It also minimizes the problems associated with changes in the number of shares outstanding (for example, repurchase programs) which confound the measurement of earnings changes with the effects of other corporate policies.[7] *Ex post* earnings measures are from annual differences in earnings for a five-year period beginning two years prior to the year that includes the announcement date, and ending two years after. Our primary focus is on the cumulative change in earnings for the one-year period ending in the year of the announced allegation. We do, however, conduct robustness checks for variations in the interval defined. The variable is denoted ΔEARN(r,s), where r and s indicate annual reporting periods relative to the year in which the announcement of an allegation was made (e.g., r= -1, s= 0 indicates the period from the last pre-announcement year to the end of the announcement year). (See Table 1 for a complete list of the definitions of the variables used in this study.)

Ideally, we would like to know the difference between what investor's think earnings would have been in the absence of the alleged illegal behavior and what they think earnings will be, given the allegation. Reported earnings may be an inadequate proxy for changes in investors' earnings expectations. To capture changes in expectations for the subset of firms in the *Institutional Brokers Estimate System* (IBES) data base, we use changes in analysts' annual earnings estimates surrounding the announcement. IBES provides both mean and median consensus forecasts of earnings per share for individual firms, as well as the number of analysts following the stock and range of forecasts.[8] Employing this data, we define the change in investors' expectations as the difference between the median consensus of one-year-ahead earnings forecast made in the month prior to the announcement month, and the similar forecast made in the month following the month of

[6] Analyses were replicated using operating earnings excluding extraordinary items and net income as alternative earnings measures. Our conclusions are not sensitive to the measure used.

[7] Karpoff and Lott (1993) use shares outstanding to normalize earnings, ostensibly giving an earning per share change. For the reasons given, we feel that this may be problematic when the interval of measurement spans several years.

[8] Since a reporting lag exists in the IBES data, about 10 days by some estimates (Cornell and Landsman, 1989), the data for the month following the announcement month would contain summary data for forecasts that are either roughly contemporaneous with, or slightly lagging, the announcement.

the announcement. This allows us to measure the change in earnings forecasts before and after the event.[9] The forecasts of earnings per share are scaled by the stock price eleven days prior to the announcement, and the resulting variable is denoted ΔESTEARN.

As discussed earlier, we examine both *ex post* and *ex ante* metrics of risk for assessing the potential role of uncertainty in connection with allegations of corporate misconduct. The *ex post measure* employs equation (1) to determine the change in market-related volatility and residual variation. Specifically, market-related volatility, residual variation, and total variation during the pre-announcement period are compared with the similarly calculated volatility and variation during the period after the event.[10] The change in systematic risk is denoted ΔBETA, the change in residual variation, ΔSTDERR, and the change in total variation, ΔTOTRISK.

We define the change in *ex ante* risk as the percentage change in the dispersion in the annual earnings forecasts made by professional analysts using IBES data, where dispersion is measured by the difference between the lowest and highest earnings estimates in a given month. We denote this variable ΔRANGE. An increase in the range of the earnings forecasts would reveal a decline in concordance among analysts and thus more uncertainty regarding the future earnings of the firm.

Recognizing the difficulty of untangling the relation between a firm's size and reputation, we examine H4 and H5 using combinations of the following four metrics: the natural log of equity market capitalization; the book-to-market ratio (the ratio of the book value of total assets to the sum of the book value of liabilities and preferred stock, and the market value of common equity); binary variables representing the exchange listing (NYSE, AMEX, NASDAQ) of a firm at the time of the allegation; and the number of analysts following the firm in the month preceding the allegation. Equity market capitalization and the book-to-

[9] The forecasts available in IBES are fully adjusted for changes in the shares outstanding at the time of the forecast.

market ratio are both measured as of the fiscal year-end preceding the announcement of the alleged misconduct (t=-1). As discussed earlier, we examine book-to-market ratios since they are frequently used to distinguish among firms on the basis of the importance of growth opportunities. Exchange listing is examined since conventional wisdom holds that listing requirements are most stringent for the NYSE, and least stringent for NASDAQ. We posit that, ceteris paribus, NYSE firms are perceived to have the highest reputational capital and NASDAQ firms, the lowest. Similarly, we posit that a firm's reputation may be reflected in the number of analysts that follow the firm. Analyses discussed in the results section lead us to conclude that exchange listing and the number of analysts have little explanatory power once firm size is accounted for.

The following regression equation is used to test the five nonexclusive hypotheses, H1 to H5:

$$CAR_i(r,s) = \sum_{C=1}^{5} a_C \; D_{Ci} + b \; SIZE_i + c \; BKMKT_i + d \; \Delta X_i + e \; \Delta\Delta_i + \varepsilon_i \qquad (4)$$

where subscripts C and i represent crime category and firm, respectively, $CAR_i(r,s)$ is the cumulative announcement period return over the multiday (t=r, . . . ,s) event window defined relative to the announcement date, D_{Ci} are the five binary variables representing the crime categories defined earlier (by excluding an intercept term, we can include all five categorical variables), $SIZE_i$ is the log of equity market capitalization for firm i, $BKMKT_i$ is the book-to-market ratio for firm i, and ΔX_i and $\Delta\Delta_i$ are the measures of change in firm i earnings and risk, respectively, which may be either *ex post* or *ex ante*, as explained above. ε_i is the error term.

As a check for robustness, for each firm in our sample, we identify a matched-control firm using the performance-matched methodology developed by Barber and Lyon (1996). Utilizing performance-based control-firm methodology facilitates the analyses by addressing the issue of specific industry or performance-

[10] In analyzing risk, our sample drops from 464 to 446 firms once the requirement that 150 consecutive post-announcement daily stock returns are available through CRSP is imposed.

based results. For each of the variables defined above there is a corresponding control-firm-adjusted value given by the difference between the value for the alleged crime-event firm and the associated control firm. For example, the control-firm adjusted abnormal return for firm *i* on day *t*, is defined as $R_{it} = R_{it} - R_{it}^{C}$, where R_{it}^{C} is the abnormal return for the control firm matched to firm *i*. Matching is based on two-digit SIC code and similar performance in year *t*=-1. Performance is measured as return on assets (ROA); the best match must have ROA within a range of 90% to 110% or +/- .01 of the sample firm *i*'s ROA in year *t*=-1. If no two-digit SIC match (control firm) is found, we then search using one-digit SIC code and our ROA requirement; if a one-digit match is not found, the SIC code restriction is relaxed completely and the best match is found based solely on ROA performance.[11] A second control group was created by adding a size matching market capitalization of the control firm within +/- 10 percent or $250 million of the event firm's market value.

III. Empirical Results

A. Shareholder Wealth Effects.

Panel A of Table 2 shows the average daily abnormal returns (AR_t), associated t-statistics (using the method of Brown and Warner (1985)), percent positive AR_ts, and associated non-parametric z-statistics for the 464 event sample, for the 21 days surrounding the first public announcement of alleged criminal activity. Panel A of Table 3 gives CAR results for the 2-day, 3-day, 7-day, and 21-day event windows for the total sample and by litigation category. Consistent with prior research, we find that announcements of alleged corporate misconduct result in statistically significant losses in shareholder wealth. Specifically, the 2-day cumulative average abnormal return is -1.64% and statistically significant (t-statistic of -8.81). In the ten

[11] In determining the best matched-control firm, we screen our potential controls to ensure they are not in our event sample. Robustness checks, such as significant changes in assets, are also conducted to screen our samples for potential confounding influences (such as a mergers and acquisitions). Repeat firms in our matched-control firm sample in any given year are prohibited, ensuring independence among our observations. 401 matched-control firms were found for the 410 event firms with complete COMPUSTAT data. Of the 401 control firm matches, 357 were matched by two-digit SIC, 40 by one-digit SIC, and 4 were matched on ROA only.

days leading up to the announcement, the returns are negative on all but one day (t=-8) and statistically significant in five of the ten days examined. The abnormal returns become positive at t=+2 and generally remain positive and/or not significant.[12] Panel B of Table 3 reports the results when the performance-based control firm methodology described earlier is used. For the total sample, both the unadjusted and control-firm adjusted results show that allegations of misconduct result in statistically significant reductions in shareholder wealth. All of the adjusted abnormal returns are significant using either a parametric t-test or non-parametric z-test, although the non-parametric test indicates that the adjustment appears to be more important for the longer event windows. The null hypothesis of no market reaction to announcements of alleged corporate misconduct is therefore rejected. On average, firms accused of engaging in illegal acts clearly suffer statistically significant losses in shareholder wealth.

