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WHICH INFORMATION MOVES PRICES: EVIDENCE FROM DAYS WITH DIVIDEND AND EARNINGS ANNOUNCEMENTS AND INSIDER TRADING

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ABSTRACT

We examine the impact of public and private information on price movements using the thirty DJIA stocks and twenty-one NASDAQ stocks. We find that the standard deviation of daily returns on information days (dividend announcement, earnings announcement, insider purchase, or insider sale) is much higher than on no-information days. Both public information matters at the NYSE, probably due to masked identification of insiders. Earnings announcement has the greatest impact for both DJIA and NASDAQ stocks, and there is some evidence of positive impact of insider asle on return volatility of NASDAQ stocks.

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There has been considerable debate, e.g., French and Roll (1986), over whether market volatility is due to public information or private information-the latter gathered through costly search and only revealed through trading. Public information is composed of (1) marketwide public information such as regularly scheduled federal economic announcements (e.g., employment, GNP, leading indicators) and (2) company-specific public information such as dividend and earnings announcements. Policy makers and corporate insiders have a better access to marketwide private information (e.g., a new monetary policy decision made in the Federal Reserve Board meeting) and company-specific private information, respectively, compated to the general public.

Ederington and Lee (1993) show that marketwide public information accounts for most of the observed volatility patterns in interest rate and foreign exchange futures markets. Company-specific public information is explored by Patell and Wolfson (1984) and Jennings and Starks (1985). They show that dividend and earnings announcements induce higher than normal volatility in equity prices. Kyle (1985), Admati and Pfleiderer (1988), Barclay, Litzenberger and Warner (1990), Foster and Viswanathan (1990), Back (1992), and Barclay and Warner (1993) show that the private information help by informed traders and revealed through trading influences market volatility. Cornell and Sirri (1992) and Meulbroek (1992) investigate the actual insider trading activities in a tender offer case and the prosecuted illegal trading cased, respectively.

This paper examines the aggregate and individual impact of marketwide information, company-specific public information, and company-specific private information on equity prices. Specifically, we use the thirty common stocks in the Dow Jones Industrial Average (DJIA) and twenty one National Association of Securities Dealers Automated Quotations (NASDAQ) common stocks to examine how their prices react to information. Marketwide information (public and private)

is estimated by the movement in the Standard and Poors (S & P) 500 Index price for the DJIA stocks and the movement in the NASDAQ Composite Index price for the NASDAQ stocks. Divedend and earnings announcements are used as a subset of company-specific public information. The trading activity of corporate insiders (major corporate officers, members of the board of directors, and owners of at least 10 percent of any equity class) with an access to private information can be cannot legally trade on private information. Therefore, most insider transactions are not necessarily based on private information. Nevertheless, we hypothesize that market participants observe how insiders trade in order to infer any information that they cannot possess because insiders tend to buy (sell) when they have good (bad) information about their company. For example, Damodaran and Liu (1993) show that insiders of real estate investment trusts buy (sell) after they receive favorable (unfavorable) appraisal news before the information in these appraisals is released to the public. Price discovery in a competitive multiple-dealership market (NASDAQ) would be different from that in a monopolistic specialist system (NYSE). Consequently, we hypothesize that NASDAQ stocks are affected more by private information (or more precisely, insider trading) than the DJIA stocks.

In the next section, we describe our choices of the fifty-one stocks and the public and private information set. We also discuss institutional differences between the NYSE and the NASDAQ market. In Section II, we examine the implications of public and private information for the volatility of daily returns of each stock. In Section III, we turn to the question of the relative importance of individual elements of our information set. Further analysis of the five DJIA stocks and the four NASDAQ stocks that are most sensitive to earnings announcements is given in Section IV, and our results are summarized in Section V.

I. Public and Private Information

We explore the impact of public and private information on the return volatility of the stocks listed in the Appendix. These are the thirty NYSE-listed common stocks in the DJIA and twenty-one NASDAQ common stocks. The Wall Street Journal was checked for the years 1988 through 1990 to obtain the list of the thirty stocks.[1] Each of the thirty DJIA stocks was located in the Value Line editions dated June 22, 1990 through September 14, 1990 to identify industry classifications. In order to obtain a matching NASDAQ stock for each DJIA stock, a list was prepared at the same time showing the NASDAQ stocks within the same industries.[2] If there were more than one NASDAQ stocks within the industry, they were ranked according to revenues. The highest revenue stock was chosen in an attempt to reduce any bias due to small firm size. A total of twenty-one NASDAQ stocks were in the final sample, as shown in the Appendix.

We examine how these DJIA and NASDAQ stocks respond to public and private information for the January 4, 1988 through December 30, 1990 period. Public information which drives each stock price can be classified into marketwide public information and company-specific public information. Marketwide public information such as regularly scheduled macroeconomic announcements is common to all stocks traded in the market, although individual stocks may exhibit differential responses. The evidence of Ederington and Lee (1993) suggests that

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1) The composition of the DJIA remained unchanged from January 4, 1988 through May 3, 1991. Beginning May 6, 1991, Navistar, Primerica, and USX were replaced by Caterpillar, Disney, and J.P. Morgan.

2) The following DJIA stocks had no matching NASDAQ stocks within the same industry: Alcoa, American Express, Exxon, Goodyear, Primerica, and Texaco. The tree initially identified NASDAQ stocks that matched for Merck, Navistar, and Westinghouse were also eliminated as they pay no dividends.

marketwide public information has a dramatic impact on interest rate and foreign exchange rate markets. The equity market must also be highly affected by marketwide public information. Although difficult to investigate, marketwide private information, if there is any, may impact the equity prices. We assume the stock market index reflects the content of market wide information. We obtained the S&P 500 Composite Index return series from the Center for Research in Security Prices (CRSP) NYSE/AMEX index file. The return volatility of the S&P 500 Index can be a proxy for marketwide information for the DJIA stocks. The NASDAQ Composite Index return series was also obtained from the CRSP NASDAQ file, and its volatility was used as an estimate of marketwide public information for the NASDAQ stocks.

Company-specific public information may include dividend announcement, earnings announcement, stock split announcement, the initial announcement of merger/acquisition talks, and so on. Among these, dividend and earnings announcements are regularly scheduled, while others are unscheduled and do not have sufficient sample points. In fact, among others, Patell and Wolfson (1984) and Jennings and Starks (1985) find that the equity return variance increases following dividend and earnings announcements. We use these two announcements as company-specific public information. Dividend and earnings announcement dates for the thirty DJIA stocks and the twenty-one NASDAQ stocks were gathered from the Wall Street Journal Index for the test period. There is usually a one day lag between the actual announcement day and the day on which the announcement is reported in the Wall Street Journal unless the announcement is made on Friday or before a holiday. The exact announcement date was carefully identified.[3] Most of our sample stocks have quarterly announcements:

3) Sometimes an initial announcement is followed by an additional announcement a few days later. Since we focus on the reaction of each stock to a new information release,

approximately 12 dividend announcements and 12 earnings announcements during the sample period.

