Class Action, Halliburton II, & Event Studies

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Executive Summary

In *Halliburton Co. v. Erica P. John Fund, Inc*., 134 S. Ct. 2398 (2014) (*Halliburton II*), the U.S. Supreme Court ruled securities fraud defendants can rebut the fraud-on-the-market presumption of reliance before class certification by providing evidence that the alleged misrepresentations did not impact the share price. The Supreme court noted that event study results could form the basis of such evidence.

On April 12, 2016, in *IBEW Local 98 Pension Fund v. Best Buy Co., Inc.*, (*Best Buy*) the Eighth Circuit Court, relying on *Halliburton II*, ruled that defendants have the right to rebut the fraud-on-the-market presumption of reliance created by *Basic*, prior to the class certification, by showing the lack of price impact of the alleged misrepresentation. *Best Buy* is the first appellate decision since *Halliburton II* where a defendant successfully rebutted the fraud-on-the-market presumption at the class certification stage. The defendant in *Best Buy* successfully rebutted the fraud-on-the-market presumption at the class certification stage by providing results of an intra-day event study.

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1. Class Action Certification and Halliburton II

There are two landmark U.S. Supreme court rulings regarding the relevance of the efficient markets hypothesis to class-action certification of shareholder lawsuits. In *Basic v. Levinson*, 485 U.S. 224 (1988), the Supreme Court endorsed a rebuttable presumption of reliance on the integrity of securities prices determined in well developed markets. Basic held that, under the "fraud-on-the-market" theory, courts may presume that securities prices in an open and developed market reflect all material public information and that investors rely on the integrity of the market price. Together, these two presumptions allow plaintiff investors to establish that they have relied, indirectly, on allegedly false or misleading public statements of corporate managers. In establishing these presumptions, *Basic* relied in part on an important underlying economic theory—the "efficient markets hypothesis."

Basic concerns the relevance of the efficient markets hypothesis to certification of securities fraud class actions under *Fed. R. Civ. P. 23*. A plaintiff must prove reliance on a false statement as an element of his securities fraud claim. If each plaintiff had to submit individual proof of reliance—e.g., that he bought a stock based on falsely positive statements by management about the company's prospects—then individual issues would predominate and courts would frequently deny class certification. The fraud-on-the-market doctrine, however, allows a presumption of reliance if plaintiffs purchased their securities in a well-developed, impersonal market. The reliance issue thus becomes a common one of showing that the market for the relevant security is sufficiently efficient to warrant the *Basic* presumption.

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presumption of reliance before class certification by providing evidence that the alleged misrepresentations did not impact the share price. The Supreme court noted that event study results could form the basis of such evidence. Hence, *Halliburton II* provided defendants an important tool for an early end to securities class action litigation.

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2. A Guide to Event Studies

Event studies are among the most successful uses of econometrics in policy analysis. The methodology, which studies the movement of stock prices due to specific events (unexpected actions or announcements by managers or policy-makers that are expected to affect firm values) was originally developed to test the hypothesis that the stock market was efficient--that publicly available information is impounded immediately into stock prices such that an investor cannot earn abnormal profits by trading on the information after its release. As evidence accumulated that the stock market was efficient, the methodology came to be used instead to value the event under study. It is through this latter usage that event studies have influenced policy analysis, particularly in corporate and securities law. This is no doubt because there is a natural fit between the methodology and those fields of law: the benchmark for evaluating the

benefit of corporate and securities laws is whether they improve investor welfare, and this can be ascertained by what event studies measure, whether stock prices have been positively affected.

The event study methodology is well-accepted and extensively used in finance. Event study results have been used in several hundred scholarly articles in leading academic finance journals to analyze corporate finance issues, such as stock repurchases and stock splits and the relation between stock prices and accounting information, by examining the impact of earnings releases.