Analysis of the variation in the shareholder wealth effects by the five litigation categories identified earlier are also reported in Tables 2 and 3. Both the unadjusted and control-firm adjusted results show that the market reaction is in fact dependent on the type of crime alleged. Fraud has the greatest negative impact on shareholder wealth, with a statistically significant 2-day abnormal return of -3.81%, unadjusted, and -3.28% when control-firm adjusted (Table 3). Indeed, in the case of fraud, both the unadjusted and adjusted abnormal returns are negative and statistically significant over all of the intervals examined. For the antitrust category, while the "unadjusted" results are negative and generally significant, these results are not robust when performance-matched control firm methodology is used. Indeed, the results become positive and insignificant. The results for the categories of bribery and copyright & patent infringement are interesting when one considers both Tables 2 and 3. Allegations of bribery are not associated with shareholder wealth

[12] In addition to employing the SIMM, market-adjusted return methodology is used to determine AR_t. The results are similar with, for example, the 2-day market-adjusted CAR of -1.599% vs. -1.638% with the SIMM, and the 3-day market-adjusted CAR of –1.979%, vs. –1.857% with the SIMM. Using equation (1), post parameter estimates were also determined using a minimum of 150 and maximum of 250-daily returns beginning at t=+11. Since virtually identical AR_t results are found, we conclude that our results are not parameter driven.

losses. Indeed, bribery is unique among the five categories in that there is virtually no suggestion that shareholder wealth suffers as a result of the allegation, and for the 21-day window, the indications from both unadjusted and control-firm adjusted results suggest wealth gains. In the case of copyright & patent infringement violations, minor but insignificant wealth losses occur when multi-day periods are considered. However, the results in Table 2 reveal that shareholder wealth losses associated with copyright & patent infringement violations are statistically significant on day t=-1 (-1.28%). For the "other" category, the results are mixed, with statistically significant wealth losses in the 2-day interval on the nonparametric test, and in the 3-day and 21-day intervals with t-tests, using the unadjusted returns. Although the parametric tests for the control firm-adjusted results for the "other" category indicate the shareholder wealth losses are not significant over any interval examined, nonparametric comparisons indicate significant negative wealth effects for the 2-day and 21-day intervals.

A point worth noting from Table 3, Panel A, is that the magnitude of the wealth losses tends to increase for longer event windows. For the total sample, estimated losses increase from 1.64% for the 2-day window to 3.41% for the 21-day window. This increase in (more negative) CARs as the event window is lengthened suggests that information relating to the alleged criminal activity is not limited to the 2-day announcement period. Interestingly, while the overall conclusions hold for the control-firm-adjusted abnormal returns reported in Panel B, the relationship between the magnitude of loss and the length of the event window is less dramatic.[13]

The results in Tables 2 and 3 reveal that the shareholder wealth effects associated with corporate misconduct do exhibit variation and depend on the type of misconduct alleged, supporting H1. Our results with respect to the fraud category, however, differ somewhat from the findings of Karpoff and Lott (1993) who examine only the category of criminal fraud and find a statistically significant 2-day abnormal return of

–1.58% (versus our finding of –3.81%). Since we use similar methodology, but a different sample period, the difference in the magnitudes of our results may be a consequence of either a difference in investor response to fraud, or in the composition of the fraud sample. Support for the former case is found in Reichert, Lockett and Rao (1996), who find a statistically significant increase in the market response to corporate indictments after 1987 and attribute this to increased public awareness. In addition, given the growth in socially responsible mutual funds, it appears plausible that allegations of corporate misconduct may have become more newsworthy, and the reputational losses more severe, than in earlier periods.

B. Sample Characteristics and Statistics.

Earnings. Descriptive statistics on the average change in normalized reported earnings for the entire sample during different intervals (ΔEARN(r,s)) are provided in Table 4, a breakdown by litigation category is given in Table 5, and control-firm adjusted results are presented in Table 6. Changes in operating earnings are given for each of the year–on–year periods beginning two years prior to the year of announcement, and for the three–year period from t= –2 to t= +1. From Table 4, the means for ΔEARN(–1,0) and for ΔEARN(–2,-1) indicate that earnings as a percent of assets fell by 0.68 and 0.08 percentage points, respectively, with associated t-statistics (not shown) of –0.956 and –0.207. Indeed, although the total sample and three of the five litigation categories display negative changes in reported earnings for the year of the announcement (-1,0), none of the individual crime categories shown in Table 5 exhibit statistically significant earnings declines. However, when we examine how the earnings of firms accused of corporate misconduct change *relative to those of similar firms* at that time, we reach different conclusions. Table 6 reports the results of *ex post* earnings changes from t=-1 to 0 for our total sample (Panel A), as well as after adjusting by our performance-matched control firms (Panel B), and performance and size-matched control firms (Panel C).

[13] Caution is necessary in interpreting the control-firm results since they may be biased by "ripple effects." Ripple effects may, for example, result in wealth losses at similar firms and thus mask the true loss of the alleged offender.

While the negative change in earnings (ΔEARN(-1,0)) are not statistically significant for our unadjusted sample (Panel A), the difference in the changes in *ex post* earnings as a percent of assets between our event firms and control firms becomes negative (-2.19 percentage points) and statistically significant (t-statistic of -2.24). Recognizing that the methodology introduced by Barber and Lyon (1996) does not control for firm size, and as an additional test for robustness, Panel C reports the results when the matched-control firms are found using both the performance (ROA) criterion described earlier as well as a market capitalization criterion. Although introducing the additional size-matching criterion reduces sample size significantly (225 observations), the results in Panel C strengthen our conclusion that statistically significant decreases in *ex post* earnings occur during the year of the announced allegation: *ex post* earnings decline by 3.94 percentage points with an associated t-statistic of -2.80, and the nonparametric test also supports the finding of earnings decline.

We next consider our *ex ante* measure of earnings by considering the change in median analysts' forecasts from the month prior to the announcement month to the month following the announcement (ΔESTEARN). Panel A of Table 6 shows that, on average, analysts do revise their forecast of future earnings downward when firms are alleged to have engaged in corporate misconduct. For the overall sample, the mean change in analysts' earnings forecasts (normalized by stock price at t=-11) is –0.44 with an associated t-statistic of –3.07. Panels B and C, show results when matched-control firm methodology is used. It should be noted that our sample sizes drop dramatically with control-firm matching, due to that fact that many of the control firms are not in the IBES database (the sample size falls from 218 to 139 when using performance-matched controls, and to just 65 when the additional size-matching criterion is applied). Though we do find that control adjusted mean changes are still negative, and that the number of negative changes exceeds the number of positive changes, only the changes reported in Panel C approach statistical significance (with a t-statistic of -1.87, and a non-parametric z-statistic of -1.14).

Turning to the five litigation categories in Table 5, the mean change in analysts' forecasts (ΔESTEARN) is shown to be negative in all categories except antitrust, with the largest change occurring with the fraud (-0.66) and other (-0.77) categories, which are both statistically significant (t-statistics of –2.94 and –2.80, respectively, not shown). However, in results not shown, analyses of the categories of misconduct fail to pass the robustness test with respect to the control-firm approach (though the sample sizes are dramatically lower). In conclusion, while we do find some support for H2 and the adverse consequences of allegations in terms of both our *ex post* and *ex ante* measures of earnings changes, caution is warranted given the lack of robustness. The linkage between allegations of corporate misconduct and levels of earnings remains unclear.

Risk. As defined in Section II.B., we examine the role of *ex post* and *ex ante* metrics for risk in explaining the observed shareholder wealth effects. The *ex post* measures, ΔTOTRISK, ΔSTDERR, and ΔBETA, measure the change in the pre-announcement and post-announcement total risk, residual variation, and systematic risk, respectively. Our *ex ante* measure, ΔRANGE, measures the change in concordance among professional analysts regarding the earnings of the firm subsequent to the announced allegation of misconduct. The results in Table 4 reveal that, for the total sample, both ΔTOTRISK and ΔSTDERR are positive (2.02 and 1.96, respectively with t-statistics, not shown, of 2.85 and 2.67, respectively), whereas ΔBETA is negative (-0.094 with a t-statistic, not shown, of -3.46). ΔRANGE is positive 11.25% (with a t-statistic, not shown, of 1.73). The highly significant increases in both ΔTOTRISK and ΔSTDERR, and the increase in ΔRANGE, indicate that uncertainty increases with announced allegations of misconduct.