We use insider trading as a proxy for company-specific private information since corporate insiders have an access to private information. However, private information cannot be used legally by corporate insiders. Meulbroek (1992) analyzes illegal insider trading prosecuted by the Securities and Exchange Commission (SEC) and concludes that the market detects and reflects in the stock price the private information owned by insiders. This evidence implies that market participants observe the transactions made by corporate insiders and attempt to draw any implications of the information possessed by insiders. If insiders purchase (sell) securities heavily, market participants would also want to take the same side in their transactions since they believe insiders have a better information about the company regardless of whether or not insiders trade on private information. We obtained the Ownership Report System (ORS) File from the Securities and Exchange Commission. This database contains a complete record of daily trading activities of corporate insiders of all NYSE/AMEX/NASDAQ securities. Specifically, it contains transaction date, CUSIP number, type of transaction (open market purchase, open market sale, stock dividend, stock split, initial holdings, acquisition by exercise of options, etc.), number of shares transacted, transaction price, reporting entity's name, reporting entity's relationship code (director, officer, president, vice president, etc.), stock symbol as shown on exchanges, and so on. We sampled transaction dates and types of transaction for the fifty-one DJIA and NASDAQ stocks for the January 1988 - December 1990 period. Out of 21 different types of transaction, we chose only two types, open market purchase and open market sale, as insider trading days, assuming that these two transactions represent information-based insider

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we include only the first announcement date in our sample.

trading better than any other transaction.

It is interesting to note that insider trading days seldom overlap with dividend and earnings announcement days. For the thirty DJIA stocks, a total of 2298 information days consist of 1680 days with insider trading and 657 days with dividend and earnings announcements, and only 39 days (0.02%) are overlapping. Similarly, insiders hardly trade on dividend and earnings announcement days in the NASDAQ market; 645 days with insider trading, 431 days with dividend and earnings announcements, and 21 overlapping days (0.02%). This observation relates to previous studies such as Keown and Pinkerton (1981), Hirschey and Zaima (1989), and John and Lang (1991) that find substantial insider trading occurrences prior to corporate announcements implying insiders take advantage of their information before it becomes public.

The NASDAQ market is characterized as a competitive multi-dealership market, while the NYSE is a monopolistic specialist market. At the NYSE, an order is placed manually or through the NYSE's SuperDot system, a trade actually occurs, and the Exchange disseminates trade information consisting of ticker symbol, execution price, trade size, and special trading conditions on a real time basis. However, it is almost impossible for a market participant to identify from whom the order originates; at best, they can find out whether the order is a member order for a member's own account or a public order submitted by a member on behalf of a nonmember. However, whether a nonmember is a corporate insider or an ordinary investor remains a question at the NYSE. Although the identity of trader in both market is not known, we posit that the price discovery in a multiple dealership market be faster than that in a specialist system. We hypothesize that the market pays close attention to trades to infer the information of insiders in the equity price. Consequently, the reaction of the NASDAQ stocks to insider trading must be more prominent compared to the DJIA stocks if our hypothesis is true.

II. Information and Volatility

A. Information Days versus No-Information Days

Daily returns, Rt, of the thirty DJIA stocks and the twenty-one NASDAQ stocks are obtained from the daily CRSP NYSE/AMEX master file and from the daily CRSP NASDAQ file, respectively, for the January 4, 1988 to December 30, 1990 period. Of primary interest is volatility on days with public and private information releases. The information day set includes days on which at least one of the following four occurs: dividend announcement (public), earnings announcement (public), insider purchase (private), and insider sale (private). Those days with none of the four occurrences above are designated as the no-information days. Standard deviations of the daily returns calculated across the information days and across the no-information days are shown in Figures 1 and 2 for the DJIA stocks and the NASDAQ stocks, respectively.

In Figure 1, twenty-two stocks out of thirty (about 73 percent of the sample) exhibit higher return volatility on information days than on no-information days. For example, in the case of Eastman Kodak (EK), the information day standard deviation is about 1.8 times the no-information day standard deviation. In the case of Alcoa (AA), the ratio is 1.7. To determine statistical significance, we employ Brown-Forsythe-modified Levene tests of the null that the variance is the same for both information days and no-information days.[4] The null is rejected at

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4) Conover, Johnson, and Johnson (1981) compare over 50 methods for testing variance homogeneity and find that this test is both one of the most powerful and quite robust to nonnormality. One of the first studies in finance to apply this test to test the homogeneity of intraday return variances was Lockwood and Linn (1990). The Brown-Forsythe-modified Levene test statistic is whereis the return for day t, intervalis the sample median return for interval j computed over thedays included in the testis the mean absolute deviation (from the median) for interval j: andis the grand mean, and

the 0.1 percent level for Eastman Kodak, at the 1 percent level for Alcoa and Primerica (CCC), and at the 5 percent level for Coca-Cola (KO), Sears & Roebuck (S), and Union Carbide (UK). When all 30 stocks are combined, the null of homoskedasticity is, however, not rejected, although the information day volatility is slightly higher than the no-information day volatility. Nevertheless, our evidence suggests that public and private information has some impact on the equity price at the NYSE, and further investigation is warranted.

B. Public Information versus Private Information

Whether public information or private information moves equity prices is an ongoing debatable issue. For example, French and Roll (1986), Barclay, Litzenberger and Warner(1990), and Barclay and Warner (1993) show that price movements are caused mainly by informed traders' private information revealed through trading, while the importance of public information is emphasized in Patel and Wolfson (1984), Jennings and Starks (1985), and Ederington and Lee (1993). Which information moves prices-private, public, or both? Although very crude, an attempt to answer this question can be made by dividing information days into public information days (dividend and earnings announcements) and private information days (insider trading). Of course, case studies for specific private information events [Cornell and Sirri (1992) and Meulbroek (1992)] would not complicate the interpretation of the results compared to our study which adopts insider trading as a proxy for private information. However, the crudeness of our data for private information allows us to obtain more sample points based on a more general selection criterion. Most importantly, a direct test to compare the impact of public and private information on price movements can be conducted in our approach.

The statistic is distributedunder the null hypothesis.

In Table I, we present the Brown-Forsythe-modified Levene test statistic (F1) for the null hypothesis that the variance of returns is constant throughout public information days (dividend and earnings announcements) and no-information days for the thirty DJIA stocks. This null is significantly rejected at the 0.1 percent level for the total data set of the thirty stocks. However, as shown in Table I the test statistic (F2) for equality of the variance across private information days (insider trading) and no-information days is not significant, which implies that private information does not induce higher than normal volatility. Standard deviations of daily returns are also reported for public information days, private information days, and no-information days.

In terms of individual stocks, twenty-two (about 73%) out of thirty stocks exhibit higher return volatility on public information days than on no-information days. This phenomenon is particularly evident for Eastman Kodak (EK), Primerica (CCC), Alcoa (AA), Coca-Cola (KO), Proctor & Gamble (PG), Union Carbide (UK), and McDonalds (MCD); the F1 statistic is significant at the 0.1 percent level for EK, CCC, and AA, at the 1 percent level for KO and PG, and at the 5 percent level for UK and MCD. The results for private information days are in sharp contrast. Seventeen (about 57%) stocks indicate relatively higher volatility on private information days. However, only one stock, Sears and Roebuck (S), shows statistically significant (at 5%) heteroskedasticity between insider trading and no-information days. At the NYSE, there is discernibly higher volatility when dividend and earnings announcements occur, while volatility remains the same regardless of insider trading. We hypothesize that constant volatility on insider trading days is due primarily to the market microstructure on information discovery. For our hypothesis to hold, the NASDAQ stocks must tend to have higher than normal volatility on insider trading days.

