

Information Asymmetries, Managerial Ownership, and the Impact of Layoff Announcements on Shareholder Wealth

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This paper tests the impact of layoff announcements on share price returns with respect to the magnitude of the layoff on the total firm workforce, the level of inside ownership, and the firm size; while controlling for the number of employees, the level of institutional ownership, and profitability. We find a statistically significant negative share price response associated with layoff announcements, with layoffs constituting a greater percentage of a firm's workforce resulting in larger negative share price responses. Using an information asymmetry framework, we discover that firm size significantly explains the cross-sectional distribution of share price responses to layoff announcements. We find no evidence of a relationship between insider ownership and share price response to layoff announcements.

Introduction

Corporate downsizing and reorganization have been common occurrences in the U.S. economy since the mid-1980s. Companies have reduced their workforces in large numbers and continue to do so. The article “Economic Beat” in *Barron's* (November 8, 1999, pp. 52–53) states that the declining layoff rate during the 1990s may be misleading. The *Barron's* article argues that by separating cyclical trends from long-term trends, layoffs are actually occurring at a relatively higher rate compared to the overall level of unemployment during the 1990s.

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The research literature in corporate finance has focused increasingly on downsizing strategies used by corporations, including mergers, selloffs, and layoffs. While downsizing appears to enhance the viability of some companies, there is considerable debate as to whether downsizing enhances shareholder wealth. The purpose of the study is to examine the information effects of one downsizing strategy—the lay-off—and to test for differences in the share price responses based on the managerial ownership level, layoff magnitude, and firm size.

Layoff Evidence and Development of Hypotheses

Previous studies examining the impact of layoff announcements indicate that the announcement of a layoff has a significant impact on a company's common stock price, but the evidence regarding the direction of the share price response and the information contained in such announcements is mixed. Abowd, Milkovich, and Hannon (1990) find inconclusive results, with mixed share price responses to layoff announcements in the 1980s that are statistically insignificant.¹ In contrast, Worrell, Davidson, and Sharma (1991), Lin and Rozeff (1993), Chadwell and Filbeck (1994), and Poudel, Cantrell, and Kulkarni (1999) find a significant, negative share price response to layoff announcements, indicating that layoff announcements reveal troubling new information about the expected cash flows from investment opportunities and the financial status of the firm.²

The impact of layoffs has also been studied on the international front. Ursel and Armstrong-Stassen (1995) and Gunderson, Verma, and Verma (1997) find similar negative results with layoffs announced by Canadian firms. Lee (1997) compares market reaction to layoffs in Japan and the U.S.. She finds that layoff announcements result in negative share price responses in both countries. Announcements of permanent layoffs produce a statistically negative share price response, while temporary layoffs result in a statistically insignificant positive share price response. The difference in share price responses to these layoff announcements may be due to the size of layoffs employed. Kang and Shivdasani (1997) point out that layoffs affect a smaller fraction of the Japanese work force.

The studies cited above and others discussed below also examine various factors that may affect the sign and magnitude of the share price reaction. Factors that are found to have a significant impact on the effect of the layoff announcement include the relative size of layoffs, the industry of the company, and the nature of the layoff (e.g., permanent or temporary). Palmon, Sun, and Tang (1997) find that the reason stated by management for the layoff is the determining factor in the share price response to layoff announcements. Statistically negative returns are associated with

¹ The authors also examine several human resource decisions including changes in compensation, benefits, or staffing.

² See Ross (1977) and Kalay (1980).

the declining-demand subsample and with firms not stating a reason for the layoff in their announcement. Statistically positive returns are associated with the efficiency-enhancing subsample. Farber and Hallock (1999), using a sample of layoffs occurring between 1990 and 1997, find that the distribution of stock market reactions has become less negative over time. They believe one explanation for this trend is the efficiency-enhancing layoffs are becoming more common compared to those motivated by declining demand.

The long-range implications of layoffs to the bottom line negatively impact the initiating firm. An article in *Financial Executive* (November/December, 1997, p. 10) indicates that many companies that institute layoffs have difficulty in recruiting employees because of a "hire/fire" reputation. Andersson and Bateman (1997) indicate that cynicism in the workplace associated with layoffs results in a greater likelihood of employees engaging in unethical practices. Regardless of rationale, layoffs may produce long-term challenges to the bottom line and, ultimately, to shareholder wealth. Consistent with most previous research, our first hypothesis is that layoff announcements produce negative abnormal returns. We also hypothesize an inverse relationship between the magnitude of the layoff and the share price response to the layoff announcement. Such a result would be consistent with previous research (e.g., Worrell, Davidson, and Sharma, 1991; Ursel and Amrstrong-Stassen, 1995; Pouder, Cantrell, and Kulkarni, 1999).