In analyzing the change in *ex post* and *ex ante* risk by crime category (Table 5), ΔTOTRISK and ΔSTDERR are positive and significant (t-statistics not shown) for fraud and copyright & patent infringement categories. It is suggestive that allegations of fraud result in the largest loss in shareholder wealth, and also the largest positive changes in ΔTOTRISK, ΔSTDERR, and ΔRANGE (3.83, 4.45, and 35.3, respectively).

For the category of bribery, where no statistically significant shareholder wealth effects are observed (Tables 2 and 3), both total risk and residual variation decrease slightly (though not significantly). Due to the small sample sizes involved, we do not report control-firm adjusted results by crime category.

C. Multivariate Regression Analysis.

Size and Reputation. To the extent that the observations in the litigation categories display systematic differences in size and reputation, the wealth effects noted above and imputed to differences in the categories may, in fact, be related to size and reputation. Table 5 indicates there are large differences among the categories, especially in terms of market capitalization and book-to-market variables. To pursue the effects of size and reputation on the observed wealth effects, we perform separate regressions of the 2-day CARs on binary variables differentiating among the announcement categories and the variables hypothesized to reflect size and reputation influences. Table 7 provides the results of the regressions. Columns A through C of Table 7 show the impact of each of the reputation and size variables; columns D and E show the results for combinations of the variables. The first regression (column A) uses exchange listings alone as the size and reputation proxy and the reference category is the NASDAQ exchange listing (NYSE and AMEX are binaries). The second regression (column B) explores the number of analysts (ANALYSTS) following the firm, and the third regression (column C) uses firm size (SIZE) along with book-to-market (BKMKT). The results of the first regression indicate that shareholders of NYSE listed firms suffer significantly smaller losses in connection with criminal allegations than shareholders of NASDAQ firms. F-tests (not shown) indicate no significant difference between returns for NYSE and AMEX firms. The results of the second regression indicate that the magnitude of allegation-related wealth losses is significantly smaller for firms with larger analysts following. Indeed, one would generally expect more analysts to follow firms listed on the NYSE. Positive coefficients for SIZE and BKMKT in column C show that large firms with relatively

higher book-to-market ratios (lower growth opportunities relative to assets-in-place) also experience smaller shareholder wealth losses, although the BKMKT coefficient is not statistically significant.

The results for exchange listing, analysts following, and size are all consistent with a conclusion that larger, better known firms have significantly lower percentage wealth losses related to announcements of allegations of corporate misconduct. Since there are high positive correlations among exchange listing, analysts following, and firm size, we perform two regression experiments to determine which proxy (or proxies) serves best. Column D includes the exchange listing binary variables along with SIZE and BKMKT; column E includes the number of analysts following the firm with SIZE and BKMKT. Comparison of columns C, D, and E suggests that once SIZE and BKMKT are controlled, exchange listing and number of analysts following a firm do not contribute significantly to explaining shareholder wealth effects of the announcements (furthermore, using the ANALYSTS variable dramatically reduces the sample size). The results for firm size are consistent with either the economy of scale or economy of reputation hypotheses described earlier in H4. If a given criminal act imposes a significant component of fixed costs in terms of legal expenses, fines, and loss of goodwill, then the percentage wealth decline will be smaller, the larger the firm's capitalization or the greater its reputation. Also indicated by the regression is that percentage wealth changes are algebraically larger (less negative) for larger firms. This relationship can easily be seen in Figure 1, which shows the scatter plot of the relationship between the estimated 2-day abnormal returns and the natural log of market capitalization, and suggests that the magnitude of the *percentage losses* is decreasing in firm size which is consistent with the positive regression coefficient on the size variable in Table 7. Although the positive sign for coefficient for BKMKT is consistent with H5, it is not significant.

Earnings and Risk. Given our findings, and to explore further the explanatory power of various measures of reported and forecasted earnings, as well a changes in risk, while controlling for the type of alleged misconduct (H1), the effects of size (H4), and growth opportunities (H5), we regress the cumulative

average announcement period returns for alternative event windows against the five categorical binary variables (we do not include a regression intercept term), SIZE, BKMKT, and measures of earnings and risk changes (equation 4). We expect that announcement-period returns should be positively related to the reported or expected earning changes, or, put another way, smaller declines in earnings should result in smaller losses to shareholders of announcing firms (H2). We expect increases in uncertainty to have a negative impact on shareholder wealth (H3). Furthermore, firm-specific risk, which is more likely to be impacted by the type of corporate activities at issue here, is relevant to the extent that share price movements in the period immediately surrounding the announcement date are likely to be the result of purchases and sales by informed traders.

Regression results using the maximum number of observations available for *ex post* and *ex ante* earnings and risk changes are presented in Table 8. Panel A gives results using the *ex post* measure of change in reported earnings over the fiscal year during which the announcement occurred, ΔEARN (-1,0), as well as the *ex post* change in risk, ΔSTDERR.[14] Panel B gives results using the *ex ante* measures of change in analysts annual earnings forecasts, ΔESTEARN, and the *ex ante* change in risk, ΔRANGE, over the same period. Noting that the magnitude of shareholder losses is substantially larger for longer event windows, we include regression estimates using the 2-day, 7-day, and 21-day event windows. The longer event windows are more relevant if new information about the magnitude of earnings effects of the alleged activities is continually being assimilated throughout the announcement window.

The coefficients on the binary variables representing the five categories of alleged criminal behavior indicate that distinguishing among the types of crime is important in explaining wealth losses for all three event-windows in terms of our *ex post* measures, and for our *ex ante* measures during 2-day and 21-day event

[14] The correlation between the standard error of estimate and the standard deviation of raw returns is 0.98. In subsequent regressions we also use the standard deviation of raw returns from the pre- and post-announcement periods with virtually identical results.

windows (supporting H2). Although the results vary somewhat depending on the length of the event window and whether *ex post* or *ex ante* measures of earnings and risk changes are being used, the fraud category once again stands out with the most negative market response to allegations of misconduct.

The size variable has a positive influence on abnormal returns using both our *ex post* and *ex ante* earning and risk changes and is significant in a majority of the regressions. The book-to-market ratio is also always positive using either our *ex post* or *ex ante* data, but is only significant for the 2-day and 21-day event windows when *ex post* information is considered. It appears that, along with the category of alleged misconduct, size plays an important role in explaining the observed wealth effects.

The results for the wealth effects of *ex post* measures of earnings change are perplexing (ΔEARN). For the 2-day event period, the coefficient of earnings change is positive, as expected, but not statistically significant. However, the relationship becomes negative and significant for the 21-day event window. The reported change in earnings, of course, is not known to the market until the post-announcement annual earnings are revealed, but we would expect rational investors to have made unbiased estimates of the results, and that those estimates would be incorporated into share prices during the announcement window. The evidence on the impact of the change in *ex post* risk (ΔSTDERR) is more reassuring and consistent with our earlier conclusions. For all three intervals, the coefficients are negative and highly significant, with t-statistics of -2.92, -3.78, and -3.55, respectively (once again supporting H3).[15]

Turning to the results based on *ex ante* earnings and risk changes (Table 8, Panel B), we find positive coefficients for forecast earnings change in the two longer event windows (with t-statistics of 2.96 and 2.20, respectively, and p-levels of .01 and .06, respectively). However, the coefficient is insignificantly negative

[15] The correlation between ΔEARN and ΔSTDERR is 0.44, and given the relatively low r-square of the regressions in Panel A of Table 8, this level of correlation could lead to multicollinearity issues. We estimated a variation of equation (4) that omitted ΔSTDERR, and found positive coefficients for ΔEARN for the 2-day and 7-day event windows, and a negative, but insignificant coefficient for the 21-day

for the 2-day window. The coefficients for the *ex ante* change in risk, ΔRANGE, are negative in all three regressions, and highly significant for the two-day window. This suggests that, at least in the short-run, shareholder wealth is significantly related to a reduction in concordance (an increase in ΔRANGE) among professional analysts.