Table II reports the results for the twenty-one NASDAQ stocks. Very

interestingly, the null of homoskedasticity between private information days and no-information days as well as the null of homoskedasticity between public information days and no-information days is overwhelmingly rejected at the 0.1 percent level. Like DJIA stocks, fourteen (about 67%) out of twenty-one stocks show abnormally higher volatility on dividend and earnings announcement days; significant heteroskedasticity for MCI Comm. (MCIC) and Sigma-Aldridge (SIAL) at the 0.1 percent level, for Coors (ACCOB) and Jacobson Stores (JCBS) at the 1 percent level, and for VWR Corp. (VWRX) at the 5 percent level. Contrary to the NYSE, price discovery in the NASDAQ would be easier because of the market microstructure difference. Therefore, it is likely that volatility is higher on insider trading days. Twelve (about 57%) stocks exhibit higher volatility, and in particular Lancaster Colony (LANC), Williamette Ind. (WMTT), and Morrison Rest., Inc. (MORR) provide statistically significant evidence of heteroskedasticity.

In summary, only public information increases volatility for the DJIA stocks, while the NASDAQ stocks are significantly affected by both public and private information in their price movements. The impact on volatility of dividend and earnings announcements appears to be dominant over that of insider trading for both the DJIA and NASDAQ stocks at aggregate as well as individual levels. Although the degree of the impact of information varies remarkably across individual stocks, there is clear evidence from several stocks that either dividend and earnings announcements or insider trading activities induce more volatile price movements.

IV. Which Information Moves Prices

In Tables I and II, it is apparent that dividend and earnings announcements have

greater impact than insider trading. However, we do not expect dividend announcements and earnings announcements to have the same impact.[5] Moreover, insider trading can be classified into insider purchase (bullish information) and insider sale (bearish information), and there may be differential impact between insider purchase and sale.[6] Attention is now turned to the question of which information has the greatest impact.

A. Procedure

We compare relative importance of dividend announcements, earnings announcements, insider purchase, and insider sale. In addition, we take into consideration the marketwide information as an element of our information set. Specifically, we define a series of dummy variables D_{kt} where $D_{kt} = 1$ if information k is released on day t and $D_{kt} = 0$ otherwise. One more independent variable in our regressions is the absolute value of the difference between the actual stock index return I_t on day t and the mean return $\bar{I}$ over all trading days during the test period. The dependent variable is the absolute value of the difference between the actual stock return R_t on day t and the mean return $\bar{R}$. In summary, our regression format is

$$|R_t - \bar{R}| = a_0 + a_1 |I_t - \bar{I}| + \sum_{k=2}^{5} a_k D_{kt} + e_t \qquad (1)$$

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5) For example, Patell and Wolfson (1984) show that dividend announcements induce much lower volatility compared to earnings announcements although the reaction to dividend changes is comparable to the impact of earnings announcements.

6) There were a few days on which both insider purchase and insider sale occurred. We compared the amount of each of insider purchase and sale and designated that day as either purchase day or sale day depending on whichever was larger.

where:

I_t = the S&P 500 Composite Index return on day t for the DJIA stocks or the NASDAQ Composite Index return on day t for the NASDAQ stocks

D_{2t} = 1 if dividend announcement is made on day t; 0 otherwise

D_{3t} = 1 if earnings announcement is made on day t; 0 otherwise

D_{4t} = 1 if insiders purchase the stock; 0 otherwise

D_{5t} = 1 if insiders sell the stock; 0 otherwise

The daily stock returns, R_v, of the thirty DJIA stocks and the twenty-one NASDAQ stocks are obtained from the daily CRSP NYSE/AMEX master file and from the daily CRSP NASDAQ file, respectively. The daily index returns, I_v, of the S&P 500 Composite Index and the NASDAQ Composite Index are also obtained from the CRSP NYSE/AMEX index file and from the CRSP NASDAQ file, respectively.

Separate regressions for each of the fifty-one DJIA and NASDAQ stocks are estimated over 758 trading days between January 4, 1988 and December 28, 1990. The absolute deviation of an index return from its mean must be able to explain the stock return volatility to the extent that marketwide information affects all the stocks in the market as a whole. The stock price movements not explained by the overall market movements can be attributed partly to company specific public information (dividend and earnings announcements) and company specific private information (insider purchase and insider sale). Whether particular information is good or bad, a_{kt} should be positive if information k moves the stock price. If

information is ignored by the market participants, a_{kj} should be approximately zero.[7]

B. Regression Results

Regression results for each of the thirty DJIA stocks are shown in Table III.[8] The overall result, as also shown in Table III, suggests that the S&P index volatility and earnings announcement greatly affect the volatility of the DJIA stocks; a1 and a3 are significantly positive at the 0.1 percent level. Interestingly, dividend announcement (a2), insider purchase (a3), and insider sale (a4) are all either negative or insignificant. These findings imply that only marketwide information and earnings announcement account for a large portion of the price movements of the DJIA stocks, while dividend announcement and insider trading information are likely ignored by the market.

Results for individual stocks confirm the overall result. With no exception, every stock in the DJIA is driven by marketwide information; all a1's are significant at the 0.1 percent level. Twelve out of thirty stocks indicate that the impact of earnings announcement is significant in their price movements; Eastman Kodak (EK), IBM (IBM), Alcoa (AA), Primerica (CCC), and Proctor & Gamble (PG) indicate significance at the 0.1 percent level, Bethlehem Steel (BS) at the 1 percent level, and Boeing (BA), American Express (AXP), Good Year (GT), International Paper (IP), United Technology (UTX), and Chevron (CHV) at the 5

7) For estimates akj to be meaningful, information should not always coincide with other information. As mentioned above, dividend and earnings announcement days seldom overlap with insider trading days. Furthermore, only 0.06% (66 days) of our dividend and earnings announcement days (1088 days) have both announcements on the same day. Therefore, a potential problem of multicollinearity is not of concern.

8) Residuals from OLS estimates of equation 1 generally display first-order serial correlation. To enhance the efficiency of estimates, we use an AR(1) model to estimate equation 1 and these results are reported.

percent level. Only two stocks [Coca-Cola (KO) and United Carbide (UK)] are significantly (at the 1 percent level) affected by dividend announcement. Regarding insider trading, three stocks respond to insider purchase information and six stocks are impacted by insider sale information; however, the impact of insider trading is a lot less than the impact of earnings announcement.

The results for the NASDAQ stocks are reported in Table IV.[9] The aggregate result for the entire set of twenty-one stocks does not mirror the result for the DJIA stocks; insider sale information induces abnormally large return volatility contrary to the DJIA result, while the significant impact of marketwide information and earnings announcement is still present like the DJIA stocks. Insider purchase information in aggregate has also a little positive impact although not significant. The evidence of insider purchase and sale information may be due to the ability of the NASDAQ market participants to infer information from trades. The impact on the NASDAQ stocks of the NASDAQ index volatility is more significant than earnings announcement and insider sale, although it is not as large as the impact of the S&P index volatility on the DJIA stocks in terms of t-values.[10]

Twenty NASDAQ stocks out of twenty-one significantly move in line with the NASDAQ index; eighteen of them are significant at the 0.1 percent level, one is significant at the 1 percent level, and one is significant at the 5 percent level. Like the NYSE stocks, the NASDAQ stocks respond significantly to earnings announcement; MCI Comm. (MCIC), Coors (ACCOB), Jacobson Stores (JCBS), and Sigma-Aldridge (SIAL) are significant at the 0.1 percent level; Apple (AAPL),

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9) For the NASDAQ stocks, the error term of equation 1 exhibits an autoregressive process of order two. To reduce potential bias in standard error estimates, we estimate equation 1 using an AR(2) model and report the results.