Managerial Ownership and Market Reaction to Layoff Announcements

Leland and Pyle (1977) argue that the quality of projects undertaken by a firm can be assessed based on the magnitude of management ownership. Vermaelen (1981) empirically finds that the level of inside ownership is an important factor in evaluating market reaction to stock repurchases. Born (1988) documents a positive relationship between managerial ownership and announcement returns associated with dividend initiations.

Han and Suk (1998) use a signaling theory framework to argue that the level of managerial ownership is useful in evaluating stock split decisions. They point out that signaling theory argues that there must be a cost to a signaling party if an action is falsely used (Spence, 1973; Ross, 1977). Han and Suk state that the signals sent by the firm with higher insider ownership carry more credibility in the market. This augmented credibility occurs because the costs of sending a false signal would have a direct negative impact on the wealth of the manager-owner. By dividing their sample into five portfolios based on the level of insider ownership, Han and Suk empirically verify a positive relationship between the share price response to stock split announcements and the level of insider ownership. Others (e.g., Datta and Iskandar-Datta, 1996) use agency-based arguments (Jenson and Meckling, 1976) to

show that higher levels of insider ownership lead to greater alignment of manager-shareholder interest.

Other research indicates that the relationship between insider ownership and firm value may not be linear. Morck, Schleifer, and Vishny (1988) find a non-monotonic relationship between firm value (measured by Tobin's Q) and insider ownership (defined as shareholders who belong to the board of directors). Using piecewise linear regressions, they find corporate value increases (decreases) if inside ownership is above (below) 25 percent. McConnell and Servaes (1990) find a significant curvilinear relationship between firm value and the percent of common stock held by corporate insiders. In particular, they find that Tobin's Q increases with progressively higher levels of insider holdings until a level of almost 50 percent of total holdings. After that point, firm value decreases with higher levels of ownership. Both studies affirm the hypothesis that inside ownership has a curvilinear effect on firm value. As the level of managerial ownership increases, managers' and owners' interests become more aligned. Eventually, at higher levels of ownership, managers become entrenched and are more likely to act in their own best interest.

We believe that higher levels of insider ownership have a positive effect on the share price response to the layoff announcement. Hirschey and Zaima (1989) find a positive relationship between insider ownership and the share price response to sell-off decisions of firms. Selloffs, like layoffs, are commonly classified as downsizing decisions. The fact that managers are owners means that the costs of false signals can result in negative personal economic consequences. Interpreting layoff announcements is particularly problematic because of the cross-section of possibilities for their purpose. Milgrom and Roberts (1992) argue that information asymmetries exist between managers and investors, as only managers know how much effort they are willing to expend to enhance short-term and long-term shareholder wealth. Walsh and Seward (1990) believe this asymmetry makes it difficult for investors to accurately assess managerial motives when announcements occur. This would be especially true for layoff announcements where the stated purpose of the layoff can range from positive (e.g., increase firm value) to neutral (e.g., restructuring) to negative (e.g., declining demand).

Regardless of the stated reason, investors desire that announced layoffs will result in reduced costs and enhanced shareholder wealth. Lee (1997) argues that firms use layoff announcements as a way of appearing proactive rather than reactive. At higher levels of managerial ownership, shareholders are more likely to believe that managers are being proactive because their managerial wealth is at stake as well. Otherwise, they are more likely to resist the specter of large-scale firings, difficult labor relations, and a potential deterioration of attitude among retained employees. The implication of this logic is that stockholders may conclude that when managers have less wealth at stake, they are more likely to undertake layoffs only when a firm is in dire circumstances. Thus, we believe that high levels of managerial ownership

result in announcements that signal that a layoff is more likely to be a proactive response to changes in technology or management practices designed to increase firm value.

Consequently, our second hypothesis is that the level of managerial ownership is positively related to share price response to a layoff announcement. Because previous research indicates that this relationship may be curvilinear, we also test for second order effects associated with the level of insider ownership.