Overall, the results in Table 8 suggest that uncertainty regarding implications of allegations of wrongdoing is one reason for the shareholder wealth effects. In addition, along with the type of alleged misconduct, size is an important determinant of shareholder wealth losses. Conclusions reached regarding changes in earnings clearly depend upon whether *ex post* or *ex ante* measures are used, and the event window analyzed. Only the results using *ex ante* metrics for earnings change and longer windows give support to H2, that wealth losses are, at least in part, directly attributable to negative earnings implications arising from alleged corporate misconduct. Using the coefficients from the 7-day window regressions, a one-standard-deviation decrease in *ex ante* earnings change would lower shareholder wealth by an additional 1.96 percent which is noteworthy.

D. Survivorship Bias

As mentioned in the Data and Methodology section, there is some concern that our data requirements naturally lead to a survivorship bias. This bias could result in significant under representation of firms that experienced the most serious repercussions from alleged wrongdoing. For example, the regression methodology requires not only a minimum of 160 pre-announcement days of CRSP stock returns data, but also 150 post-announcement stock returns for estimating post- announcement market model coefficients. In addition, measuring the change in earnings from the year prior to the announcement date to the year during which the announcement occurred may require that the accused firm survive for up to one full year after the

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window. Our conclusion is that the significant negative coefficient for the 21-day window may be the result of this collinearity.

allegation. The very firms for which the consequences of the alleged criminal behavior are the worst are the most likely not to survive long enough to meet our data requirements.

As a check on the potential for survivorship bias, we conduct a two-year follow-up on 54 firms that were in the original sample of announced allegations of corporate crime appearing in the *Wall Street Journal* and *FACTIVA*, but failed to meet data availability requirements for either CRSP or COMPUSTAT. Using the *Wall Street Journal Index*, 36 of the firms eliminated were found to have experienced some additional form of distress: 10 filed for Chapter 11 protection, 17 were acquired, 5 experienced changes in the top executive ranks, and 4 underwent restructurings. The bankruptcy or acquisition of 27 of the 54 firms suggests that, following allegations of illegal acts, the viability of many firms accused of illegal activities is in serious jeopardy. Questions regarding the long-run viability of WorldCom Inc. and Enron are recent examples. The clear implication is that data requirements imposed for quantifying the pre- to post-announcement changes used in our study (and others) likely result in a significant survivorship bias toward understatement of the negative earnings and risk implications of allegations of illegal activities.

IV. Conclusions

Our study examines the magnitude and causes of market-imposed penalties on publicly traded companies alleged to have committed illegal acts. Using a more extensive sample than prior studies, we test five hypotheses (H1 – H 5) as potential explanations for the market's reaction to allegations of corporate misconduct. Our finding of an average announcement period wealth loss of 1.64% confirms earlier findings of economically and statistically significant losses in shareholder wealth. In investigating five subcategories of crimes, we find that three experience statistically significant negative announcement period returns for 2-day, 3-day and 21-day event windows. We further find that the losses in wealth associated with allegations of fraud are substantially larger than those in the other categories examined, and that allegations of bribery and copyright and patent infringement are not associated with statistically significant shareholder losses in any of the multiday event windows examined. Furthermore, for the overall sample and for the fraud category, our

CAR results are robust when control-firm methodology is used. Regression analysis supports the conclusion that the observed wealth effects are related to the type of misconduct alleged. Clear support for H1 is found.

We investigate the potential linkage between accusations of crime and changes in corporate earnings by considering both changes in reported (*ex post*) earnings and in analysts' forecasts of (*ex ante*) earnings (H2). Control firm methodology is employed to check the robustness of our results. Both our unadjusted and adjusted *ex post* earnings measures show a decrease in reported earnings, though the unadjusted decreases were not statistically significant. However, control-firm adjusted results reveal that statistically significant declines in reported earnings occur in the year of the announced allegation of misconduct. In cross–sectional regressions, after controlling for crime category, size, and book-to-market, however, we do not find clear evidence of the expected direct statistical link between changes in *reported* earnings and market-imposed costs of alleged crimes. Thus, while we find reliable evidence of declines in average reported earnings, and significant market-imposed costs on firms alleged to have engaged in illegal acts, it does not appear that investors can reliably forecast which firms will suffer above average earnings declines, and which will suffer below average earnings declines.

Using a subset of the data for which analysts' forecasts are available, regression analysis reveals some support for a direct link between market-imposed costs of alleged misconduct and revisions in *ex ante* earnings using 7-day and 21-day event windows. We do not, however, find a significant relationship when using a 2-day event window. We speculate that the shorter window is not long enough to capture the full process of revision in expectations associated with the announcement, perhaps because investors await more definitive information relating to the allegations. The results for the longer event windows suggest that the forecasted impact on earnings do explain a substantial portion of the cross-section variation in investor losses relating to the allegations.

In examining the association between changes in risk and announced allegations of corporate crime (H3), we find strong support for a conclusion that changes in risk occurring around the time of the announcement are systematically related to the observed wealth effects. Furthermore, these findings are robust to the length of the event window employed. In the 2-day event window, we also find support for the conclusion that increases in disparity among professional analysts regarding the future earnings of firms accused of engaging in corporate misconduct contribute to the announcement-period wealth losses.

Examination of the relationship between proxies for size and reputation (H4 and H5) reveal that, while market-imposed dollar wealth losses appear to be increasing in firm size, percentage wealth losses are decreasing. This is consistent with the existence of significant fixed costs associated with allegations of criminal behavior and an implication of scale economies based either on sheer size, diversification, or reputation. Firms whose value is dependent on growth opportunities appear to suffer greater wealth losses as a consequence of the criminal allegations, and in general, the results indicate that firm size and reputation are important determinants that should be controlled for in evaluating cross-sectional differences in wealth losses associated with corporate crime.

A survivorship bias appears to plague studies which compare the "before and after" impact of allegations of serious corporate misconduct. This bias works against finding significant adverse earnings and risk consequences related to the announced allegations. Our study is no exception. Follow-up of 54 firms that experienced allegations of misconduct, and for which post-announcement financial data was unavailable, indicated a high incidence of disappearance, either through bankruptcy or merger. Notwithstanding the survivorship bias, however, the results presented offer the strongest support to date for a direct linkage between the market-imposed penalties associated with allegations of illegal acts and the subsequent changes in the level or uncertainty of earnings.

REFERENCES

Agrawal, Anup, Jeffrey F. Jaffe, and Jonathan M. Karpoff. "Management Turnover and Governance Changes Following The Revelation of Fraud." *Journal of Law and Economics,* 42 (1999), 309-342.

Barber, Brad M. and John D. Lyon. "Detecting Abnormal Operating Performance: The Empirical Power and Specification of the Test Statistics." *Journal of Financial Economics*, 41 (1996), 359-399.

Brown, Stephen J. and Jerold B. Warner. "Using Daily Stock Returns: The Case of Event Studies." *Journal of Financial Economics*, 14 (1985), 3–31.

Cornell, Bradford, and Wayne R. Landsman. "Security Price Response to Quarterly Earnings Announcements and Analysts' Forecast Revisions." *The Accounting Review*, 4 (1989), 680-693.

Jarrell, Gregg, and Sam Peltzman. "The Impact of Product Recalls on the Wealth of Sellers." *Journal of Political Economy*, 3 (1985), 512-536.

Karpoff, Jonathan and John R. Lott, Jr. "The Reputational Penalty Firms Bear from Committing Criminal Fraud." *Journal of Law and Economics*, 36 (1993), 757–802.

Klein, Benjamin and Keith B. Leffler. "The Role of Market Forces in Assuring Contractual Performance." *Journal of Political Economics*, 89 (1981), 615-641.

Reichert, Alan K., Michael Lockett, and Ramesh P. Rao. "The Impact of Illegal Business Practice on Shareholder Returns." *The Financial Review,* 1 (1996), 67–85.

Skantz, Terrance R., Dale O. Cloninger, and Thomas H. Strickland. "Price–Fixing and Shareholder Returns: An Empirical Study." *The Financial Review*, 1 (1990), 153–163.

Social Investment Forum, *2001 Report on Socially Responsible Investing Trends in the United States*, (http://www.socialinvest.org/areas/research/trends/2001-Trends.htm).