10) Note also that the a1 coefficient is approximately 0.65 for the NASDAQ stocks, while it is about 1.01 for the DJIA stocks. The reason for the NASDAQ stocks being less volatile than the NASDAQ Composite Index is that our NASDAQ stocks are chosen based on large revenues and hence relatively large firm sizes.

VWR Corp. (VWRX), and Dibrell Brothers (DBRL) are significant at the 1 percent level; Steel Technologies (STTX) is significant at the 5 percent level. Dividend announcement does not affect price movements of the NASDAQ stocks. Five stocks show some positive impact of insider purchase information; Williamette Ind. (WMTT), Morrison Rest. (MORR), Hamilton Oil (HAML), Petrolite (PLIT), and Sigma-Aldridge (SIAL) are all significant at the 5 percent level. Finally, a significant reaction to insider sale information is observed from price movements of Lancaster Colony (LANC) and MCI Comm. (MCIC) at the 1 percent level and Steel Technologies (STTX) at the 5 percent level.

IV. Further Investigation

In the previous section, earnings announcement was reported to be dominant over dividend announcement, insider purchase, and insider sale in its impact on stock price movements. We focus on the five DJIA stocks (AA, EK, IBM, CCC, and PG) and the four NASDAQ stocks (MCIC, ACCOB, JCBS, and SIAL) to address several issues regarding earnings announcement. Specifically, we examine the return volatility pattern around earnings announcement day. We also compare average trading volume on earnings announcement days with that on no-information days.

A. Volatility around Earnings Announcement Day

We have shown in Tables III and IV that return volatility is impacted by earnings announcement. Attention is now turned to the question of how long return volatility remains higher than normal. We expect the standard deviation of

returns to increase when the information is released and to return to normal once the full implications of the information for stock prices are worked out.

Some evidence of the volatility adjustment is presented in Table V. We calculate successive daily return standard deviations for days prior to announcement (day-5 through day-1), the announcement day (day+0), and days following announcement (day+1 through day+5).[11][12] We examine the DJIA and NASDAQ stocks that are significantly impacted by earnings announcement at the 0.1 percent level. We also report Brown-Forsythe-Levene tests for homoskedasticity between the standard deviation on each of day+0 through day+5 and the standard deviation during the day-5 to day-1 period.

Table V yields a general observation that the standard deviation on day+0 is remarkably higher than normal. On the average, the standard deviation on the announcement day is about 2.4 and 2.6 times the normal standard deviation (day-5 through day-1), and in particular Eastman Kodak (EK) and Coors (ACCOB) exhibit about four times higher than normal volatility on day+0. There is no tendency of increasing volatility as the announcement day approaches except for Jacobson Stores (JCBS) (which has considerably high volatility on day-2 and day-1). It is also clear that the volatility adjustment is complete within the announcement day. B-F-L tests show that only the day+0 (out of day+0 through day+5) volatility is significantly higher than the day-5 to day-1 volatility. The exception is Sigma-Aldridge (SIAL) which shows relatively high volatility on day+1 and day+2.

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11) We attempted to conduct a similar analysis on the impact of insider sale on return volatility since it appears to be dominant over insider purchase as shown in Tables III and IV. However, insider sale frequently occurs on consecutive days, which makes it difficult to calculate daily return standard deviations separately on each of day-5 through day+5.

12) Lin and Rozeff (1992) examined the speed of price adjustment to private information. They report that most private information is reflected into prices within a day and any remaining portion is carried into the next day.

B. Trading Volume

We now examine trading volume on earnings announcement days. We ask whether the average trading volume on earnings announcement days is higher than normal. Previous studies found that volume and price variability are positively related in general.[13] Our finding that volatility is higher on information days than on no-information days make us anticipate higher trading volume on information days. We calculate mean trading volume on earnings announcement days for each of the five DJIA stocks and the four NASDAQ stocks using daily trading volume data obtained from the daily CRSP NYSE/AMEX master file and CRSP NASDAQ file. For comparison, mean trading volume on no-information days is also calculated.

Results are presented in Table VI where we show without exception the earnings announcement day volume far exceeds the no-information day volume.[14] This phenomenon tends to be more prominent for the NASDAQ stocks. For example, MCI Comm. (MCIC) exhibits the trading volume on earnings announcement days more than three times that on no-information days. On the

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13) For example, see Jain and Joh (1988).

14) We seek further evidence of the positive relationship between volume and volatility by the absolute deviation of the return R_t from its mean $\overline{R}$ on the trading volume on day t, TV_t. We also added $D_t^* TV_t$ as another independent variable to investigate differential impacts on volatility of information and no-information day volumes. Our regression format is

$$| R_t - \overline{R} | = a_0 + a_1 TV_t + a_2 D_t TV_t + e_t$$

where $D_t = 1$ if earnings announcement is released on day t; 0 otherwise. The regression results showed that both a_1 and a_2 are significant, which implies that higher volume on no-information days has positive impact on volatility as much as higher volume on information days, although as shown above higher volume tends to be observed on information days.

average, 1.7 times and 2.2 times higher than normal volumes are observed for the DJIA and NASDAQ stocks, respectively. On the right-hand side of the table, we also show results of t tests for mean difference between earnings announcement days and no-information days. The null of equality of mean trading volumes was rejected at the 5 percent or lower for five out of the nine stocks. The aggregate results also suggest rejection of the null for both the DJIA and the NASDAQ stocks.

V. Conclusions

We have explored the impact of information on stock price movements. Our most important findings may be summarized as follows. First, standard deviations of daily returns are notably higher on information days (dividend and earnings announcement days and insider trading days) than on no-information days. Second, both public and private information induces higher than normal volatility for the NASDAQ stocks, while only public information impacts volatility for the DJIA stocks in general. This may be due partly to the fact that market participants can better infer information from trades made by insiders in the NASDAQ market than at the NYSE. Third, earnings announcement has the greatest impact on return volatility for both DJIA and NASDAQ stocks. There is also some evidence of positive impact of insider sale on volatility for the NASDAQ stocks. In general, dividend announcement and insider purchase are not significantly incorporated in stock price movements in both markets. Fourth, the price adjustment to earnings announcement is complete within a day, and the trading volume on earnings announcement days is much higher than on no-information days.

In contrast to previous studies where some cases of private information events were analyzed, we take a crude approach to estimating private information to draw a more general conclusion about the impact of private as well as public information on stock price movements. Although not all of our sample stocks indicate significant impact of public and private information probably due to coarseness of our data, the importance of both public and private information found from many stocks we examine - particularly, earnings announcement and insider sale - cannot be emphasized too much.