The price of a stock reflects the time- and risk-discounted present value of all future cash flows that are expected to accrue to the holder of that stock. According to the semi-strong version of the efficient market hypothesis, all publicly-available information is reflected completely and in an unbiased manner in the price of the stock, such that it is not possible to earn economic profits on the basis of this information.[1] Therefore, only an unanticipated event can change the price of a stock. This change should equal the expected changes in the future cash flows of the firm or the riskiness of these cash flows. Thus, an event is said to have an impact on

[1] The efficient market hypothesis has been subjected to extensive empirical testing; perhaps the most intensive and extensive testing of any hypothesis in all of the social sciences. Most tests find evidence consistent with the efficient market hypothesis. Some studies find that the stock price responds within minutes of a corporate announcement such as a stock offering (see Barclay and Litzenberger, 1988).) Most finance scholars hold the view that the stock market in the U.S. is semi-strong form efficient (Welch 2000). But controversy regarding the efficient market hypothesis lingers. This controversy is based on issues regarding the definition and measurement of risk, and the relationship between risk and return. There is, however, agreement that these issues do not invalidate the event study methodology; see Fama (1990); and Brown and Warner (1985). Some legal scholars consider the stock market to be inefficient (see, e.g., Stout, 2005). But careful scrutiny of the efficient market anomalies have raised concerns about the asset pricing models used to construct the expected returns rather than the efficiency of the market (see Schwert, 2003). It should further be noted that finance theory does not depend on whether the average investor is rational (a criticism directed by users of the behavioral finance literature, e.g., Stout, 2005); it depends, as one finance scholar puts it, on the existence of "sharks," sophisticated investors who seek to profit from arbitraging pricing anomalies (Ross, 2005). There are a few fascinating examples in which arbitrage is ineffective at eliminating pricing differentials for a period of time (e.g., Lamont and Thaler, 2003), but these micro examples of violations of the law of one price are not very important for the question of market efficiency, occurring as they do, in isolated examples of individual stocks (Ross, 2005), and not always offering an exploitable arbitrage opportunity (e.g., Lamont and Thaler, 2003).

the financial performance of a firm if it produces an abnormal movement in the price of the stock. Broad stock market movements are usually subtracted from the stock's price movement in estimating the abnormal return. Event studies apply conventional econometric techniques to measure the effect of specific events, such as actions by firms, legislatures, and government agencies, on the stock price of affected firms. Their advantage for policy analysis is that they provide an anchor for determining value, which eliminates reliance on ad hoc judgments about the impact of specific events or policies on stock prices.

2.1. Mechanics of Event Studies

An event study has four component parts: defining the event and announcement day(s); measuring the stock's return during the announcement period; estimating the expected return of the stock during this announcement period in the absence of the announcement; and computing the abnormal return (actual return minus expected return) and measuring its statistical and economic significance.

In order to conduct an event study, the researcher first defines the event under investigation. Events are usually announcements of various corporate, legal, or regulatory action or proposed action. Examples of events that have been studied are: takeovers, equity offerings, change in state of incorporation, adoption of antitakeover provisions, filing of lawsuits against corporations, deaths of corporate executives, and product recalls. After defining the event, the researcher searches for the first public announcement of the event. Identification of the first public announcement of the event is critical since, under the semi-strong form of the efficient market hypothesis, the impact of the event on the value of the firm would occur on the announcement date. Historically, the *Wall Street Journal Index* has been a popular source for

announcement dates. More recently, computer accessible databases such as *Lexis-Nexis* and the *Thompson Financial Securities Data* are being increasingly used.

Conceptually, the announcement date is straightforward: It is the "day" the public is first informed of the event.[2] However, identification of this date can sometimes be nontrivial. Consider the announcement of a tender offer. It is possible and probable that news of the tender offer may have leaked to some market participants prior to the first public announcement. If such is the case then some impact of the tender offer on the firm's share price would occur prior to the public announcement. Some researchers have attempted to address this issue by considering the period several weeks (or months) through the announcement day as the announcement period. However, this obvious solution has two problems, one conceptual and the other technical. Conceptually, it is unclear if the leakage occurs over a few days, weeks, or months. Technically, as we increase the length of the announcement period, the noise-to-signal ratio increases, and it becomes increasingly difficult to measure the impact of the tender offer on share price with precision; we will discuss this later in the chapter. Aside from news leakage issues, at the time the tender offer is announced there is uncertainty over whether it will be successful, and if successful, over the terms of the final offer. Sometimes the final resolution may not be known for months or even years.