Figure 1: Two-day Announcement Returns vs. log of Mark Capitalization

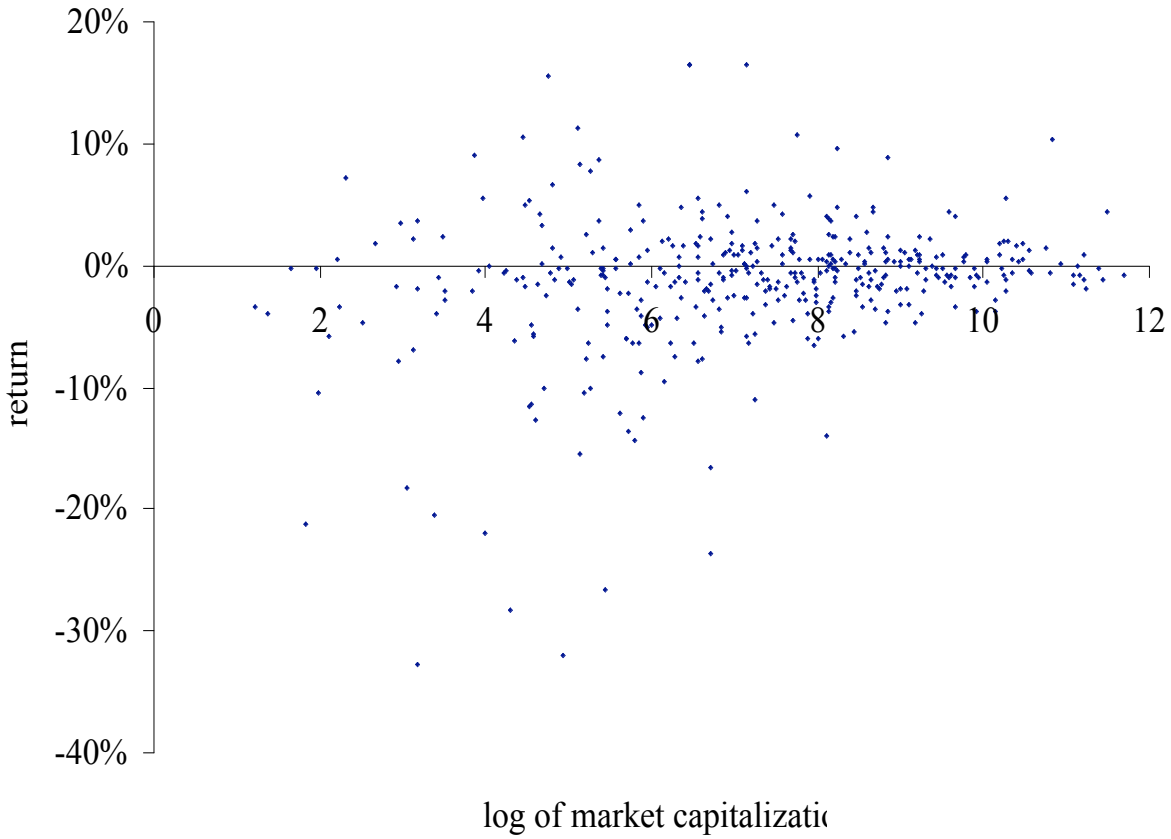

Table 1: Variable Definitions

VARIABLE	DEFINITION	SOURCE
CAR(r,s)	Announcement period excess returns obtained by Single Index Market Model (SIMM), days r to s, relative to announcement date (t=0)	CRSP (Brown and Warner methodology)
NYSE, AMEX	Binary variables representing listing on the New York and American Stock Exchanges, respectively	CRSP
Antitrust, Bribery, Fraud, Copyright & Patent	Binary variables representing categories of alleged criminal activity	*Wall Street Journal, FACTIVA*
Market Capitalization	Equity capitalization at the fiscal year-end prior to the announcement ($millions)	COMPUSTAT Items 24, 25
SIZE	Natural log of Market Capitalization at the fiscal year-end prior to the announcement	Calculated
BKMKT	Ratio of book value of total assets to the sum of book value of liabilities and preferred stock and the market value of common equity at the fiscal year-end prior to the announcement [BKMKT =total Assets/(total Assets-book value of common equity+market value of common equity]	COMPUSTAT Items 6, 216, 24, 25, and either 56, 10 or 130
□EARN(r,s)	Change in reported earnings, scaled by assets, from fiscal year r to s, relative to announcement year (t=0)	COMPUSTAT Items 18, 6
□STDERR	Change in SIMM residual variation from the preannouncement interval (days -260, -11) to the post announcement interval (days +11, +260)	CRSP
ΔTOTRISK	Change in total variation from the preannouncement interval (days -260, -11) to the post announcement interval (days +11, +260)	CRSP
□BETA	Change in SIMM beta estimate from the preannouncement interval (days -260, -11) to the post announcement interval (days +11, +260)	CRSP
ANALYSTS	Number of analysts following the company in the month prior to the announced allegation	IBES
□ESTEARN	Change in median analysts' forecast, from one month prior to the month after the allegation, scaled by stock price eleven days prior to announcement date	IBES
□RANGE	Percentage change in the range of the analysts earnings estimates, from one month prior to the month after the allegation	IBES

Table 2: Average Daily Excess Returns During 21-Days Surrounding an Announcement of Alleged Corporate Crime

Average daily excess returns (AR_t), expressed in percent, are based on market model parameters calculated over the period -260 days to -11 days relative to the announcement date. T-statistics are calculated using the methodology in Brown and Warner (1985). % positive is the fraction of abnormal returns that are positive. Antitrust, Bribery, Fraud, Copyright & Patent Infringement, and Other represent categories of alleged criminal activity.

Panel A - Total sample, Antitrust, and Bribery

Category	Total sample		No. Obs. = 464		Antitrust		No. Obs. = 88		Bribery		No. Obs. = 24	
Day (t)	Avg Excess Return (%)	t-statistic	% positive	z-statistic	Avg Excess Return (%)	t-statistic	% positive	z-statistic	Avg Excess Return (%)	t-statistic	% positive	z-statistic
-10	-0.338	-2.572 *	42.7	-3.11 *	-0.199	-0.969	38.6	-2.025 **	-0.168	-0.401	33.3	-1.429
-9	-0.160	-1.217	44.8	-2.18 **	0.139	0.678	50.0	0.107	-0.454	-1.084	37.5	-1.021
-8	0.124	0.943	47.0	-1.25	-0.132	-0.641	38.6	-2.025 **	0.256	0.61	50.0	0.204
-7	-0.285	-2.166 **	42.7	-3.11 *	-0.086	-0.417	42.0	-1.386	0.048	0.115	50.0	0.204
-6	-0.242	-1.842	44.4	-2.37 **	-0.315	-1.532	43.2	-1.173	0.300	0.714	62.5	1.021
-5	-0.293	-2.229 **	45.0	-2.09 **	-0.060	-0.291	38.6	-2.025 **	-0.196	-0.468	41.7	-0.612
-4	-0.244	-1.860	46.3	-1.53	-0.100	-0.488	46.6	-0.533	-0.614	-1.464	41.7	-0.612
-3	-0.263	-1.998 **	48.7	-0.51	0.287	1.397	51.1	0.107	0.350	0.836	50.0	0.204
-2	-0.196	-1.493	47.6	-0.98	-0.051	-0.249	45.5	-0.746	0.220	0.525	37.5	-1.021
-1	-1.101	-8.384 *	42.5	-3.20 *	-0.226	-1.102	48.9	-0.107	-0.687	-1.64	50.0	0.204
0	-0.536	-4.082 *	45.5	-1.90	-0.627	-3.054 *	43.2	-1.173	0.698	1.664	50.0	0.204
1	-0.220	-1.673	42.2	-3.30 *	-0.059	-0.289	48.9	-0.107	0.309	0.738	45.8	-0.204
2	0.056	0.423	48.1	-0.79	-0.353	-1.719	39.8	-1.812	-0.476	-1.134	45.8	-0.204
3	0.178	1.355	50.9	0.33	0.034	0.163	50.0	0.107	1.171	2.793 **	70.8	1.837
4	0.112	0.851	49.6	-0.14	0.166	0.81	48.9	-0.107	0.100	0.239	45.8	-0.204
5	-0.089	-0.678	45.7	-1.81	-0.240	-1.167	43.2	-1.173	-0.517	-1.233	37.5	-1.021
6	0.096	0.733	49.1	-0.33	-0.231	-1.124	46.6	-0.533	0.477	1.138	54.2	0.204
7	0.213	1.620	48.1	-0.79	-0.208	-1.014	44.3	-0.959	0.813	1.938	58.3	0.612
8	0.177	1.345	52.4	0.98	0.199	0.967	50.0	0.107	0.780	1.861	66.7	1.429
9	-0.260	-1.977 **	45.0	-2.09 **	0.075	0.364	37.5	-2.239 **	-0.067	-0.159	41.7	-0.612
10	-0.144	-1.093	46.3	-1.534	0.080	0.389	52.3	0.32	1.070	2.553 **	75.0	2.245 **

Note: * and ** denote significance at the .01 and .05 levels (two-tailed test), respectively.