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Appendix
DJIA and NASDAQ Stocks in the Same Industries
Based on the Value Line Editions from 6/22/90 through 9/14/90

DJIA			NASDAQ	
Company Name	Ticker Symbol	Common Industry	Company Name	Ticker Symbol
Alcoa	AA	Metals & Mining	N/A	
Allied Signal	ALD	Diversified	Kaman	KAMNA
American Express	AXP	Financial Services	N/A	
AT&T	T	Telecomm. Service	MCI Comm.	MCIC
Bethlehem Steel	BS	Steel/Integrated	Steel Technologies[1]	STTX
Boeing	BA	Aerospace/Defense	Wyman-Gordon	WYMN
Chevron	CHV	Petroleum/Integrated	Hamilton Oil[2]	HAML
Coca-Cola	KO	Beverages	Coors	ACCOB
DuPont	DD	Chemical/Basic	H.B. Fuller[3]	FULL
Eastman Kodak	EK	Precision Instruments	VWR Corp.	VWRX
Exxon	XON	Petroleum/Integrated	N/A	
General Electric	GE	Electrical Equipment	Joslyn Corp.	JOSL
General Motors	GM	Auto & Truck	PACCAR	PCAR
Good Year	GT	Tire & Rubber	N/A	
IBM	IBM	Computer & Peripherals	Apple	AAPL
International Paper	IP	Paper & Forest Products	Williamette Ind.	WMTT
McDonalds	MCD	Restaurant	Morrison Rest., Inc.	MORR
Merck	MRK	Drug	N/A	
3M	MMM	Chemical/Diversified	Petrolite, Inc.[4]	PLIT
Navistar	NAV	Auto & Truck	N/A[5]	
Phillip Morris	MO	Tobacco	Dibrell Brothers	DBRL
Primerica	CCC	Financial Services	N/A	
Proctor & Gamble	PG	Household Products	Lancaster Colony	LANC
Sears & Roebuck	S	Retail Store	Jacobson Stores	JCBS
Texaco	TX	Petroleum/Integrated	N/A	
USX	X	Steel/Integrated	Worthington Ind.[6]	WTHG
Union Carbide	UK	Chemical/Basic	Sigma-Aldridge[7]	SIAL
United Technology	UTX	Diversified	Figgie Int'l. "B"	FIG
Westinghouse	WX	Electric Equipment	N/A	
Woolworth	Z	Retail Store	Dollar General	DOLR

[1]Steel Technologies is listed as Steel/General.
[2]Hamilton Oil was the only NASDAQ stock listed as Petroleum/Integrated in the 1990 Value Line Editions.
[3]H.B. Fuller is listed as Chemical/Specialty.
[4]Petrolite, Inc. is listed as Chemical/Specialty.
[5]Mack Trucks was also listed as Auto & Truck but was excluded from our sample since it never paid dividends during the test period.
[6]Worthington Ind. is listed as Steel/General.
[7]Sigma-Aldridge is listed as Chemical/Specialty.

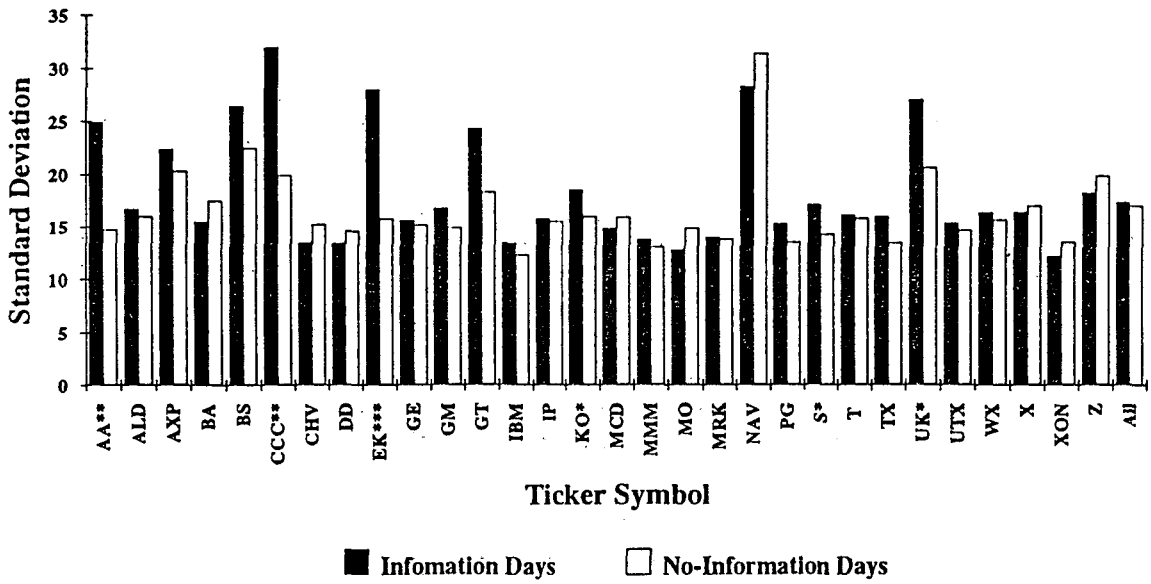

Figure 1. Daily return volatilities on information days and no-information days for the thirty DJIA stocks. Standard deviations of daily returns are reported for days with at least one of the following occurrences: dividend announcement (public), earnings announcement (public), insider purchase (private), and insider sale (private). Those for days with none of these four are also reported. Daily observations from January 4, 1988 through December 28, 1990 are utilized. The reported standard deviations are 10^3 times the calculated values. The ticker symbol is shown for each of the thirty DJIA stocks. One, two, and three asterisks indicate that the null hypothesis of equality of the variances between information and no-information days is rejected at the 5, 1, and 0.1 percent levels, respectively, on the basis of the Brown-Forsythe-modified Levene test statistics.

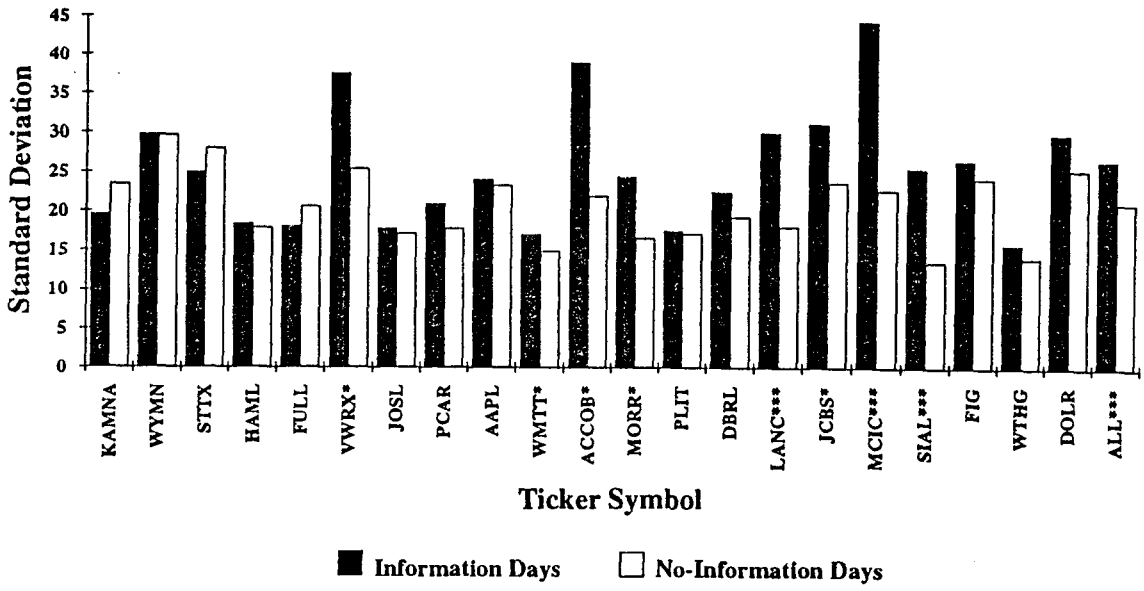

Figure 2. Daily return volatilities on information days and no-information days for the twenty-one NASDAQ stocks. Standard deviations of daily returns are reported for days with at least one of the following occurrences: dividend announcement (public), earnings announcement (public), insider purchase (private), and insider sale (private). Those for days with none of these four are also reported. Daily observations from January 4, 1988 through December 28, 1990 are utilized. The reported standard deviations are 10^3 times the calculated values. The ticker symbol is shown for each of the twenty-one NASDAQ stocks. One and three asterisks indicate that the null hypothesis of equality of the variances between information and no-information days is rejected at the 5 and 0.1 percent levels, respectively, on the basis of the Brown-Forsythe-modified Levene test statistics.