Firm Size and Market Reaction to Layoff Announcements

In the previous section, we argue that investors' perceptions of a layoff announcement may be guided to some extent by information asymmetries. Firm size often is used as a proxy for information asymmetry. Information asymmetry may be greater for smaller firms. For example, Vermaelen (1981) points out that smaller firms receive less media attention and analyst coverage compared to larger firms. (See also Atiase, 1985; Freeman, 1987; Grossman and Stiglitz, 1976.) In addition, Bethel and Liebeskind (1993) conjecture that institutional owners are more likely to avoid investing in smaller firms because they require more internal monitoring. Less coverage implies that less information on smaller firms may be available. Therefore, the market may find announcements made by smaller firms more informative, as these announcements serve as a means of reducing information asymmetries. Taken collectively, these studies imply that firm size may serve as a proxy for information asymmetries. Because a majority of the studies finds the reaction to corporate layoffs to be negative, we would expect the more pronounced negative reactions to such announcements to occur for smaller firms. Our third hypothesis is that firm size is positively related to the share price response to layoff announcements. As with Palmom, Sun, and Tang (1997), we measure firm size using the logarithm of the market value for sample firms because of the potential non-normality of this variable.

Morck, Shleifer, and Vishny (1988) believe that managerial ownership serves as a stronger signal in smaller firms than in larger firms. Han and Suk (1998) find that the level of insider ownership for smaller firms significantly affects announcement returns for stock splits. Managerial ownership and firm size may jointly explain share price responses to firm announcements. As an alternative to our third hypothesis, we use a more complex version of the Han and Suk model to test for the joint effect of insider ownership and firm size on the announcements of corporate layoffs. Han and Suk divide their overall sample into three subsamples based on firm size to test for the interaction between firm size and insider ownership.

Firms often make public statements about the reasons for a layoff. These statements may either confirm or complicate an investor's intuition regarding the information content of the layoff announcement. Previous research indicates that the manner in which a firm discloses a layoff announcement may impact the share price response. Thus, the stated purpose for the layoff may serve as a signal to the market-

place of the future prospects of the firm. The stated purpose of the layoff may not coincide, however, with the realities of the individual firm's actual condition. Firms could state that they are seeking enhanced efficiency in initiating a layoff when, in fact, they are facing a declining demand for their products. Investors must analyze individual firm announcements in order to draw conclusions about the true nature of the signals sent. Thus, a control mechanism is necessary to control for the market reaction to stated rationales for layoff announcements (a frequently researched topic) from the market reaction to layoff announcements based on differences in informational asymmetries for which firm size serves as a proxy (a primary objective of this paper). In order to control for market interpretation of announcement signals with respect to firm size, we initiate a second set of models where the absolute value of the cumulative abnormal return serves as the dependent variable in the cross-sectional regression. Szewczyk, Tsetsekos, and Varma (1992) argue that the absolute value of abnormal returns provides a better indication of information content of an announcement regardless of whether the "inferred information is positive or negative in its valuable effect." (p. 220).

Analyzing the impact on share price response to layoff announcements in this manner is particularly attractive, as it eliminates the guesswork in discerning whether such announcements are good or bad. Regardless of the sign of the abnormal returns associated with a layoff announcement, the greater the absolute value of the abnormal returns, the more information that is being conveyed to the market with the announcement. The use of the absolute value of abnormal returns associated with corporate layoffs is particular fitting, given that the variety of market reactions that occurs primarily depends on the stated purpose. Thus, such a model variation allows us to better determine whether firm size serves as a proxy for information asymmetry with layoff announcements. Whether the share price response to layoff announcements is positive or negative, we would expect that the more extreme returns at either end of the spectrum are coming from the smaller firms in our sample. We believe that greater information asymmetry existing for smaller firms prior to the layoff announcements causes a stronger reaction to layoff announcements initiated by smaller firms. Thus, our fourth hypothesis is that firm size is negatively related to the absolute share price response to a layoff announcement. Firm size is measured as the number of outstanding shares multiplied by the market price. We calculate firm size for sample firms in the month prior to the layoff announcement.

Data and Methodology

We construct our initial sample by searching the *Wall Street Journal Index* (WSJI) for announcements related to layoffs or restructurings for the years 1990–

1997.³ Firms with any large-scale confounding events in the WSJI occurring up to three days on or before the announced layoff are eliminated from the sample.⁴ Also, we eliminate subsequent layoff announcements by firms occurring within a year of the initial layoff announcement. Actual articles for those events making the initial screen are collected to determine any other confounding events that might appear within the context of the article, but are not covered in the WSJI.