Finally, some events may have several distinct event dates. For example, the enactment of a statute involves many different events, each of which may provide new information to

[2] Currently, most event studies consider daily returns, hence the announcement period is typically a day. However, historically, some event studies have considered monthly returns - where the announcement need only be identified for a particular month; see the classic study by Fama et al. (1969). More recently, announcements have been identified to the nearest minute, and returns have been computed over minute and trade intervals such that the event study is conducted using intra-day data; see Barclay and Litzenberger (1988).

investors regarding the likelihood of passage: when a bill is introduced, when a committee holds hearings on the bill, when one legislative chamber votes on the bill, when a conference committee approves a final bill, and when the executive signs the bill (if there is uncertainty over whether or not the bill will be vetoed). In this context, rather than treat the entire interval from bill introduction to executive signature as the event and run into the problems discussed above, the researcher can adapt the methodology to permit each event date to be identified separately; however, in doing so the researcher's bias and priors on what is a significant or relevant event enters the analysis.

After defining the event and announcement period, stock returns are measured for this period. If daily data are being used, this is straightforward: the return is measured using closing prices. Often there is uncertainty if the announcement is made before or after the close of trade on the exchange. To address this, the returns from the next day are often included.

Calculation of the third component is more complicated. While it is straightforward to measure the actual return for the announcement period, determination of the impact of the event itself on the share price is less so. To measure this impact, the *expected return* must be subtracted from the actual announcement period return. This expected return is the return that would have accrued to the shareholders in the absence of this or any other unusual event. The finance literature has considered several models of expected returns. These models can broadly be classified as statistical models or economic models. The statistical models are simple models of price formation that are not grounded in a specific economic theory. The economic models are derived from specific economic theories of asset price formation. One can think of the economic models as placing certain restrictions on the statistical models (that is, on the slopes and intercepts being estimated).

Since several studies have found evidence inconsistent with the economic models, in particular CAPM, the use of such restrictions is not appropriate. Hence, most researchers have begun to rely on the statistical models to estimate the expected returns during the announcement period. For estimation of the market model, researchers most commonly use for the market portfolio, all of the stocks in the University of Chicago Center for Research in Securities Prices (CRSP) data base, the best source for stock return data; if all of the firms under study are small, however, using the CRSP portfolio or an index such as the S&P 500, whose average firm size is large, for the market adjustment, may produce biased estimates of the sample firms' abnormal return (see, e.g., Karpoff and Malatesta, 1995). The statistical models are usually estimated using between 100 and 200 daily returns in the period preceding the announcement period. The unexpected announcement period return, also known as the *abnormal return*, is computed as the actual return minus the estimated expected return. This abnormal return is the estimated impact of the event on the share value.

The fourth and final step is to compute the statistical significance of this abnormal return. The standard error of the residuals from the estimated statistical model can be used as an estimate of the standard error for the announcement period abnormal return. However, since individual stock returns are quite volatile, this standard error can be quite high relative to the abnormal return. Event studies usually consider a sample of firms that have made or been the subject of the same type of announcement; each firm's announcement typically has been made on a different calendar day. Another benefit of this approach is that it increases the likelihood that no other information besides the event under study will be valued, since any additional unexpected information disclosed on one firm's announcement date will wash out with that on other firms' announcement days.

The abnormal returns of this sample of firms is averaged to obtain the *average abnormal return.* This average abnormal return is the estimated impact of the event on the share value. Next, the residuals from the estimated statistical model for these firms are averaged in *event time*. Usually the announcement day is defined as *event day 0*. *t* days before (after) the announcement day is defined as *event day -t* (*event day +t*). Finally, the standard error of these averaged residuals is used as an estimate of the standard error of the average abnormal return. Under the null hypothesis that the event under study has no impact on firm value, the expected average abnormal return is zero. Additionally, assuming that the announcement period returns for the sample firms are independently and identically distributed, then by the Central Limit Theorem the average abnormal return is normally distributed with mean zero.

The above estimate of the standard error of the average abnormal return would be appropriate if the announcement period abnormal return had the same variance as the estimation period residuals. However, substantial evidence in the finance literature suggests that stock returns in the announcement period are typically more volatile. Brown and Warner (1985) have suggested the use of cross-sectional test statistics when there is an increase in return variance during the announcement period. The standard error of the announcement period returns for the sample firms is used as an estimate of the standard error of the average abnormal return. Non-parametric tests, such as the Fisher sign test and the Wilcoxon signed rank test, are also conducted on the announcement period returns; the usual null hypothesis is that the median announcement period return is zero.