Table I

Tests of Homoskedasticity of the Return Variates between Information and No-Information Days for the Thirty DJIA Stocks

Standard deviations of daily returns are reported for public information days (dividend announcement or earnings announcement), private information days (insider purchase or insider sale), and no-information days. The reported standard deviations are 10^3 times the calculated values. Brown-Forsythe-modified Levene test statistics are reported; F_1 is the test statistic for equality of the variances between public information days and no-information days. F_2 is the test statistic for equality of the variances between private information days and no-information days. One, two, and three asterisks indicate that the null hypothesis of homoskedasticity is rejected at the 5, 1, and 0.1 percent levels, respectively.

Ticker Symbol	Standard Deviations of Daily Returns						F_1	F_2
	Public Info. Days	No. of Obs.	Private Info. Days	No. of Obs.	No-Info. Days	No. of Obs.	$H_0:\sigma_{pub.\ info.} = \sigma_{no\text{-}info.}$	$H_0:\sigma_{priv.\ info.} = \sigma_{no\text{-}info.}$
AA	31.543	24	15.184	24	14.731	711	15.38***	0.10
ALD	16.201	24	16.887	84	16.015	653	0.27	1.44
AXP	23.905	24	20.706	21	20.288	713	1.51	0.00
T	16.352	24	15.538	20	15.836	716	0.01	0.00
BS	30.877	15	22.083	15	22.450	728	1.85	0.02
BA	17.102	16	13.510	22	17.511	721	0.13	0.52
CHV	15.247	23	13.300	179	15.202	560	0.43	1.43
KO	21.580	24	16.158	25	15.986	710	6.84**	0.54
DD	15.568	14	13.156	93	14.562	651	0.27	0.15
EK	36.343	24	22.016	30	15.774	706	34.94***	2.03
XON	13.356	24	10.494	27	13.571	707	0.12	1.77
GE	16.302	24	15.236	26	15.135	708	0.09	0.76
GM	18.242	24	16.593	223	14.897	515	0.64	1.44
GT	23.229	24	27.252	12	18.289	722	0.56	1.64
IBM	16.469	24	10.709	32	12.289	703	2.51	0.22
IP	16.391	18	15.217	18	15.549	723	0.00	0.05
MCD	20.762	24	12.394	71	15.950	664	4.05*	2.64
MRK	12.634	24	14.476	54	13.826	680	0.82	0.53
MMM	12.993	24	14.623	24	13.072	710	0.22	1.01
NAV	28.037	11	35.349	3	31.365	744	0.08	0.00
MO	11.371	24	13.558	56	14.892	680	0.81	0.32
CCC	38.681	22	22.999	21	19.899	716	16.67***	0.05
PG	20.220	24	13.919	89	13.555	647	6.81**	0.04
S	13.047	24	17.286	353	14.291	390	0.04	5.81*
TX	12.420	22	18.143	32	13.499	705	0.67	3.68
X	18.350	16	14.937	22	17.069	721	0.37	0.07
UK	25.486	24	31.101	8	20.624	727	4.40*	0.22
UTX	16.998	21	13.880	30	14.650	707	0.38	0.66
WX	10.254	23	19.167	33	15.713	703	2.93	2.10
Z	20.844	24	16.323	33	19.948	701	0.44	0.26
Overall	20.546	657	16.093	1680	17.093	20442	25.01***	0.71

Table II

Tests of Homoskedasticity of the Return Variates between Information and No-Information Days for the Twenty-one NASDAQ Stocks

Standard deviations of daily returns are reported for public information days (dividend announcement or earnings announcement), private information days (insider purchase or insider sale), and no-information days. The reported standard deviations are 10^3 times the calculated values. Brown-Forsythe-modified Levene test statistics are reported; F_1 is the test statistic for equality of the variances between public information days and no-information days. F_2 is the test statistic for equality of the variances between private information days and no-information days. One, two, and three asterisks indicate that the null hypothesis of homoskedasticity is rejected at the 5, 1, and 0.1 percent levels, respectively.

Ticker Symbol	Standard Deviations of Daily Returns						F_1	F_2
	Public Info. Days	No. of Obs.	Private Info. Days	No. of Obs.	No-Info. Days	No. of Obs.	H_0:$\sigma_{pub.\ info.} = \sigma_{no\text{-}info.}$	H_0:$\sigma_{priv.\ info.} = \sigma_{no\text{-}info.}$
KAMNA	22.011	24	15.528	21	23.473	714	0.35	2.02
MCIC	50.493	14	42.798	46	22.699	698	42.73***	3.62
STTX	22.503	14	27.531	14	27.924	730	1.36	0.89
WYMN	26.248	21	34.779	10	29.634	727	0.06	0.78
HAML	17.006	23	19.231	15	17.869	720	0.06	0.28
ACCOB	47.402	22	19.028	13	21.887	723	8.64**	0.07
FULL	18.609	24	16.161	22	20.551	712	0.07	0.15
VWRX	44.772	21	24.261	19	25.346	719	5.95*	0.10
JOSL	22.980	13	9.531	15	17.081	730	1.07	2.28
PCAR	23.387	20	14.770	11	17.764	727	2.38	0.24
AAPL	31.981	24	20.102	67	23.306	670	2.25	0.01
WMTT	15.629	24	17.256	180	14.866	563	0.46	6.91**
MORR	19.108	18	27.559	16	16.570	726	1.06	6.45*
PLIT	16.798	23	21.574	6	17.070	729	0.14	2.00
DBRL	25.326	24	16.390	13	19.249	721	3.12	0.38
LANC	26.914	23	30.764	70	18.051	667	3.22	10.45**
JCBS	42.016	20	23.380	38	23.636	700	7.31**	0.05
WTHG	15.665	24	14.359	6	14.043	728	0.76	0.54
SIAL	29.862	13	21.286	13	13.492	732	11.01***	2.92
FIG	19.033	23	32.802	23	24.259	714	0.59	3.82
DOLR	26.102	19	29.972	27	25.346	713	0.49	0.56
Overall	28.591	431	24.945	645	21.165	14863	36.43***	12.63***

Table III

The Impact of Public Information and Private Information on the Daily Return Volatilities for the Thirty DJIA Stocks

Coefficients of the regression $| R_t - \overline{R} | = a_0 + a_1 | I_t - \overline{I} | + \sum_{k=2}^{5} a_k D_{kt} + e_t$ are reported. R_t is the daily return on day t. $\overline{R}$ is the mean of the daily returns, R_t's. I_t is the daily return of the S&P 500 Index on day t. $\overline{I}$ is the mean of the daily returns, I_t's. $D_{kt} = 1$ if information k is available on day t, where k = 2 for dividend announcement (public), k = 3 for earnings announcement (public), k = 4 for insider purchase (private), and k = 5 for insider sale (private); $D_{kt} = 0$ otherwise. The regression is estimated over 758 trading days, t, between 1/4/88 and 12/28/90, for each of the thirty DJIA stocks. The reported coefficients are the actual coefficients times 10^3. Parentheses show t-values. One, two, and three asterisks indicate significance at the 5, 1, and 0.1 percent levels, respectively, based on one-tailed t-tests.

