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# Securities Litigation and Stock Returns: An Event Study

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## *Abstract*

This paper executes a simple event study of the effects of securities litigation on stock returns. Securities litigation is a common occurrence on the US investment markets, via which shareholders aim to recover losses they have suffered as a result of managerial misconduct. Filing lawsuits, however, signals to the market in general that there is something wrong with the company, unless the market knows it already. In that case, litigation may have negative consequences on future stock returns of the company. Applying t-tests, this paper tests this hypothesis and finds that significant negative stock reaction to litigation is present but not overwhelmingly. Positive reaction to lawsuits can sometimes be observed. Negative reaction, however, is twice as common as positive reaction to lawsuits. Shareholders should not be concerned that filing a securities lawsuit will necessarily result in stock return declines.

Keywords: shareholder litigation, event study, pulse dummies.

## I. Introduction

This paper conducts an event study using securities litigation announcements as the event under study. Event studies are often employed in finance to study the effect of certain events on stock prices and investor wealth. Event studies are particularly effective in corporate finance. Event studies typically test whether a certain event has had an effect on the stock price. As such, event studies have a strong foundation in finance theory. Finance theory suggests that stock prices reflect all the time- and risk-discounted present value of all future cash-flows of the company. According to the semi-strong efficient market hypothesis, the stock price reflects all public information fully and without bias, making it impossible to earn economic profits based on this information alone (Fama 1990). The efficient market hypothesis is one of the most tested hypotheses in social sciences (Bhagat et al. 2001). Only an unexpected event can influence the price. This change should reflect the future change in cash-flows or their riskiness (Bhagat et al. 2001).

An event is said to have an impact on the firm's financial performance when it results in an abnormal movement in the stock price. Events studied in the past have been actions by the government, firm decisions, legal actions, takeovers, etc. Event studies have been particularly useful in the study of corporate litigation, because they can measure the effect of a certain action on stock price performance. While various types of corporate litigation have been subjected to event study examinations, shareholder litigation has not been specifically targeted in those studies. As investor wealth maximization is the central part in such research, event study methodology can be employed to study the effects on stock returns.

The greatest risk directors and officers of corporations are exposed to is that of being sued. For public corporations, the largest share of the risk comes from shareholder litigation. The average shareholder claim cost is \$25 million (as reported in 2004 PLUS D&O Symposium). The same symposium notes increased severity of claims, and increased frequency of claims. Two-hundred and 12 cases were filed in 2003. The average investor losses in 2002 were 1.0 Billion (Buckberg 2004). Shareholders are aiming to recover investor losses they have suffered as a result of managers' negligence or fraud-on-the-market. The Sarbanes-Oxley Act, passed by US Congress, extended the statute of limitations on those cases to two years after disclosure of fraud or five years after its occurrence (Buckberg 2004). That securities litigation can be a major event for a corporation can be illustrated by the record settlement reached by Cendant Corporation in 2000: \$2.83 billion (2004 PLUS D&O Symposium).

Securities lawsuits most often allege misrepresentation and false information on the financial performance of the company as provided by the management. These cases are typically filed as class actions. The Reform Act of 1995 requires plaintiffs to state which statements are misleading and why.

An interesting feature here is that such litigation is often initiated by shareholders, the very people who care the most about stock returns. Thus it is of interest whether filing a shareholder lawsuit has a significant effect on stock returns. If it has a negative effect on returns, then shareholders are hurting the stock price by initiating litigation against the company. They may be able to recover past losses through litigation, but the lawsuits may negatively influence future returns of the company, affecting its present and future shareholders. Shareholder lawsuits are typically filed as class actions, so they involve

many shareholders. But do all these shareholders benefit from the litigation that recovers past losses but may lead to future losses? Shareholders who continue to keep their shares in the company may have to weigh the gains versus the future losses.

The hypothesis here is that shareholder litigation announcements negatively affect stock returns. This hypothesis finds partial support. Forty-four of the companies studied (out of about 130) show negative stock reactions to litigation. Twenty-four companies, however, show positive reactions to litigation.

## II. Review of the Literature

### A. Methodology

There are two approaches to event studies. The traditional approach, as proposed by Fama et al. (1969), estimates the market model on the pre-event data (estimation window) and then uses the estimates on the data from the event window. It can be illustrated as follows:

Estimation Period (T observations):     |     Event Window ( N observations):

Estimate the Market model using OLS. | Calculate residuals or abnormal returns; t-tests.