Stock price returns are obtained from the CRSP combined daily return tape. We use standard event study methodology to examine the share price response to layoff announcements (Brown and Warner, 1985). For each announcement, the regression coefficients are estimated with the market model using daily returns over a 100-day period (days -150 to -51) prior to the announcement period (days -1 and 0), and standardized abnormal returns are calculated for the period.⁵ We eliminate announcements from firms without complete return information over this period. We test the significance of the abnormal returns and the two-day announcement period standardized abnormal return using a Z-test statistic (Mikkelson and Partch, 1988).

The search results in 366 announcements over the seven-year period. (See Table 1.)

Table 1—Sample Descriptive Statistics, Distribution of Announcements by Year

Year	Announcements
1990	34
1991	35
1992	62
1993	32
1994	43
1995	57
1996	52
1997	41
Total	366

Information on the total number of laid-off employees, the proportion of laid-off employees to total employees, and the total number of employees is obtained from the original WSJ article. Announcements with incomplete information regarding the total number of employees laid off are eliminated from the final sample. If not pre-

³Chadwell and Mullineaux (1993) and Chadwell and Filbeck (1994) find that layoff announcements by bank holding companies yield a positive abnormal return. The regulatory environment of bank holding companies helps to ensure that managers are acting in the shareholders' best interest. Because of these results, all financial firms are removed from our study. Also see Madura, Akhigbe, and Bartunek (1996).

⁴Large-scale confounding events include announcements such as a change in earnings, dividends, bond ratings changes, executive resignations, and mergers/acquisitions.

⁵Day 0 is the announcement day. The results are robust using a variety of estimation periods and methods for adjusting returns for market changes. These additional results are available upon request from the authors.

sent in the article, the total number of employees and the proportion of laid off employees to total employees are obtained from Research Insight[®] in the month just prior to the layoff announcement.

Compact Disclosure is our source for inside ownership data. We measure insider ownership at the closest possible date just prior to the layoff announcement. A total of 317 announcements remains from the initial screened sample that have both layoff and ownership data available. As with Palmon, Sun, and Tang (1997), we include the logarithm of firm size as a control variable to measure the effects of information asymmetry associated with a layoff announcement. We calculate firm size in the month prior to the actual layoff announcement.

We also include return on equity as an additional control variable to measure the impact that recent firm profitability has on the market reaction to a layoff announcement. As mentioned previously, interpreting the true rationale for a layoff announcement is often challenging, particularly in the presence of smaller firms that possess greater information asymmetry. Investors are likely to look to recent profitability measures in assessing whether a layoff is being initiated to increase firm efficiency or as a result of poor future prospects for product demand. If a firm has a recent history of high (low) profitability, the market is likely to consider the announcement to be related to the former (latter). Return on equity, our measure of profitability, comes from the most recent quarter prior to the layoff announcement. Research Insight[®] serves as a basis for information for calculations related to firm size and return on equity.

We also include the firm's levels of institutional ownership as another control variable. Pouder, Cantrell, and Kulkarni (1999) argue that institutional owners at least indirectly influence directors and managers to use layoffs as a means of promoting shareholder interests. Institutional owners have the ability to reduce information asymmetries because of their economies of scale in gathering information (Demsetz, 1983) and reducing agency costs (Demsetz and Lehn, 1985; Szewczyk, Tsetsekos, and Varma, 1992). Institutional ownership data come from the *S & P Stock Guide*. We obtain the institutional ownership level of the firm in the month prior to the layoff announcement.

We employ three different variations of a regression model, using different combinations of potential explanatory variables, in an attempt to explain the cross-sectional variation of the share price response to layoff announcements. Because of data availability issues, the number of layoff announcements analyzed varies depending on the variables included in the particular variation of the regression model. Model 1 investigates the hypothesis that an inverse relationship exists between the magnitude of the layoff and the share price response to layoff announcements and includes all control variables, but not the level of managerial ownership:

$$AR = \alpha_0 + \alpha_1 LAYOFF + \alpha_2 EMPLOYEES + \alpha_3 SIZE + \alpha_4 ROE + \alpha_5 INST + \varepsilon$$

where:

- AR (%) = The abnormal return;
 LAYOFF (%) = The percentage of total employees laid off;
 EMPLOYEES = The total number of employees for the firm just before the layoff;
 SIZE = The natural log market value of the firm (in millions);
 ROE = The return on equity (profitability) at the end of the month prior to the layoff announcement; and
 INST = The percentage of shares owned by institutions.
 EMPLOYEES, ROE, and INST are included as control variables.