2.2. Statistical Power of Event Studies

If an event changes firm value by a specific amount, say, 1 percent, can the event study technique detect it with some statistical precision? Equally important, from a statistical, financial

and legal viewpoint: If an event has no impact on firm value, that is, the announcement period abnormal return is zero, can the event study technique provide this inference with some statistical precision? These questions can be addressed by considering the statistical power of event studies.

The power of a test statistic is considered in the context of a null hypothesis and an alternate hypothesis. (Hopefully, the alternate hypothesis would be economically meaningful.) In the context of event studies, the usual null hypothesis is that the event has no impact on firm value. An interesting alternate hypothesis could be that the event increases firm value by 1 percent. Under the assumption that the alternate hypothesis is true, the power of the event study in this context is the probability of observing a statistically significant test statistic. Brown and Warner (1985) and MacKinlay (1997) have studied the power of test statistics typically used in event studies. These authors show that the power of the event study technique improves as the number of firms in the sample increase, as the number of days in the announcement window decrease, and as the alternative of a larger abnormal return is considered against the null hypothesis of zero abnormal return.

The following numerical examples from MacKinlay (1997) illustrate the power of the event test methodology, and how the power can be enhanced.

For a one day announcement window, a sample size of 25 firms, and a two-sided test with a 5 percent significance level, the probabilities of detecting an abnormal return of 0.5 percent, 1.0 percent and 2.0 percent, are 24 percent, 71 percent and 100 percent, respectively.

- If the sample size were increased to 50 firms, the probabilities of detecting an abnormal return of 0.5 percent, 1.0 percent and 2.0 percent, are 42 percent, 94 percent and 100 percent, respectively.

- If the sample size were increased to 100 firms, the probabilities of detecting an abnormal return of 0.5 percent, 1.0 percent, and 2.0 percent, are 71 percent, 100 percent and 100 percent, respectively.

- For a two days announcement window (or equivalently, doubling of the standard deviation of the event day abnormal return), and a sample size of 25 firms, the probabilities of detecting an abnormal return of 0.5 percent, 1.0 percent and 2.0 percent, are 10 percent, 24 percent and 71 percent, respectively.

- For this two days announcement window and a sample size of 50 firms, the probabilities of detecting an abnormal return of 0.5 percent, 1.0 percent and 2.0 percent, are 14 percent, 42 percent and 94 percent, respectively.

- For this two days announcement window and a sample size of 100 firms, the probabilities of detecting an abnormal return of 0.5 percent, 1.0 percent and 2.0 percent, are 24 percent, 71 percent and 100 percent, respectively.

2. 3. Single-Firm Event Studies

The above findings suggest that the power of the event study diminishes as the sample size decreases, and as the event period is increased from one to just two days. An important question is can an event study be conducted with just one firm, that is, is a sample size of one acceptable? This question is especially relevant in court cases or regulatory injunctions involving only one firm.

Conceptually, a sample of one is a rather small sample but this by itself does not invalidate the event study methodology. However, single-firm event studies are impacted by two types of problems not usually encountered, or encountered to a much lesser extent, in multi-firm event studies.

2. 3. 1. Problem with Single-Firm Event Studies: Power

Power is the probability that the null hypothesis of no abnormal return will be rejected given a certain abnormal performance (and significance level) on the event day. The statistical

power with a sample of one is likely to be quite low. The variability of (abnormal) returns of a portfolio with just one stock in it is significantly higher than a portfolio with even a few, say five, stocks in it. Any standard finance or investment textbook will have a graph depicting the impact of diversification on portfolio variance: a sharp drop in variance of portfolio returns as the number of stocks in the portfolio increases from one, to five, to ten; after about fifty stocks in the portfolio the decrease in variance is quite small.

The variability of (abnormal) returns of a portfolio with just one stock in it is significantly higher than a portfolio with several firms. The variability of (abnormal) returns of a one-stock portfolio will also depend on the (market capitalization) size of the stock. The largest decile stocks in the U.S. have a daily standard deviation of about 1%; the smallest decile stocks in the U.S. have a daily standard deviation of about 4%; the mid-decile stocks have a daily standard deviation of about 2%. We can use the power function in Mackinlay (1997) to compute the probability of rejecting the null hypothesis (of no abnormal return) on the event day given a certain level of abnormal performance (say, -1%, -5%, and -10%), and a significance level (say, 5%). The following table notes the power of the single-firm event studies when considering firms of different sizes.