Table 2 (continued)

Panel B – Fraud, Copyright & Patent Infringement, and All Other Allegations

Category	Fraud		No. Obs. = 142		Copyright & Patent		No. obs. = 68		Other		No. obs. = 142	
Day (t)	Avg Excess Return (%)	t-statistic	% positive	z-statistic	Avg Excess Return (%)	t-statistic	% positive	z-statistic	Avg Excess Return (%)	t-statistic	% positive	z-statistic
-10	-0.171	-0.614	45.1	-1.091	-0.450	-1.29	42.6	-1.091	-0.567	-2.167 **	44.4	-1.259
-9	0.035	0.125	42.3	-1.762	-0.613	-1.758	42.6	-1.091	-0.273	-1.045	46.5	-0.755
-8	0.031	0.111	51.4	0.252	0.521	1.495	44.1	-0.849	0.163	0.622	48.6	-0.252
-7	-0.074	-0.265	45.8	-0.923	-0.616	-1.768	41.2	-1.334	-0.516	-1.975 **	39.4	-2.434 **
-6	-0.270	-0.969	46.5	-0.755	-0.026	-0.075	45.6	-0.606	-0.365	-1.395	39.4	-2.434 **
-5	-0.254	-0.914	45.1	-1.091	0.137	0.392	60.3	1.576	-0.698	-2.669 **	42.3	-1.762
-4	-0.557	-2.003 **	48.6	-0.252	0.155	0.445	47.1	-0.364	-0.150	-0.572	44.4	-1.259
-3	-0.383	-1.376	45.8	-0.923	-0.532	-1.527	41.2	-1.334	-0.457	-1.748	53.5	0.755
-2	0.086	0.309	50.7	0.084	0.529	1.517	50.0	0.121	-0.986	-3.771 *	46.5	-0.755
-1	-2.111	-7.585 *	40.1	-2.266 **	-1.284	-3.685 *	39.7	-1.576	-0.617	-2.360 **	40.8	-2.098 **
0	-1.700	-6.109 *	38.0	-2.769 *	0.448	1.285	58.8	1.334	0.004	0.015	47.2	-0.587
1	-0.358	-1.288	38.7	-2.601 *	0.099	0.283	47.1	-0.364	-0.423	-1.617	38.7	-2.601 *
2	-0.035	-0.125	54.9	1.091	0.054	0.156	39.7	-1.576	0.490	1.873	50.7	0.084
3	-0.212	-0.76	45.8	-0.923	-0.220	-0.632	47.1	-0.364	0.680	2.602 *	54.9	1.091
4	0.041	0.148	51.4	0.252	0.171	0.491	47.1	-0.364	0.122	0.467	50.0	0.084
5	-0.193	-0.694	47.2	-0.587	0.366	1.05	48.5	-0.121	-0.037	-0.142	45.8	-0.923
6	0.195	0.702	52.8	0.587	0.213	0.612	45.6	-0.606	0.079	0.304	47.9	-0.420
7	0.546	1.962	53.5	0.755	0.102	0.292	41.2	-1.334	0.092	0.352	46.5	-0.755
8	-0.018	-0.066	46.5	-0.755	-0.035	-0.101	57.4	1.091	0.358	1.368	54.9	1.091
9	-0.419	-1.507	48.6	-0.252	-0.124	-0.356	47.1	-0.364	-0.405	-1.550	45.8	-0.923
10	-0.238	-0.853	43.0	-1.594	0.085	0.245	50.0	0.121	-0.503	-1.924	39.4	-2.434 **

Note: * and ** denote significance at the .01 and .05 levels (two-tailed test), respectively.

Table 3: Cumulative Excess Returns and Percentage of Positive Returns over Selected Intervals

The cumulative average abnormal returns (CAR(r,s)), in percent, for day r through s relative to announcement date (sum of average daily excess returns, AR_t). T-statistics are calculated using the methodology in Brown and Warner (1985). % positive is the fraction of CAR(r,s) that are positive. Antitrust, Bribery, Fraud, Copyright & Patent Infringement, and Other represent categories of alleged criminal activity;

Panel A – Results Without Control-Adjustment

Interval	Mean	t-statistic	% pos	z-statistic
Category:	Total		no. obs. = 464	
CAR(-1,0)	-1.6375	-8.814 *	38.6	-4.875 *
CAR(-1,+1)	-1.8573	-8.163 *	39.7	-4.410 *
CAR(-3,+3)	-2.0822	-5.991 *	40.7	-3.946 *
CAR(-10,+10)	-3.4147	-5.673 *	40.9	-3.853 *
Category:	Antitrust		no. obs. = 88	
CAR(-1,0)	-0.8530	-2.939 *	42	-1.386
CAR(-1,+1)	-0.9123	-2.566 **	42	-1.386
CAR(-3,+3)	-0.9958	-1.834	37.5	-2.239 **
CAR(-10,+10)	-1.9060	-2.026 **	37.5	-2.239 **
Category:	Bribery		no. obs. = 24	
CAR(-1,0)	0.0102	0.017	50	0.204
CAR(-1,+1)	0.3197	0.440	62.5	1.021
CAR(-3,+3)	1.5857	1.429	62.5	1.021
CAR(-10,+10)	3.4135	1.777	70.8	1.837
Category:	Fraud		no. obs. = 142	
CAR(-1,0)	-3.8105	-9.684 *	30.3	-4.615 *
CAR(-1,+1)	-4.1687	-8.650 *	30.3	-4.615 *
CAR(-3,+3)	-4.7121	-6.401 *	26.1	-5.623 *
CAR(-10,+10)	-6.0574	-4.751 *	35.2	-3.441 *
Category:	Copyright & Patent		no. obs. = 68	
CAR(-1,0)	-0.8362	-1.697	47.1	-0.364
CAR(-1,+1)	-0.7376	-1.222	47.1	-0.364
CAR(-3,+3)	-0.9070	-0.984	54.4	0.606
CAR(-10,+10)	-1.0202	-0.639	42.6	-1.091
Category:	Other		no. obs. = 142	
CAR(-1,0)	-0.6129	-1.658	38.7	-2.602 **
CAR(-1,+1)	-1.0355	-2.287 **	40.1	-2.266 **
CAR(-3,+3)	-1.3084	-1.892	47.2	-0.587
CAR(-10,+10)	-4.0076	-3.346 *	43.0	-1.594

Panel B – After Adjustment for Matching Control Firms

Interval	Mean	t-statistic	% pos	z-statistic
Category:	Total		no. obs. = 401	
CAR(-1,0)	-1.2216	-3.154 *	44.6	-2.097 **
CAR(-1,+1)	-1.5150	-2.368 **	46.9	-1.199
CAR(-3,+3)	-1.2346	-2.781 *	46.9	-1.199
CAR(-10,+10)	-1.5623	-1.504	42.1	-3.096 *
Category:	Antitrust		no. obs. = 82	
CAR(-1,0)	0.1305	0.210	53.7	0.552
CAR(-1,+1)	0.4750	0.468	57.3	1.215
CAR(-3,+3)	0.4500	0.627	54.9	0.773
CAR(-10,+10)	0.3958	0.214	52.4	0.331
Category:	Bribery		no. obs. = 18	
CAR(-1,0)	-1.1477	-0.544	55.6	0.236
CAR(-1,+1)	2.0115	0.925	61.1	0.707
CAR(-3,+3)	1.0320	0.466	66.7	1.179
CAR(-10,+10)	8.2142	2.075	55.6	0.236
Category:	Fraud		no. obs. = 115	
CAR(-1,0)	-3.2819	-4.397 *	40	-2.052 **
CAR(-1,+1)	-4.1628	-3.563 *	38.3	-2.425 **
CAR(-3,+3)	-3.3130	-3.864 *	34.8	-3.171 *
CAR(-10,+10)	-4.3105	-2.074 **	37.4	-2.611 *
Category:	Copyright & Patent		no. obs. = 63	
CAR(-1,0)	-0.5216	-0.635	49.2	0.000
CAR(-1,+1)	-2.7710	-1.637	52.4	0.252
CAR(-3,+3)	-0.9943	-0.883	41.3	-1.260
CAR(-10,+10)	0.5878	0.257	41.3	-1.260
Category:	Other		no. obs. = 123	
CAR(-1,0)	-0.5662	-0.713	39	-2.344 **
CAR(-1,+1)	-0.2389	-0.179	43.1	-1.443
CAR(-3,+3)	-0.8693	-1.003	52.8	0.541
CAR(-10,+10)	-2.8301	-1.359	38.2	-2.525 **

Note: * and ** denote significance at the .01 and .05 levels (two-tailed test), respectively.