This is a two-step procedure. First, estimates of the intercept and slope are found from the Market model using the T observations in the estimation period. Then, residuals are calculated as the actual minus the predicted value for each observation in the event window. The residuals essentially represent abnormal returns.

The other method involves a single equation estimation with dummies for the event dates. It is sometimes called *event parameter approach*. This approach was first proposed by Thompson (1985), and Binder (1985a and b), among others. It is reviewed in Karafiath (1988).

Karafiath (1988) demonstrates the equivalence between the residual analysis method and the dummy variable approach in event studies. The traditional (residual) approach goes as follows: we obtain estimates for  $\sigma$  and  $\beta$  from the estimation period. Then prediction errors (residuals) are obtained as the actual minus predicted value for each company in the forecast period. Karafiath (1988) shows that identical results can be obtained in one step by using a dummy variable approach, appending a vector of (0, 1) to the right-hand side of the market model regression. For each observation in the forecast window, we append one dummy variable that is equal to 1 for that observation only and 0 elsewhere. That would result in N dummy variables (N being the number of observations in the forecast window):

$$R_{jt} = \hat{\alpha}_j + \hat{\beta}_j R_{mt} + \sum_{n=T+1}^{T+N} \hat{\tau}_{jn} D_{nt} + \hat{e}_{jt}, \quad t = 1, \dots, T, T+1, \dots, T+N \quad (1)$$

where

$R_{jt}$  = return on stock j on observation t

$\hat{\alpha}_j$  = OLS estimate of the intercept

$\hat{\beta}_j$  = OLS estimate of systematic risk

$R_{mt}$  = market return on observation t

$\hat{\tau}_{jn}$  = estimated coefficient on dummy  $D_{nt}$  (excess return to stock j on observation t)

$D_n$  = dummy variable equal to one on observation n and zero otherwise

$\hat{e}_{jt}$  = residual for stock j on observation t. With the dummy variable method, the residual will be zero for T+1 to T+N, which is essentially the forecast period.

Each coefficient on a dummy variable is equal to the actual minus forecasted value for the observations. The equation above is estimated over both the estimation and

forecast periods (there are T observations in the estimation period and N observations in the forecast period). The N observations in the forecast period are “dummiless,” so they will not affect the estimated coefficients. Only the T observations determine the coefficients on the intercept and slope. This method produces identical results to the residual analysis method (Karafiath 1988). Karafiath (1988) verifies the equivalence of the residual and dummy variable approaches using CRSP data.

Since the dummy coefficients represent abnormal returns, one tests their statistical significance or the significance of their sum. If one tests for effects in either direction, one employs F tests. For one-sided tests, t tests are used.

An advantage of the event parameter approach, as demonstrated by Karafiath (1995), is that any standard statistical package can estimate the dummy coefficients, which are prediction errors (or abnormal returns). Then t-tests can be performed on sums of the dummy coefficients for their significance. As the event date is different for the companies in the sample, the estimation equation must be estimated separately for each company.

A critical assumption to use Ordinary Least Squares for inference is that the error terms are independent and identically distributed (iid). In that case, OLS produces consistent and appropriate tests using F and t statistics. In the presence of autocorrelation and/or heteroskedasticity, however, HAC (Newey-West (1987)) adjustment of standard errors is necessitated. Then HAC adjusted F and t statistics are used for consistent tests of the hypothesis on the coefficients. HAC adjustments, however, should be used only when the errors are not iid. Fomby and Murfin (2004) show that when the market model errors

are iid, HAC standard errors greatly underestimate the true standard errors of abnormal return estimates and provide increasingly spurious significance, as the estimation window increases. Thus in the case of iid errors, HAC adjustment should not be used.