Model 2 reflects our second hypothesis that the level of managerial ownership is positively related to share price response to a layoff announcement. Consistent with previous research, we also test for second order effects associated with levels of insider ownership. We include all control variables, but do not include the layoff percentage tested in the first hypothesis.

$$AR = \alpha_0 + \alpha_1 INSIDE + \alpha_2 INSIDE^2 + \alpha_3 EMPLOYEES + \alpha_4 SIZE + \alpha_5 ROE + \alpha_6 INST + \varepsilon$$

where:

INSIDE = The percent insider ownership held just before the layoff announcement

Model 3 reflects the inclusion of both the layoff percentage and the managerial ownership (and second order term) as independent variables along with all control variables.

$$AR = \alpha_0 + \alpha_1 LAYOFF + \alpha_2 INSIDE + \alpha_3 INSIDE^2 + \alpha_4 EMPLOYEES + \alpha_5 SIZE + \alpha_6 ROE + \alpha_7 INST + \varepsilon$$

We alter each of these models to consider our fourth hypothesis that firm size is negatively related to the absolute share price response to a layoff announcement.

As an alternative to our third hypothesis, we test for the joint effect of insider ownership and firm size to the announcements of corporate layoffs. Using Han and Suk's suggested division, the overall sample is separated into three subsamples based on firm size. We arrive at the following model:

$$AR = \alpha_0 + \alpha_1 K1*INSIDE + \alpha_2 K2*INSIDE + \alpha_3 K3*INSIDE^2 + \alpha_4 LAYOFF + \alpha_5 EMPLOYEES + \alpha_6 ROE + \alpha_7 INST + \varepsilon$$

The dummy variables K1, K2, and K3 represent the three subsamples equally divided based on size. Dummy variable K1 is set equal to one (zero otherwise) if the market value of the firm is less than \$560M. Dummy variable K2 is set equal to one (zero otherwise) if the market value of the firm is between \$560M and \$4,160M, and dummy variable K3 is set equal to one (zero otherwise) if the market value of the firm is greater than \$4,160M.

Table 2 gives summary statistics on the sample two-day cumulative abnormal returns (CARs), ownership data, layoff magnitude data, and firm size, and with all control variables. The average CAR is -1.15 percent (minimum = -40.76 percent, maximum = 25.50 percent). The magnitude of the share price response to the layoff

event is consistent with other studies. The proportion of insider ownership to total shares outstanding ranges from 0 to 94.34 percent, with an average of 11.00 percent. For comparative purposes, the average percent of managerial ownership is 27.18 percent in the Han and Suk (1998) sample. The standard deviation of our sample's managerial ownership is 17.38 percent, which is almost identical to the 18.75 percent standard deviation in the Han and Suk study (which they conclude gives enough variation in ownership for the purposes of studying their impact on share price responses). Our mean layoff percentage is 11.68 percent with a standard deviation of 12.43 percent. Layoffs constitute a range between 0.07 percent and 83.00 percent of

Table 2—Sample Descriptive Statistics

Variable	Observations	Mean (Standard Deviation)	Median	Min	Max
CAR (%)	366	-1.15 (7.01)	-0.17	-40.76	25.50
INSIDE (%)	334	11.00 (17.38)	2.65	0.00	94.34
LAYOFF (%)	317	11.68 (12.43)	7.81	0.07	83.00
OWNERS	334	22.64 (15.95)	19	0	115
LAYOFFS	348	1,630.33 (5221.03)	400	3	74,000
EMPLOYEES	323	25,478 (61,030)	7,000	15	761,400
MARKET VALUE (\$M)	360	6797.45 (25440.27)	1445.83	5.52	432678.1
RETURN ON EQUITY (%)	343	-6.66 (112.74)	6.7	-1335.08	460.815
SHARES	334	7771.24 (34080.63)	1248	0	565622
INSTITUTIONAL OWNERSHIP (%)	352	48.84 (22.66)	51.80	0.01	98.00