Ticker Symbol	Intercept a_0	Index (S&P) Volatility a_1	Dividend Announcement a_2	Earnings Announcement a_3	Insider Purchase a_4	Insider Sale a_5	Total R^2
AA	7.06***	975.91***	2.27	11.40***	1.23	1.16	0.205
	(14.13)	(12.60)	(0.82)	(4.12)	(0.29)	(0.52)	
ALD	6.09***	1166.55***	3.48	1.50	0.65	1.37	0.216
	(11.11)	(13.88)	(1.14)	(0.50)	(0.38)	(0.84)	
AXP	9.44***	1316.54***	2.04	6.78*	-3.06	2.38	0.207
	(14.58)	(13.14)	(0.57)	(1.89)	(-0.65)	(0.70)	
T	7.96***	989.26***	-0.40	-0.24	-2.93	2.05	0.206
	(16.55)	(13.19)	(-0.15)	(-0.09)	(-1.03)	(0.66)	
BS	12.56***	1074.04***	-1.24	10.21**	3.50	2.95	0.120
	(17.32)	(9.52)	(-0.21)	(2.38)	(0.36)	(0.74)	
BA	7.85***	1208.72***	-7.10	7.63*	-0.48	0.92	0.245
	(14.40)	(14.51)	(-1.78)	(1.90)	(-0.13)	(0.33)	
CHV	7.38***	891.46***	-0.38	4.52*	-1.06	-3.79	0.165
	(14.77)	(11.94)	(-0.14)	(1.68)	(-1.27)	(-1.56)	
KO	6.66***	1269.42***	7.80**	2.98	5.07*	-2.09	0.313
	(14.23)	(17.59)	(3.01)	(1.15)	(2.03)	(-0.80)	
DD	5.79***	1139.85***	1.05	1.66	-2.71	-0.07	0.270
	(12.48)	(16.39)	(0.26)	(0.43)	(-1.25)	(-0.07)	
EK	6.90***	1040.47***	1.13	28.34***	---	3.80*	0.233
	(12.68)	(12.14)	(0.37)	(9.17)		(1.90)	
XON	6.71***	845.38***	-3.49	1.52	-3.80	-0.37	0.196
	(15.88)	(13.00)	(-1.50)	(0.65)	(-1.04)	(-0.21)	
GE	5.97***	1261.25***	1.85	-0.11	-0.55	2.46	0.314
	(13.85)	(18.34)	(0.74)	(-0.05)	(-0.28)	(0.70)	
GM	6.84***	1066.96***	-2.44	2.95	-2.55	1.40*	0.229
	(13.29)	(14.37)	(-0.91)	(1.10)	(-1.46)	(1.81)	
GT	9.43***	979.97***	-0.92	6.47*	0.34	5.91	0.142
	(15.05)	(10.16)	(-0.27)	(1.89)	(0.08)	(0.97)	
IBM	5.26***	944.14***	-1.61	10.25***	-2.23	-0.31	0.288
	(14.87)	(16.77)	(-0.79)	(5.01)	(-1.18)	(-0.19)	
IP	6.66***	1118.84***	-2.70	5.27*	---	2.64	0.249
	(13.41)	(14.86)	(-0.87)	(1.77)		(1.18)	

Table III -*Continued*

Ticker Symbol	Intercept a_0	Index (S&P) Volatility a_1	Dividend Announcement a_2	Earnings Announcement a_3	Insider Purchase a_4	Insider Sale a_5	Total R^2
MCD	8.39***	864.83***	3.73	2.82	-7.91	-1.30	0.173
	(15.82)	(11.24)	(1.36)	(1.03)	(-0.84)	(-1.04)	
MRK	6.14***	1053.50***	0.29	-1.56	1.29	2.65*	0.289
	(15.49)	(17.16)	(0.13)	(-0.70)	(0.42)	(2.32)	
MMM	5.34***	1009.51***	1.23	0.27	3.04	3.11*	0.292
	(12.48)	(16.44)	(0.57)	(0.12)	(0.70)	(1.86)	
NAV	18.61***	648.96***	---	-4.52	14.74	-1.45	0.032
	(15.50)	(3.53)		(-0.66)	(0.65)	(-0.09)	
MO	7.02***	999.81***	-4.51	1.66	-1.92	0.28	0.227
	(15.79)	(14.46)	(-1.81)	(0.67)	(-1.10)	(0.18)	
CCC	9.64***	1230.01***	5.97	15.25***	3.87	-5.22	0.188
	(14.71)	(11.78)	(1.52)	(4.02)	(1.11)	(-1.05)	
PG	5.74***	1023.67***	1.50	7.52***	0.21	0.15	0.267
	(13.26)	(15.59)	(0.64)	(3.20)	(0.05)	(0.17)	
S	6.47***	996.93***	-6.41	2.70	0.82	3.82*	0.234
	(9.51)	(12.43)	(-2.28)	(0.96)	(0.92)	(1.72)	
TX	8.15***	377.62***	-5.78	0.56	4.14*	0.05	0.067
	(16.04)	(5.02)	(-1.98)	(0.21)	(2.07)	(0.02)	
X	8.47***	929.81***	-1.09	5.12	-5.02	3.11	0.154
	(14.31)	(10.53)	(-0.27)	(1.26)	(-1.61)	(0.84)	
UK	9.46***	1180.78***	10.12**	4.96	67.06***	-6.52	0.169
	(12.97)	(10.53)	(2.51)	(1.24)	(4.85)	(-1.22)	
UTX	7.98***	801.32***	-4.95	4.89*	-4.72	-0.07	0.168
	(17.52)	(11.31)	(-1.88)	(1.76)	(-1.08)	(-0.04)	
WX	7.33***	1032.72***	-4.35	-2.45	-9.98	4.61**	0.199
	(15.20)	(13.38)	(-1.49)	(-0.88)	(-1.47)	(2.62)	
Z	9.35***	1175.13***	3.20	-0.92	-4.84	-0.91	0.169
	(13.27)	(11.37)	(0.88)	(-0.25)	(-1.08)	(-0.35)	
Overall	8.02***	1012.02***	-0.35	4.18***	-1.07	0.24	0.169
	(72.85)	(62.31)	(-0.58)	(7.19)	(-2.47)	(0.62)	

Table IV

The Impact of Public Information and Private Information on the Daily Return Volatilities for the Twenty-one NASDAQ Stocks

Coefficients of the regression $| R_t - \overline{R} | = a_0 + a_1 | I_t - \overline{I} | + \sum_{k=2}^{5} a_k D_{kt} + e_t$ are reported. R_t is the daily return on day t. $\overline{R}$ is the mean of the daily log returns, R_t's. I_t is the daily return of the NASDAQ Composite Index on day t. $\overline{I}$ is the mean of the daily returns, I_t's. $D_{kt} = 1$ if information k is available on day t, where k = 2 for dividend announcement (public), k = 3 for earnings announcement (public), k = 4 for insider purchase (private), and k = 5 for insider sale (private); $D_{kt} = 0$ otherwise. The regression is estimated over 758 trading days, t, between 1/4/88 and 12/28/90, for each of the twenty-one NASDAQ stocks. The reported coefficients are the actual coefficients times 10^3. Parentheses show t-values. One, two, and three asterisks indicate significance at the 5, 1, and 0.1 percent levels, respectively, based on one-tailed t-tests.