MacKinlay (1997) states that under general conditions ordinary least squares (OLS) is consistent and efficient for estimation of the market model parameters. Under the market model, the abnormal return is

$$AR_{it} = R_{it} - \hat{\alpha}_i - \hat{\beta}_i R_{mt} \quad (2)$$

$$\text{since } E(R_{it}|R_{mt}) = \hat{\alpha}_i + \hat{\beta}_i R_{mt} \quad (3)$$

Under the null hypothesis, conditional on the event window returns, the abnormal returns will be jointly normally distributed with a zero conditional mean and conditional variance of the abnormal return  $\sigma^2$  equal to:

$$\sigma^2 = \sigma_e^2 + \frac{1}{L_1} \left\{ 1 + \frac{(R_{mt} - \hat{\mu}_m)^2}{\hat{\sigma}_m^2} \right\} \quad (4)$$

$L_1$  is the estimation window, the period before the event. From (7), it appears that the conditional variance has two components. One component is the disturbance term variance; the other component is variance due to sampling error in  $\alpha_i$  and  $\beta_i$ . This sampling error is common to all event window observations. It leads to serial correlation of the abnormal returns in spite of the independent through time errors. As the length of the estimation window  $L_1$  gets large, the second component of the variance approaches zero, as the sampling error disappears (MacKinlay 1997). The variance of the abnormal return then is  $\sigma_e^2$  and the abnormal returns become independent through time. The estimation window can be selected to be large enough, so that it is reasonable to assume that second component in the conditional variance is zero.



I test the residuals from each company's regression for autocorrelation using the Box-Pierce statistic. With high p-values, I overwhelmingly do not reject the null of no autocorrelation in the residuals for the majority of the companies. Therefore the HAC adjustments is not necessary and I rely on OLS estimates.

The estimation period is selected to be 180 days. This is a standard estimation period used in finance for estimating stock returns, such as in Value-Line. The event window is initially set at 30 days, 15 days before the event day and 15 days after. Experience suggests that filing lawsuits gets reported two weeks later on the average in the *Wall Street Journal* (Romano 1991), at least historically. Thus selecting a 15 day window afterwards is quite reasonable. Sensitivity tests are conducted on the boundaries of the event window. I test the significance of the sums of dummy coefficients for the following dates in the event windows: (-15, -1), (-15, -11), (-10, -1), (0), (1, 10), (11, 15), (1, 15). When the sums are significant, the respective dates are kept in the window; otherwise they are thrown out. The window sizes are adjusted accordingly.

The expectation is that filing securities litigation will have a negative effect on stock returns. Therefore one-sided tests are appropriate. That necessitates the use of t statistics, which are equal to the square root of F statistics. The tests test whether the sum of dummy coefficients is significant. The null hypothesis is that the sum is equal to zero. The alternative hypothesis is that the sum is less than zero, in other words, the event has had a negative effect on the stock returns. T-tests are provided for windows before the event and after. Significant positive sums are also noted.

The model that is chosen for analysis is the Market Model, often used for event studies. Researchers usually use the models with daily returns. The abnormal return is equal to:

$$AR_{it} = R_{it} - E(R_{it}|X_t) \quad (5)$$

where  $AR_{it}$  is the abnormal return,  $R_{it}$  is the actual return and  $E(R_{it}|X_t)$  is the expected return. The latter is defined as the normal return, which is the expected return without conditioning on the event.  $X_t$  is the information on which we condition the expected return. The normal return is modeled based on some of the above choices. In the Market Return Model,  $X_t$  is the market return. This model assumes a stable linear relationship between the market return and the individual return.

The Market Model takes the form:

$$R_{it} = \alpha_i + \beta_i R_{im} + e_{it} \quad E(e_{it})=0, \text{ var}(e_{it})=\sigma_e^2 \quad (6)$$

where  $R_{im}$  is the market return for the specific period. Thus the individual return depends on the market return. Some commonly used broad indexes used for the market return are S&P 500, CRSP Value Weighted Index, CRSP Equal Weighted Index (MacKinlay 1997). Here the S&P 500 index is utilized, as available from CRSP. The market model potentially improves over the constant returns model. The market model removes the portion of the return related to variation in the market return and thus decreases the variance of the abnormal return. This helps detect event effects (MacKinlay 1997). The higher the  $R^2$  of the of the market model regression, the greater the variance reduction of the abnormal return and the larger the benefit.

The final step in the study is to measure the significance of the abnormal return. The standard error of the residuals from the estimated statistical model could be used as an

estimate of the standard error of the event window abnormal return (Bhagat et al. 2001). Since individual stocks are very volatile, the standard error can be very high relative to the abnormal return. Event studies often consider companies that have experienced the same announcement. This is the case in the current study: companies that have been sued. This approach increases the probability that no other information besides the event of interest is valued, since any other unexpected information disclosed on a firm's announcement date will wipe out with that on other firms' announcement dates. As the sample size increases, the influence of unrelated information becomes less significant (goes to zero) (Bhagat 2001).