CAR (%) is the two-day cumulative abnormal return (-1,0), INSIDE (%) is the percent insider ownership held just before the layoff announcement, LAYOFF (%) is the percentage of total employees laid off, OWNERS is the number of inside owners, LAYOFFS is the number of employees laid off, EMPLOYEES is the total number of employees for the firm just before the layoff, Research Insight®'s MARKET VALUE and RETURN ON EQUITY represents the value of the firm (in millions) and measure of profitability at the end of the month prior to the layoff announcement. INSTITUTIONAL OWNERSHIP and SHARES represent the percentage of shares owned by institutions and the number of shares of outstanding stock (in millions) based on data from Standard & Poor's

our sample firm's workforce. A wide range of market values exists within our sample (\$5.52M to \$432,678.1M) with an average market value of \$6,797.45M. The average institutional ownership of our sample is 48.84 percent, which is larger than the 30.96 percent in the Han and Suk sample, although the standard deviations are

comparable (22.66 percent in our study versus 20.40 percent in their study). A listing of the descriptive statistics of all variables in our sample appears in Table 2.

Results

The average cumulative abnormal returns and test statistics for layoff announcements during 1990–1997 appear in Table 3. Six intervals are tested. The intervals for days –1 and 0 show an average CAR of –1.15 percent with a Z-test statistic of –3.94**, which is significant at the one percent level. For the interval of days –1 to +1, the average CAR is –1.24% with a Z-test statistic of –3.20**, which is also significant at the one percent level. No other intervals tested between days –10 to +10 show significant abnormal returns, with the exception of days +2 to +10. The abnormal returns for days +2 to +10 are driven by shareholder activity occurring in the second week after the announcement. Ruling out subsequent announcement effects, one may speculate these post-event results could be caused as value traders take advantage of a perceived market overreaction to the layoff announcement. Overall, these results support our first hypothesis that the layoff announcements produce negative abnormal returns.

Table 3—Average Cumulative Abnormal Returns and Test Statistics For Layoff Announcements During 1990–1997 (n = 366, Equally Weighted Market Index)

Interval	Average CAR (%)	Z
–1 to 0	–1.15	–3.94**
–1 to +1	–1.24	–3.20**
–10 to –2	0.38	0.78
–5 to –2	0.54	1.50
+2 to +5	0.57	2.00
+2 to +10	0.84	2.56*

** Significant at the 1 percent level

* Significant at the 5 percent level

Table 4 shows our three model variations for the OLS regression results of the two-day announcement period abnormal returns on the layoff percentage of total employees.⁶ With a sample of 294 announcements in model 1, the coefficient associated with the layoff percentage is negative and statistically significant at the one percent level. As predicted, this indicates that layoffs that constitute a higher percentage of the workforce are associated with a more negative share price response. This result is consistent with our first hypothesis of an inverse relationship between the magnitude of layoffs and the share price response to layoff announcements. Similar positive, statistically significant results at the one percent level are obtained for firm size in the first model variation. As predicted, abnormal returns are posi-

⁶ We use the variance inflation factors (VIF) procedure to test for problems with multicollinearity (Neter, *et al*, 1989), which is found not to be significant using the rule-of-thumb upper bound of ten. VIF values appear in Tables 4 and 5.

tively related to firm size (i.e., the more negative share price responses are associated with announcements made by smaller firms). This result affirms our third hypothesis that firm size is positively related to the share price response to layoff announcements. The implication is that firm size serves as a proxy for information asymmetries existing at the time of a layoff announcement.

Table 4—OLS Regressions of Two-Day Announcement Period Abnormal Returns on INSIDE (%), INSIDE² (%), LAYOFF (%), EMPLOYEES, RETURN ON EQUITY, LOGARITHM OF MARKET VALUE, and PERCENTAGE OF INSTITUTIONAL OWNERSHIP