Power of Single-Firm Event Study (5% significance level)			
	Small Firm Standard Deviation = **4%**	Mid-size Firm Standard Deviation = **2%**	Large Firm Standard Deviation = **1%**
Event Day Abnormal Return = **- 1%**	6%	8%	17%
Event Day Abnormal Return = **- 5%**	24%	71%	100%
Event Day Abnormal Return = **- 10%**	71%	100%	100%

The above table indicates that a single-large-size-firm event study can detect a daily abnormal performance of 5%. A single-mid-size-firm event study can detect a daily abnormal performance of 10%. A single-small-size-firm event study c*annot* detect a daily abnormal performance of even 10%

2. 3. 2. Problem with Single-Firm Event Studies: Confounding Announcements

Second, it is plausible that the announcement period return of an announcing firm will be affected by other information unrelated to the event under study. Companies often make several related and unrelated announcements on the same day; see Bhagat et al (2005).[3] If a sample of one is considered, it is quite difficult to determine the separate effects on firm value of the announcement and of the unrelated information item(s). If the sample has several firms, then the effect on firm value of such unrelated information is likely to cancel out. As the sample size increases the effect on firm value of such unrelated information (goes to zero) becomes less and less significant.

Consider a single-large-size-firm event study: The announcement day abnormal return is -6%; hence is likely to be statistically significant. Let us say the particular announcement generated a return of -4%. Another -2% was generated by *unrelated* company-specific news. Hence, it would be incorrect to infer that the abnormal return related to the particular announcement of the large-size firm is -6%.

3 *Wall Street Journal*, December 18, 1998, C1, "It's Wall Street's Version of 'Wag the Dog.'" "Over the past week, both Mattel and Coca-Cola have announced acquisitions on the same day they also issued warnings about disappointing earnings. ... No one is suggesting that either company unveiled its acquisition solely to divert attention from its problems... But it is also clear that the acquisitions, like the [Iraq] bombings, helped shift attention away from other less favorable developments."

On the other hand, consider the announcement day abnormal return of -3% for a large-size firm; hence the return is likely to be statistically insignificant. Let us say the particular announcement generated a return of -5%. Another +2% was generated by unrelated company-specific news. Hence, it would be incorrect to infer that the (insignificant) abnormal return related to the particular announcement of the large-size firm is -3%.

One way to address the above problem is to consider intra-day returns. If the announcement of interest and the unrelated company-specific announcements are made at *different* times in the announcement day, then intra-day abnormal returns can allow us to measure the abnormal return associated with the announcement of interest. Such intra-day abnormal return analysis was the essence of the empirical evidence highlighted by the defense expert in a recent shareholder class-action lawsuit, namely, *Best Buy*. The Eighth Circuit Court in *Best Bu*y noted the intra-day abnormal return analysis by the defendant's expert as an important reason for their ruling for the defense.

Conclusions

In *Halliburton Co. v. Erica P. John Fund, Inc*., 134 S. Ct. 2398 (2014) (*Halliburton II*), the U.S. Supreme Court ruled securities fraud defendants can rebut the fraud-on-the-market presumption of reliance before class certification by providing evidence that the alleged misrepresentations did not impact the share price. The Supreme court noted that event study results could form the basis of such evidence.

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References

Acharya, S. 1988. “A Generalized Econometric Model and Tests of a Signalling Hypotehsis with Two Discrete Signals,” 43 *Journal of Finance* 413-29.

Alexander, Cindy R. 1999. “On the Nature of the Reputational Penalty for Corporate Crime,” *42 Journal of Law and Economics* 489-526.

Barber, Brad and John Lyon. 1997. "Detecting Long-Run Abnormal stock returns: The Empirical power and specification of Test Statistics," 43 *Journal of Financial Economics*, 341-372.

Barclay, Michael and Robert Litzenberger. 1988. “Announcement Effect of New equity Issues and the Use of Intra-Day Price Data,” 21 *Journal of Financial Economics* 71-100.