One approach is to use aggregation. An alternative approach, however, is to analyze the abnormal returns without aggregation (Bhagat et al. 2001). We test the null hypothesis of no impact of the event by using unaggregated stock by stock data. This approach is particularly appealing when there is total clustering, i.e., an event for all companies on the same date. The basics consist of a multivariate regression model with dummy variables for the event date. An advantage is that we can have an alternative hypothesis where some firms have positive abnormal returns and others—negative. The drawbacks are that often the test statistic has poor finite sample performance and the test has little power against economically viable alternatives. The finite sample performance will not be a problem here, since the data set is quite large. Schipper and Thompson (1983, 85) and Collins and Dent (1984) develop that method.

An important consideration is the statistical power of inference. If an event has no impact, with what statistical precision can we establish that? The common null hypothesis in event studies is that the event had no impact. An alternative hypothesis could be that the

event increased stock returns by 1%. If the alternative hypothesis is true, the power of the test is the probability of observing a statistically significant test statistic. Brown and Warner (1985) and MacKinlay (1997) show that the power of the event study technique increases as the sample size increases and the number of days in the event window decreases and as the alternative of a larger abnormal return is considered against the null of zero abnormal return.

There have been studies that consider long horizon event windows, such as several years. The reason to do such long run studies is because the market does not fully understand the announcements and their impact at the time. In addition, some information may become available later. Kothari and Warner (1997), Barber and Lyon (1997) and Lyon, Barber and Tsai (1999) raise serious concerns about the specification and power of the event study technique in such long horizons. Kothari and Warner (1997) find that the test statistics in that case are generally misspecified; they reject the null hypothesis when there is no abnormal performance too frequently, given the significance level. While Lyon, Barber and Tsai (1999) suggest ways to correct the test statistics, they warn that these test statistics are not well specified in non-random samples (while being well-specified for random samples). Given that occasions in finance may call for non-random samples, the concern remains. Furthermore, Lyon, Barber and Tsai (1999) test the power of long-horizon test statistics to detect abnormal performance when it is present. They document that for a 12 month abnormal return, a sample of 200 firms and one-sided test at 5% significance level, the probabilities of detecting abnormal returns of 5%, 10% and 20% are 20%, 55% and 100%, respectively. As the horizon increases above 12 months and the sample decreases, the power of the technique further decreases. The authors

conclude: “the analysis of long-run abnormal returns is treacherous” (Lyon, Barber and Tsai 1999).

#### B. Empirical Literature.

Some researchers have reviewed securities litigation. Jones (1980) concludes that larger firms are more likely to be sued by shareholders. Beck and Bhagat (1997) find that firms that were sued were more likely to have large price drops and had significantly high betas than a matched sample of non-sued firms. Jones and Weingram (1996) observe that litigation risk is determined by trading volume, market capitalization and stock price drops in the year prior to litigation. Johnston et al. (1995) study a sample of high-technology and pharmaceutical firms and find that greater assets, more actively traded shares, low prior-year returns and big stock price drops increase the probability of being sued.

Dechow et al. (1996) study firms that SEC has accused of manipulating earnings and find that these are more likely to have insider-dominated boards, CEOs same as chair of the board and/or firm founder, but are less likely to have audit committees or outside blockholders. Summers and Sweeney (1998), on the other hand, find that insiders in companies accused of fraud sell their stock.

### III. Estimation of the Model

#### A. Data and Sample Selection

We have obtained a comprehensive securities litigation database from the Institutional Shareholder Services. It includes all federal, state and SEC securities actions in US since 1994 and in some cases earlier. This amounts to more than 3,000 cases. This is the pool from which the sample selection is made. We choose a sample of 138 cases, including some companies with multiple cases, widely representative of the whole sample. We

construct distribution sensitive histograms to obtain a good sense of the spread of companies along four key variables: market capitalization, debt/equity ratio, asset size, and beta. The distributions of the selected companies resembles well the overall distributions of the whole sample. The event dates are the filing dates of the lawsuits. The event dates range from 7 November, 1990 to 2 December, 2003. Companies with dates in 2004 are deleted because CRSP data are not yet available for 2004. The stock returns for individual stocks and the portfolio are obtained from CRSP.