Coefficient	Model 1	Model 2	Model 3
	Parameter Estimate (p-value)	Parameter Estimate (p-value)	Parameter Estimate (p-value)
Intercept	-3.856* (0.0196)	-5.306** (0.0027)	-3.451 (0.065)
INSIDE (%)		-0.10978 (0.0552)	-0.093 (0.1069)
INSIDE2 (%)		VIF = 7.31 0.00138 (0.0862)	VIF = 7.27 0.001 (0.1163)
LAYOFF (%)	-0.0955** (0.0025)		VIF = 6.87 -0.0958** (0.0027)
EMPLOYEES	VIF = 1.11 -0.000 (0.6217)	-0.000 (0.9313)	VIF = 1.13 -0.000 (0.6707)
LOG OF MARKET VALUE	VIF = 1.16 0.560** (0.0058)	VIF = 1.15 0.664** (0.0025)	VIF = 1.16 0.557* (0.0128)
RETURN ON EQUITY	VIF = 1.25 -0.002 (0.4234)	VIF = 1.36 -0.0007 (0.8028)	VIF = 1.40 -0.001 (0.6834)
INSTITUTIONAL OWNERSHIP (%)	VIF = 1.02 -0.002 0.9035	VIF = 1.07 -0.0016 (0.9248)	VIF = 1.07 -0.003 0.8505
F-statistic (P -value)	VIF = 1.08 4.57** (0.0005)	VIF = 1.12 3.43** (0.0028)	VIF = 1.12 4.22** (0.0002)
Adjusted R ²	0.0574	0.0499	0.0767
Number of observations	(N = 294)	(N = 279)	(N = 272)

** Significant at the 1 percent level

* Significant at the 5 percent level

VIF refers to the variance inflation factors procedure described in footnote 6

Table 4, model 2, shows the OLS regression results of the two-day announcement period abnormal returns on the level of institutional ownership (n = 279). We find no support for our second hypothesis that the market reaction to layoff announcements is related to the level of managerial ownership, either on a linear or

curvilinear basis.⁷ Again, we find that firm size serves as a statistically significant explanatory variable in the cross-sectional analysis of the market reaction to layoff announcements. Thus, we fail to find support for our second hypothesis that the level of managerial ownership is positively related to the share price response to a layoff announcement.

Table 4, model 3, shows the OLS regressions results of the two-day announcement returns on both insider ownership and the portion of workforce affected by a layoff ($n = 272$). The coefficients associated with layoff percentage and size once again are found to be significant at the one percent and five percent level, respectively, in our most comprehensive model.

Table 5—OLS Regressions of the Absolute Value of the Two-Day Announcement Period Abnormal Returns ON INSIDE (%), INSIDE² (%), LAYOFF (%), EMPLOYEES, RETURN ON EQUITY, LOGARITHM OF MARKET VALUE, and PERCENTAGE OF INSTITUTIONAL OWNERSHIP

	Model 1 Parameter Estimate (p-value)	Model 2 Parameter Estimate (p-value)	Model 3 Parameter Estimate (p-value)
Intercept	9.185** (0.000)	9.960** (0.000)	8.432** (0.000)
INSIDE (%)		0.0436 (0.3488)	0.0301 (0.5230)
		VIF = 7.32	VIF = 7.26
INSIDE ² (%)		-0.0008 (0.2083)	-0.0007 (0.2700)
		VIF = 7.02	VIF = 6.87
LAYOFF (%)	0.0796** (0.0015)		0.08158** (0.0018)
	VIF = 1.11		VIF = 1.13
EMPLOYEES	0.000 (0.2954)	0.000 (0.6377)	0.000 (0.4159)
	VIF = 1.16	VIF = 1.15	VIF = 1.16
LOG OF MARKET VALUE	-0.8137** (0.0000)	-0.7931** (0.0000)	-0.7119** (0.0001)
	VIF = 1.36	VIF = 1.36	VIF = 1.40
RETURN ON EQUITY	0.0042* (0.0891)	0.0023 (0.3616)	0.0030 (0.2433)
	VIF = 1.02	VIF = 1.07	VIF = 1.07
INSTITUTIONAL OWNERSHIP (%)	-0.0129 (0.3263)	-0.0154 (0.2730)	-0.0132 (0.3544)
	VIF = 1.07	VIF = 1.12	VIF = 1.12
F-statistic (P -value)	10.64**(0.000)	5.40**(0.000)	6.07**(0.000)
Adjusted R ²	0.1413	0.0867	0.1158
Number of observations	(N = 294)	(N = 279)	(N = 272)

** Significant at the 1 percent level

* Significant at the 5 percent level

⁷ We also obtain statistically insignificant results from regression analysis using only the linear form of the insider ownership variable.

None of the three models show a statistically significant relationship between any of the independent control variables (employees, profitability, and institutional ownership) and the share price response to layoff announcements.