Table 4: Whole Sample Descriptive Statistics

Means, standard deviations, minimum and maximum values for the following variables: CAR(r,s), are announcement period returns, in percent, obtained by Single Index Market Model (SIMM), days r to s; NYSE, AMEX are binary variables representing listing on the New York and American Stock Exchanges, respectively; SIZE is equity capitalization at the fiscal year-end prior to the announcement ($millions); BKMKT is the ratio of book value of total assets to the sum of book value of liabilities and preferred stock and the market value of common equity at the fiscal year-end prior to the announcement; ΔEARN(r,s) is the change in reported earnings, scaled by prior period assets, from fiscal year r to s, relative to announcement year (t=0); ΔTOTRISK, ΔSTDERR, and ΔBETA are the changes in SIMM total variation, residual variation, and the SIMM beta estimate, respectively, from the preannouncement interval (days -260, -11) to the post announcement interval (days +11, +260); ANALYSTS is the number of analysts following the company; ΔESTEARN and ΔRANGE are the appropriately adjusted changes in median analysts' forecast, and range of the analysts earnings estimates, respectively, from one month prior to the month after the allegation. Statistics are reported for the maximum number of observations on each variable.

Variable	No. Obs.	Mean	Std. Dev.	Min.	Max.
CAR(-1,0)	464	-1.638	7.205	-71.426	28.041
CAR(-3,+3)	464	-2.082	10.469	-83.040	38.764
SIZE ($x10^6$)	426	7014.9	14615.8	4.0	119988.9
BKMKT	426	0.693	0.281	0.019	1.669
ΔTOTRISK ($x10^3$)	446	2.0243	14.991	-49.1608	208.9893
ΔSTDERR ($x10^3$)	446	1.9615	15.488	-50.0575	208.5958
ΔBETA	446	-0.0938	0.574	-3.940	2.2438
ΔEARN (-2,+1) (X 100)	386	0.528	17.837	-162.873	108.275
ΔEARN (-2,-1) (X 100)	424	-0.081	8.092	-61.426	49.396
ΔEARN (-1,0) (X 100)	410	-0.678	14.348	-112.883	93.485
ΔEARN (0,+1) (X 100)	389	0.434	15.644	-129.952	64.234
ΔEARN (+1,+2) (X 100)	358	2.108	17.464	-91.479	166.648
ANALYSTS	232	16.27	10.48	1	43
ΔESTEARN (X 100)	232	-0.469	2.090	-12.768	14.211
ΔRANGE (X 100)	219	11.253	96.211	-100	1000
NYSE (%)	464	57.5	49.5	NA	NA
AMEX (%)	464	8.0	27.1	NA	NA
NASDAQ (%)	464	34.5	47.6	NA	NA

Table 5: Descriptive Statistics by Crime Category

Means, and standard deviations for the following variables: CAR(r,s), are announcement period returns obtained by Single Index Market Model (SIMM), days r to s; NYSE, AMEX are binary variables representing listing on the New York and American Stock Exchanges, respectively; Antitrust, Bribery, Fraud, Copyright & Patent Infringement, and Other represent categories of alleged criminal activity; Market Capitalization is equity capitalization at the fiscal year-end prior to the announcement ($millions); BKMKT is the ratio of book value of total assets to the sum of book value of liabilities and preferred stock and the market value of common equity at the fiscal year-end prior to the announcement; ΔEARN(r,s) is the change in reported earnings, scaled by prior period assets, from fiscal year r to s, relative to announcement year (t=0); ΔTOTRISK, ΔSTDERR, and ΔBETA are the changes in SIMM total variation, residual variation, and the SIMM beta estimate, respectively, from the preannouncement interval (days -260, -11) to the post announcement interval (days +11, +260); ANALYSTS is the number of analysts following the company; ΔESTEARN and ΔRANGE are the appropriately adjusted changes in median analysts' forecast and range of the analysts earnings estimates, respectively, from one month prior to the month after the allegation. Statistics are reported for the maximum number of observations on each variable.

Category	Antitrust			Bribery			Fraud			Copyright & Patent			Other		
Variable	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.
CAR(-1,0)	88	-0.853	3.299	24	0.010	4.554	142	-3.810	10.251	68	-0.836	5.725	142	-0.613	5.724
CAR(-3,+3)	88	-0.996	5.363	24	1.586	7.394	142	-4.712	12.992	68	-0.907	8.863	142	-1.308	10.795
SIZE ($x10^6$)	82	12009.3	19786.7	19	7551.4	12833.8	127	2752.1	5327.5	65	7414.3	13901.7	133	7734.4	16452.2
BKMKT	82	0.669	0.2506	19	0.808	0.2284	127	0.770	0.2885	65	0.571	0.2657	133	0.677	0.2825
ΔTOTRISK($x10^3$)	86	0.1939	4.8307	24	-0.3928	5.4464	138	3.8318	24.0485	67	3.8703	11.0168	131	0.6069	10.9088
ΔSTDERR ($x10^3$)	86	-0.0355	4.2312	24	-0.6223	4.6453	138	4.4495	23.6307	67	2.8602	9.6685	131	0.879	10.285
ΔBETA	86	-0.0363	0.4455	24	0.1489	0.5264	138	-0.1412	0.6455	67	-0.1164	0.6007	131	-0.1144	0.5574
ΔEARN (-2,+1) (X 100)	79	2.7006	7.9891	18	0.2798	6.7298	113	0.1703	14.9389	59	-0.6801	31.3055	117	0.0556	17.2212
ΔEARN (-2,-1) (X 100)	82	0.329	4.048	19	0.679	2.218	125	-0.560	8.842	65	0.888	9.109	133	-0.466	9.189
ΔEARN (-1,0) (X 100)	82	0.225	8.360	18	-0.121	3.434	121	-1.540	17.260	63	1.217	10.966	126	-1.464	16.652
ΔEARN (0,+1) (X 100)	80	2.304	9.494	18	-0.308	5.307	114	0.753	11.582	59	-3.487	25.701	118	0.930	16.706
ΔEARN (+1,+2) (X 100)	78	1.861	7.121	16	0.802	2.038	103	0.947	17.342	55	9.997	30.368	106	-0.477	13.849
ANALYSTS	49	16.1	11.2	8	15.6	11.0	62	13.9	9.6	35	18.2	10.9	78	17.5	10.3
ΔESTEARN (X 100)	49	0.004	2.413	8	-0.151	1.378	62	-0.656	1.757	35	-0.203	1.264	78	-0.768	2.420
ΔRANGE (X 100)	49	-10.775	40.884	7	22.649	73.169	57	35.263	145.856	32	0.929	97.649	74	10.732	69.994
NYSE (%)	88	72.7	44.8	24	75.0	44.2	142	47.9	50.1	68	47.1	50.3	142	59.9	49.2
AMEX (%)	88	4.5	20.9	24	16.7	38.1	142	12.0	32.6	68	7.4	26.3	142	4.9	21.7
NASDAQ (%)	88	22.7	42.1	24	8.3	28.2	142	40.1	49.2	68	45.6	50.2	142	35.2	47.9

Table 6: Analysis of earnings and risk using both performance-matched control firm methodology (Barber and Lyon (1996)), and performance and size-matched control firm methodology, for 2-day, 7-day and 21-day event windows. Statistics are reported for the maximum number of observations on each variable.