The event window is chosen to be 15 days before the event and 15 days after the event. This is a reasonable size window, not too small and not too large. In the literature event windows may vary from 1 day to 25 days or more in long-term studies. Long-term windows, however, can be treacherous, as pointed out by Lyon, Barber and Tsai (1999). In the case of lawsuits it makes sense to have such a reasonable sized window. Before a lawsuit is filed, the shareholders of the company have prior knowledge of that, so the anticipated event starts influencing their behavior. Once the lawsuit is filed, it takes time for the news to reach all market participants. The estimation period is set to be 180 days prior to the event window. This is a standard period of calculating returns, as used by Value-Line.

I estimate an unordered logit model, where a dependent variable (=1 if positive effect, =0 if no effect, and =-1 if negative effect) is regressed on the number of financial explanatory variables. None of them, however, are found to be significant.

## B. Individual Firm Analysis

From the one-sided t-tests, we find a significant negative reaction to lawsuits in 44 of the cases. On the other hand, 24 cases exhibit significant positive reaction of stock

returns to lawsuit announcements. The rest of the companies do not show significant results, one way or the other. The positive reactions can be easily rationalized. By the time the lawsuit is filed, the market may already know that wrong-doing has been going on in the company from the media and other outlets. For instance, the Enron scandal broke before lawsuits were filed. By the time lawsuits are filed, the market may perceive them as positive news, in other words, news that investigations of the wrong-doing will be carried out, wrong-doers punished and probably losses recovered. Thus it is not difficult to believe that lawsuits can actually be positive and beneficial news to shareholders under certain circumstances.

The negative reaction to lawsuit announcements finds some confirmation here, with 44 significant results. Certainly, negative reactions to lawsuits are more common than positive ones. On the other hand, it is worth noting that securities litigation does not always negatively affect stock returns, in fact in the majority of cases here there is no negative impact. Thus shareholders should not be intimidated by negative future returns when filing shareholder litigation. In fact, after the public has learned about the wrong-doing, litigation may bring positive news to the market and reassure shareholders that the system is working and their rights are protected.

### C. Spillover Analysis

Once I identify which companies have experienced negative or positive effects on stock returns, I select five companies with highly significant negative effects, five companies with highly significant positive effects and five (eventually four) companies without a significant effect. These companies are matched with companies from the same industries with similar assets that have not been sued. The five industries for the five

companies with negative effects are: Natural gas, Commercial banks, Steel works, Semiconductor, and Prepackaged software. The five industries for the five companies with positive effects are: General building contractors, Trucking, Educational Services, Prepackaged software, and Women's, misses, juniors outerwear. The four industries for the four companies with insignificant effects are: X-ray and related apparatus, Miscellaneous chemical products, Insurance carriers, and Miscellaneous electric machinery. It is interesting to note that the industry Prepackaged software has companies that have experienced negative and positive effects. Depending on their own characteristics, companies may react differently to litigation, even though they are in the same industry. Seemingly unrelated regressions are used for the matched couples. Then I test whether the sums of dummy coefficients are jointly equal to zero for both companies in the couple.

From the inspection of the matched companies from the same industries in the spillover analysis, I find significant negative effects only among two of the five industries corresponding to companies with negative effects. The results are from joint tests from seemingly unrelated regression estimations. Two of the five non-sued companies experienced significant negative effects like the sued companies. Those industries are Natural gas and Commercial banks. From the evidence here, for these industries it appears that there is some spillover effect over the industries. For the other three industries, Steel Works, Semiconductor, and Prepackaged software, sued and non-sued companies exhibit a marked difference in the behavior of their returns. Litigation has had a negative impact on the sued companies. Among the industries corresponding to the firms with significant positive effects, none of the matched companies exhibit any effect at all. There is no



spillover effect of any kind. Similarly, among the companies matched with “non-effect” companies, none exhibits any significant effect.

#### D. Conclusions

Overall, we find that litigation announcements can have some negative effect on stock returns but the effect is not predominant and the reaction is much more mixed than expected. Positive stock reactions can occur too. Individual company characteristics can be more important for the type of reaction than company industry. Mixed results occurred in the investigation of spillover effects.

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