Ticker Symbol	Intercept a_0	Index (NASDAQ) Volatility a_1	Dividend Announcement a_2	Earnings Announcement a_3	Insider Purchase a_4	Insider Sale a_5	Total R^2
KAMMA	14.19***	649.79***	1.65	-5.58	-4.56	---	0.045
	(15.37)	(3.85)	(0.35)	(-1.18)	(-1.27)		
MCIC	14.98***	749.73***	-5.97	28.95***	4.14	7.43**	0.110
	(16.13)	(4.49)	(-0.53)	(6.20)	(0.56)	(2.81)	
STTX	16.29***	774.64***	-3.80	10.43*	-21.19	11.02*	0.044
	(14.94)	(3.80)	(-0.38)	(1.65)	(-1.51)	(1.91)	
WYMN	14.19***	649.79***	1.65	-5.58	-4.56	---	0.045
	(15.37)	(3.85)	(0.35)	(-1.18)	(-1.27)		
HAML	10.63***	491.40***	-6.15	1.34	9.39*	1.81	0.063
	(14.16)	(3.72)	(-1.69)	(0.37)	(1.77)	(0.43)	
ACCOB	10.80***	1116.92***	-1.52	23.30***	-6.50	-2.71	0.170
	(10.41)	(6.56)	(-0.32)	(5.09)	(-0.58)	(-0.57)	
FULL	12.16***	621.93***	1.46	1.02	0.59	-2.12	0.027
	(16.34)	(4.28)	(0.35)	(0.24)	(0.15)	(-0.41)	
VWRX	16.26***	416.91*	4.47	14.27**	1.32	-6.46	0.045
	(15.76)	(2.18)	(0.76)	(2.56)	(0.27)	(-0.70)	
JOSL	11.60***	71.53	2.18	3.13	---	-4.06	0.024
	(16.90)	(0.57)	(0.26)	(0.37)		(-1.26)	
PCAR	9.02***	1045.17***	6.46	3.45	-2.53	5.73	0.123
	(13.49)	(8.50)	(1.62)	(0.96)	(-0.64)	(0.68)	
AAPL	13.60***	1063.61***	-1.08	13.10**	-7.33	1.38	0.083
	(16.65)	(6.93)	(-0.24)	(2.98)	(-0.83)	(0.68)	
WMTT	8.35***	673.44***	-1.83	2.96	2.17*	-0.89	0.109
	(13.21)	(6.36)	(-0.62)	(1.01)	(2.20)	(-0.35)	
MORR	9.54***	348.14**	4.95	-2.99	7.89*	4.39	0.072
	(12.54)	(2.65)	(1.26)	(-0.76)	(2.00)	(0.77)	
PLIT	9.82***	659.43***	-2.87	2.94	8.92*	13.96	0.082
	(15.01)	(5.55)	(-0.83)	(0.88)	(1.73)	(1.22)	
DBRL	13.27***	398.43***	0.70	8.56**	-3.44	---	0.036
	(19.34)	(3.11)	(0.19)	(2.37)	(-0.98)		

Table IV -*Continued*

Ticker Symbol	Intercept a_0	Index (NASDAQ) Volatility a_1	Dividend Announcement a_2	Earnings Announcement a_3	Insider Purchase a_4	Insider Sale a_5	Total R^2
LANC	10.83***	484.55***	0.33	5.51	3.19	8.43**	0.097
	(12.11)	(3.26)	(0.08)	(1.36)	(1.45)	(2.95)	
JCBS	15.08***	522.63***	-2.38	21.23***	1.06	-5.13	0.127
	(14.74)	(3.05)	(-0.47)	(4.40)	(0.29)	(-1.29)	
WTHG	7.81***	653.46***	1.71	2.01	1.51	13.93	0.068
	(15.86)	(6.78)	(0.62)	(0.72)	(0.35)	(1.45)	
SIAL	7.42***	726.35***	-12.46	19.56***	5.46*	-0.05	0.124
	(14.49)	(7.65)	(-2.22)	(3.63)	(1.67)	(-0.01)	
FIG	13.96***	850.27***	3.32	-9.42	6.02	5.74	0.135
	(13.09)	(4.93)	(0.68)	(-2.03)	(1.27)	(1.00)	
DOLR	15.29***	803.21***	5.22	1.21	1.41	-5.27	0.062
	(14.49)	(4.36)	(0.99)	(0.20)	(0.37)	(-0.60)	
Overall	12.27***	654.44***	0.35	6.36***	0.66	3.12***	0.084
	(59.85)	(18.94)	(0.35)	(6.59)	(0.81)	(3.20)	

Table V
Volatility around Earnings Announcement Day

Standard deviations of daily returns are reported for days around earnings announcement. Day-n and day+n represent n days prior to announcement and n days after announcement, respectively. Day+0 is the announcement day. The data period is 1/4/88 through 12/28/90. The reported standard deviations are 10^3 times the calculated values. From day+0 to day+5, the Brown-Forsythe-modified Levene tests are reported for the null hypothesis of equality of the variances between each of day+0 through day+5 and the day-5 to day-1 period. One, two, and three asterisks denote significance at the 5, 1, and 0.1 percent levels, respectively.

Ticker Symbol	day-5	day-4	day-3	day-2	day-1	day+0	day+1	day+2	day+3	day+4	day+5
						Panel A: DJIA Stocks					
AA	11.461	9.521	21.416	19.863	19.262	38.198*	12.111	13.574	14.137	16.292	12.853
EK	8.335	14.774	14.600	11.184	13.166	49.690***	16.452	15.412	9.902	10.569	13.845
IBM	13.042	12.931	13.828	12.578	18.713	22.079	13.589	14.464	18.205	14.892	7.894
CCC	10.183	21.176	22.061	14.143	15.243	48.532***	28.024	25.715	20.462	20.523	18.188
PG	18.058	18.090	20.786	13.287	13.826	24.288	14.962	13.421	9.573	11.643	14.385
Overall	12.738	15.682	18.342	14.944	16.074	37.201***	17.665	16.883	15.063	15.003	14.482
						Panel B: NASDAQ Stocks					
MCIC	17.372	22.093	23.950	32.235	20.773	54.356***	29.853	26.761	22.162	20.987	26.223
ACCOB	27.930	13.151	10.931	13.129	13.269	63.284**	22.520	21.553	12.634	22.752	20.167
JCBS	19.014	15.726	21.994	34.558	37.518	46.615	24.498	32.796	27.427	19.518	16.913
SIAL	11.472	12.225	7.618	15.456	17.912	31.169*	28.629**	26.820	9.456	13.277	8.153
Overall	20.469	16.239	17.268	25.696	23.788	49.706***	26.700**	26.769	19.780	19.322	19.010

Table VI
Trading Volume on Earnings Announcement Day

Average trading volumes are reported and compared for earnings announcement day and no-information day. The data period is 1/4/88 through 12/28/90. The t statistics for the null hypothesis of equality of the mean trading volumes between earnings announcement day and no-information day are reported. One, two, and three asterisks denote significance of the 5, 1, and 0.1 percent levels, respectively.

Ticker Symbol	Mean Trading Volume		t Statistic
	Earnings Announcement Day	No-Information Day	
	Panel A: DJIA Stocks		
AA	727058	398462	2.75*
EK	1952308	1013514	2.78*
IBM	2736983	1527581	3.68**
CCC	341567	272093	0.80
PG	695467	425445	2.33*
Overall	1290677	730066	3.65***
	Panel B: NASDAQ Stocks		
MCIC	5965800	1966919	3.48**
ACCOB	206576	109684	1.41
JCBS	14973	8890	1.55
SIAL	105072	46500	1.43
Overall	1573105	523124	2.26*