Panel A, Total Sample						
Variable	Obs	Mean	t-stat	% Neg	% Pos	z-stat
CAR(-1,0)	406	-1.358	-4.63*	61.3	38.7	-4.52*
CAR(-3,+3)	406	-2.044	-4.34*	60.3	39.7	-4.12*
CAR(-10,+10)	406	-3.241	-4.42*	60.3	39.7	-4.12*
SIZE (x 10^6)	406	7275.8	9.83*	0.0	100.0	20.1*
BKMKT	406	0.690	49.1*	0.0	100.0	20.1*
ΔEARN(-1,0)	406	-0.687	-0.96	44.3	55.7	2.23*
ΔSTDERR (X 10^3)	406	1.359	2.01*	49.3	50.7	0.25
ΔTOTRISK (X 10^3)	406	1.311	1.86**	50.0	50.0	0.05
ΔESTEARN (X 100)	218	-0.44	-3.07*	48.2	28.4	-3.28*
ΔRANGE (X 100)	218	11.49	1.76***	33.0	35.3	-1.47***
Panel B, Performance Matched Control Sample						
Variable	Obs	Mean	t-stat	% Neg	% Pos	z-stat
CAR(-1,0)	390	-0.0117	-2.98*	55.4	44.6	-2.07**
CAR(-3,+3)	390	-0.0135	-2.13**	52.6	47.4	-0.96
CAR(-10,+10)	390	-0.0172	-1.66	53.3	46.7	-1.27
SIZE (x 10^6)	390	6681.1	8.82*	11.8	88.2	15.0*
BKMKT	390	-0.0382	-2.30**	54.4	45.6	-1.67**
ΔEARN(-1,0)	390	-0.0219	-2.24**	52.6	47.4	-0.96
ΔSTDERR (X 10^3)	390	1.393	1.39	43.8	56.2	2.37**
ΔTOTRISK (X 10^3)	390	1.439	1.42	44.4	55.6	2.18**
ΔESTEARN (X 100)	139	-0.132	-0.84	50.4	43.2	-0.70
ΔRANGE (X 100)	139	-9.02	-0.69	32.4	46.8	-0.53
Panel C, Performance and Market Size Control Sample						
Variable	Obs	Mean	t-stat	% Neg	% Pos	z-stat
CAR(-1,0)	225	-0.0195	-3.86*	61.8	38.2	-3.47*
CAR(-3,+3)	225	-0.0235	-2.81*	58.7	41.3	-2.53*
CAR(-10,+10)	225	-0.0449	-3.42*	57.8	42.2	-2.27**
SIZE (x 10^6)	225	54.788	4.42*	35.6	64.4	4.27*
BKMKT	225	-0.0058	-0.27	48.9	51.1	0.27
ΔEARN(-1,0)	225	-0.0394	-2.80*	56.9	43.1	-2.00**
ΔSTDERR (X 10^3)	225	2.875	2.13**	43.6	56.4	1.87**
ΔTOTRISK (X 10^3)	225	3.062	2.25**	42.7	57.3	2.13**
ΔESTEARN (X 100)	65	-0.579	-1.87***	55.4	40.0	-1.14
ΔRANGE (X 100)	65	-3.21	-0.29	29.2	47.7	-0.38

*, **, and *** denote significance at .01, .05, and .10 levels, respectively

Table 7: Regression Results, Size and Reputation Variables

The dependent variable in all regressions is the two-day announcement period return, CAR(-1,0). NYSE, AMEX are binary variables representing listing on the New York and American Stock Exchanges, respectively (the reference group is over-the-counter stocks); Size is the natural log of equity capitalization at the fiscal year-end prior to the announcement ($millions); BKMKT is the ratio of book value of total assets to the sum of book value of liabilities and preferred stock and the market value of common equity at the fiscal year-end prior to the announcement; ANALYSTS is the number of IBES analysts following the company. Statistics are reported for the maximum number of observations on each variable.

	(A) Exchange listing		(B) Analysts		(C) Size and Book-to-Market		(D) Exchange listing, Size and Book-to-Market		(E) Analysts and Size and Book-to-Market	
variable	coefficient	t-statistic	coefficient	t-statistic	coefficient	t-statistic	coefficient	t-statistic	coefficient	t-statistic
Intercept	-0.02819	-5.08 *	-0.02196	-4.18 *	-0.08725	-5.65 *	-0.08914	-5.21 *	-0.06212	-4.04 *
NYSE	0.02156	3.08 *					0.00011	0.01		
AMEX	0.00961	0.74					0.00893	0.68		
ANALYSTS			0.00062	2.30 **					-0.00001	-0.02
SIZE					0.00813	5.16 *	0.00838	4.20 *	0.00547	2.52 **
BKMKT					0.01908	1.65	0.01817	1.42	0.01417	1.44
no. obs.	426		231		426		426		231	
adj. r-square	1.75%		1.84%		5.58%		5.25%		4.25%	

Notes:
* and ** denote significance at the .01 and .05 levels (two-tailed test), respectively.
In regressions (A) or (C), F-tests indicate that the difference between the NYSE and AMEX coefficients is not significant at 0.1.

Table 8: Multiple Regression Tests of the Relationship Between Announcement Wealth Effects of Alleged Illegal Activities, Reported and Expected Earnings Changes, and Changes in Risk

The dependent variable in all regressions is CAR(r,s), for days r to s relative to announcement. Antitrust, Bribery, Fraud, Copyright & Patent Infringement, and Other are binary variables representing categories of alleged criminal activity; SIZE is the log of equity capitalization at the fiscal year-end prior to the announcement ($millions); BKMKT is the ratio of book value of total assets to the sum of book value of liabilities and preferred stock and the market value of common equity at the fiscal year-end prior to the announcement; ΔEARN(-1,0) is the change in reported earnings, scaled by prior period assets, from fiscal year-end prior to the year of the announcement of litigation, to the fiscal year-end following the announcement; ΔSTDERR, is the change in SIMM residual variation from the preannouncement interval (days -260, -11) to the post announcement interval (days +11, +260); ΔESTEARN and ΔRANGE are the appropriately adjusted changes in median analysts' forecast and range of the analysts earnings estimates, respectively, from one month prior to the month after the allegation.

Panel A - *Ex Post* Earnings and Risk Changes

Model:	(A) Dependent variable CAR(-1,0)		(B) Dependent variable CAR(-3,+3)		(C) Dependent variable CAR(-10,+10)	
variable	coefficient	t-statistic	coefficient	t-statistic	coefficient	t-statistic
Antitrust	-0.0691	-4.36*	-0.0799	-3.09*	-0.1664	-4.15*
Bribery	-0.0625	-3.16*	-0.0632	-1.97**	-0.1266	-2.53*
Fraud	-0.0836	-5.84*	-0.1033	-4.43*	-0.1783	-4.92*
Copyright & Patent	-0.0573	-3.90*	-0.0636	-2.66*	-0.1246	-3.35*
Other	-0.0634	-4.39*	-0.0789	-3.35*	-0.1873	-5.12*
ΔEARN (-1,0)	0.0077	0.35	-0.0537	-1.50	-0.1286	-2.32**
ΔSTDERR	-0.0007	-2.92*	-0.0014	-3.78*	-0.0021	-3.55*
SIZE	0.0058	4.01*	0.0067	2.83*	0.0115	3.13*
BKMKT	0.0209	2.03**	0.0224	1.34	0.0777	2.98*
No. obs.	406		406		406	
Adj. R-square	13.9%		11.0%		11.8%	

Panel B - *Ex Ante* Earnings and Risk Changes

Model:	(A) Dependent variable CAR(-1,0)		(B) Dependent variable CAR(-3,+3)		(C) Dependent variable CAR(-10,+10)	
variable	coefficient	t-statistic	coefficient	t-statistic	coefficient	t-statistic
Antitrust	-0.0553	-3.25*	-0.0388	-0.99	-0.1263	-2.14**
Bribery	-0.0510	-2.37**	-0.0398	-0.81	-0.0618	-0.83
Fraud	-0.0748	-4.80*	-0.0681	-1.90	-0.1294	-2.40**
Copyright & Patent	-0.0564	-3.44*	-0.0393	-1.04	-0.1042	-1.84
Other	-0.0500	-3.04*	-0.0268	-0.71	-0.1159	-2.04**
ΔESTEARN	-0.1574	-1.16	0.9249	2.96*	1.0355	2.20 **
ΔRANGE	-0.0085	-2.93*	-0.0016	-0.24	-0.0113	-1.12
SIZE	0.0046	2.69*	0.0033	0.84	0.0089	1.49
BKMKT	0.0179	1.73	0.0018	0.08	0.0528	1.48
No. obs.	218		218		218	
Adj. R-square	18.6%		8.8%		4.9%	

Note: * and ** denote significance at the .01 and .05 levels (two-tailed test), respectively