Bhagat Sanjai, John Bizjak and Jeffrey Coles. 1998. "The Shareholder Wealth Implications of Corporate Lawsuits," 27 *Financial Management* 5-27.

Bhagat, Sanjai, James A. Brickley and Jeffrey L. Coles. 1994. "The Wealth Effects of Interfirm Lawsuits: Evidence from Corporate Lawsuits," 35 *Journal of Financial Economics* 221-247.

Bhagat Sanjai, David Hirshleifer, M. Dong, and Robert Noah. 2005. “Do Tender Offers Create Value? New Methods and Evidence,” *Journal of Financial Economics* 76, 3-66.

Bhagat, Sanjai and Richard Jefferis. 1991. "Voting Power in the Proxy Process: The Case of Antitakeover Charter Amendments," 30 *Journal of Financial Economics* 193-226.

Bhagat, Sanjai and Roberta Romano. 2007. “Empirical Studies of Corporate Law,” in *Handbook of Law & Economics* edited by Mitch Polinsky and Steven Shavell (Harvard Law School), North Holland, 2007

Bhagat, Sanjai and Roberta Romano. 2002 a. “Event Studies And The Law: Part I- Technique and Corporate Litigation,” *American Law & Economics Review* 4, 1.

Bhagat, Sanjai and Roberta Romano. 2002 b. “Event Studies And The Law: Part II-Empirical Studies of Corporate Law,” *American Law & Economics Review* 4, 2.

Binder, John J. 1985. “Measuring the Effects of Regulation with Stock Price Data,” 16 *Rand Journal of Economics* 167-183.

Brown, Stephen and Jerold Warner. 1985. “Using Daily Stock Returns: the Case of Event Studies,” 14 *Journal of Financial Economics* 3-32.

Dungworth, Terence and Nicholas Pace, 1990, "Statistical Overview of Civil Litigation in the Federal Courts," Santa

Monica, CA: Rand Institute for Civil Justice.

Fama, Eugene F. 1990. “Efficient Capital Markets: II,” 46 *Journal of Finance* 1575- 1617.

Fama, Eugene F., Lawrence Fisher, Michael Jensen and Richard Roll. 1969. “The Adjustment of Stock Prices to New Information,” 10 (Feb.) *International Economic Review* 1-21.

Karpoff, Jonathan M. and Paul H. Malatesta. 1989. “The Wealth Effects of Second Generation Takeover Legislation,” 25 *Journal of Financial Economics* 291-322.

Karpoff, Jonathan and John Lott. 1993. “The Reputational Penalty Firms Bear from Committing Criminal Fraud,” 36 *Journal of Law and Economics* 757-802.

Kothari, S.P. and Jerold Warner. 1997. "Measuring Long-Horizon Security Price performance," 43 *Journal of Financial Economics* 301-340.

Lyon, John, Brad Barber and Chih Tsai. 1999. "Improved Methods for Tests of Long-Run Abnormal Stock returns," 54 *Journal of Finance* 165-201.

MacKinlay, Craig. 1997. "Event Studies in Economics and Finance," 35 *Journal of Economic Literature* 13-39.

Prabhala, N.R. 1997. “Conditional Methods in Event Studies and an Equilibrium Justificaiton for Standard Event-Study Procedures,” 10 *Review of Financial Studies* 1-38.

Welch, Ivo. 2000. “Views of Financial Economists on the Equity Premium and on Professional Controversies,” 73 *Journal of Business* 501-538.

Power of Classical Multi-Firm Event Study (5% significance level) **One Day** Announcement Window NYSE stocks			
	Sample = 25 firms	Sample = 50 firms	Sample = 100 firms
Event Day Abnormal Return = **0.5%**	24%	42%	71%
Event Day Abnormal Return = **1.0%**	71%	94%	100%
Event Day Abnormal Return = **2.0%**	100%	100%	100%

Power of Classical Multi-Firm Event Study (5% significance level) **Two Days** Announcement Window (or equivalently, doubling of the standard deviation of the event day abnormal return) NYSE stocks			
	Sample = 25 firms	Sample = 50 firms	Sample = 100 firms
Event Day Abnormal Return = **0.5%**	10%	14%	24%
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