Table 5 contains the cross-sectional results associated with the regressions exhibited in Table 4 except that the absolute value of the cumulative abnormal returns is used as the dependent variable to better ascertain whether firm size effectively serves as a proxy for information asymmetry differences in layoff announcements. In all three models, as hypothesized, we observe that the coefficient associated with firm size is negative and statistically significant at the one percent level. These results offer support for our fourth hypothesis that firms size is negatively related to the absolute share price response to layoff announcements. The implication is that larger share price responses, regardless of whether the reaction is positive or negative, are associated with layoff announcements made by smaller firms. This is additional evidence of information asymmetry differences based on firm size. In addition, in the two model variations in which the layoff percentage serves as an independent variable, we also observe that the relatively larger layoffs produce larger absolute market reactions.

As evidenced in Table 6 (and contrary to results found in the Han and Suk research on stock splits), we do not find support of a joint effect of insider ownership and firm size on announcement returns of layoff announcements. We observe a lack of significance in the three interaction terms between subsamples of layoffs (separated into three categories by size) and insider ownership. This result is not surprising, due to the lack of statistical significance for the insider ownership variables in the previous models. Thus, we find no support for our variation to our third hypothesis that a joint effect of insider ownership and firm size exists to the announcement of corporate layoffs.

Conclusions

In this paper, we test the impact of layoff announcements on share price returns with respect to levels of inside ownership, magnitude of the layoff, and firm size, while controlling for differences in profitability, number of employees, and levels of institutional ownership. As with previous studies, we find statistically significant negative share price responses associated with layoff announcements. Second, we find that layoff announcements involving a greater percentage of a firm's workers result in more negative share price responses. Third, we discover that the firm size serves as an effective proxy for information asymmetries. Layoff announcements initiated by smaller firms result in larger (and more negative) share price responses. Finally, we confirm that the absolute value of the share price responses is negatively associated with firm size. This means that, regardless of intent, shareholders react more strongly to the announcements of layoffs coming from smaller firms, rather than larger firms. Using this information to employ appropriate derivative strategies

allows investors to capitalize on the greater information asymmetries occurring in the smaller firms, regardless of the stated intent of or the subsequent interpretation of the layoff announcement.

We find no evidence of a relationship between the level of managerial ownership and the share price response to layoff announcements. In addition, we find that the number of employees, level of institutional ownership, and firm profitability do not serve as explanatory variables for the share price response to layoff announcements. The market does believe that recent profitability findings are worthy of influencing their reaction to layoff announcements.

Table 6—OLS Regressions of the Two-day Announcement Period Abnormal Returns on Interaction Term Between Firm Size Categorization and INSIDER PERCENTAGE, LAYOFF (%), EMPLOYEES, RETURN ON EQUITY, and PERCENTAGE OF INSTITUTIONAL OWNERSHIP

Coefficient	Model 1—CARs	Model 2—Absolute Value of CARs
	Parameter Estimate (p-value)	Parameter Estimate (p-value)
Intercept	0.0223 (0.9840)	3.847** (0.0001)
K1 * INSIDE (%)	-0.0250 (0.3741) VIF = 1.27	0.0063 (0.7862) VIF = 1.27
K2 * INSIDE (%)	-0.0095 (0.8297) VIF = 1.05	0.0046 (0.8994) VIF = 1.05
K3 * INSIDE (%)	-0.0436 (0.3865) VIF = 1.03	-0.0283 (0.4975) VIF = 1.03
LAYOFF (%)	-0.1140** (0.0004) VIF = 1.11	0.0990** (0.0002) VIF = 1.11
EMPLOYEES	0.0000 (0.6174) VIF = 1.06	0.0000 (0.6906) VIF = 1.06
RETURN ON EQUITY	-0.0012 (0.6984) VIF = 1.09	0.0031 (0.2494) VIF = 1.09
INSTITUTIONAL OWNERSHIP (%)	0.0038 (0.8327) VIF = 1.11	-0.0235 (0.1108) VIF = 1.11
F-statistic (P-value)	2.65 (0.0115)*	3.24 (0.0026)**
Adjusted R ²	0.0409	0.0546
Number of Observations	N = 272	N = 272

** Significant at the 1 percent level

* Significant at the 5 percent level

K1, K2, and K3 are dummy variables related to the size divisions detailed in the sample and methodology section

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