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MARK L. MITCHELL and J. HAROLD MULHERIN*

ABSTRACT

We study the relation between the number of news announcements reported daily by Dow Jones & Company and aggregate measures of securities market activity including trading volume and market returns. We find that the number of Dow Jones announcements and market activity are directly related and that the results are robust to the addition of factors previously found to influence financial markets such as day-of-the-week dummy variables, news importance as proxied by large *New York Times* headlines and major macroeconomic announcements, and non-information sources of market activity as measured by dividend capture and triple witching trading. However, the observed relation between news and market activity is not particularly strong and the patterns in news announcements do not explain the day-of-the-week seasonalities in market activity. Our analysis of the Dow Jones database confirms the difficulty of linking volume and volatility to observed measures of information.

IN THIS ARTICLE, WE ask the straightforward question of whether the amount of information that is publicly reported affects the trading activity and the price movements in securities markets. The primary contribution of our research design to this important issue is that we employ a distinctive proxy for information—the number of announcements released daily by Dow Jones & Company. Although this proxy certainly yields an imperfect treatment of the information available to securities market participants, it is more comprehensive than most measures used in prior studies and provides a reasonably broad, observable variable with which to address the question of the impact of public information on the stock market.

The underlying motivation for our analysis is the fact that much of the behavior of financial markets is difficult to explain using conventional models of information and trading. For example, a large body of research documents evidence of empirical regularities in financial markets. Measures of market activity including trading volume, price changes, and return volatility evince systematic patterns by hour, day, and other seasonal frequencies. These patterns are quite pervasive, occurring in equity, futures, and other financial

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markets, and are often labelled anomalies because of their apparent inconsistency with financial theory.

The extent to which financial market regularities are in fact anomalous depends, of course, on the behavior of the information that influences financial markets. If information itself follows a nonrandom pattern, then trading activity would be expected to behave likewise. Arguments linking market patterns to the nature of information flow have been made since early work such as Rozeff and Kinney (1976), who conjecture that the abnormal stock returns in January could stem from an above-average amount of information production by firms at the turn of the year. Such conjectures are often difficult to test, however, due to the problematic nature of defining and measuring information.

In spite of such estimation problems, recent studies report similarities between the regularities in financial markets and the frequency at which news is reported. Patterns in intraday news releases, unusually large *New York Times* front-page headlines, the daily number of *Wall Street Journal* stories, and seasonalities in earnings announcements mirror many of the observed regularities in financial markets. (See, e.g., Atkins and Basu (1991), Berry and Howe (1993), Niederhoffer (1971), Penman (1987) and Thompson, Olsen, and Dietrich (1987).) A related line of research links market volatility patterns to the timing of the release of macroeconomic and government announcements. (See, e.g., Ederington and Lee (1993), Harvey and Huang (1991) and French, Leftwich, and Uhrig (1989).)

Although acknowledging these common patterns in news and financial markets, several articles question the strength of the relation between news announcements and market activity. Damodaran (1989) reports that, although there is a day-of-the-week pattern in the information content of dividend and earnings announcements resembling that of stock returns, the announcement pattern explains only a small fraction of the weekend effect. Roll (1988) provides comparable evidence that stories from the financial press have little effect on the returns of 96 large stocks. Related work (e.g., Schwert (1981)) finds only a weak relation between stock prices and macroeconomic announcements. More general analysis by Cutler, Poterba, and Summers (1989) and Haugen, Talmor, and Torous (1991) fails to find a linkage between major news stories and large movements in market prices. The lack of a strong relation between news and market activity suggests that any joint patterns they share are merely coincidental.

Much of the disagreement regarding the news-market relation can be traced to the differing emphasis of the various studies. Some research is concerned with firm-specific news, while other studies analyze macroeconomic announcements. Some articles note the joint patterns of news and market activity, while others more directly study the actual relation between news stories and market activity. We bridge the differences in the prior research by employing the comprehensive reporting of Dow Jones as our proxy for news.

Understanding the nature of the relation between public information and market activity carries significant policy implications. At least since 1987, the Securities and Exchange Commission (SEC) has wrangled with the question of whether news announcements or trading practices such as program trading are the source of market volatility. More recently, a contentious political debate has arisen concerning the effect that Federal Reserve actions have on financial markets. (See "Fed Study Causes a Dispute," *New York Times*, October 25, 1993, p. D2.)

We contribute to this debate by relating aggregate measures of market activity such as trading volume and market returns to the broad sample of macroeconomic and firm-specific news announcements released by Dow Jones & Company. We note the seasonal patterns in the announcements and then examine how the news variable affects market activity. This analysis assesses the notion that a greater number of news announcements maps into more information facing investors and thereby induces greater trading volume and price variability. By using the broad measure of Dow Jones news announcements, we avoid making arbitrary ex ante classifications of the type of news that moves markets and also avoid a bias toward emphasizing announcements that turn out, ex post, to influence the market in our sample. As a check of the robustness of the analysis, we also report specifications that include control variables previously found to affect financial markets.

Although relatively straightforward, our research design must deal with several potential estimation problems including the endogeneity of news reporting, the variation in the importance of news, and the measurement of the information content of a particular story. First, since some stories may be written in response to large market movements, we take care to ensure that our results are not driven by such endogenous news reporting. Second, because not all announcements are equal, we also consider measures such as the number of topics covered by an announcement, the size of *New York Times* headlines, and the occurrence of monthly macroeconomic announcements to proxy for the importance of the news on a particular day. Finally, accounting for the information content of an announcement is arguably the most problematic aspect of our analysis, as we know that many of the announcements in the database represent expected information that tends not to have an effect on the market. But our analysis does allow us to measure the effect that the average announcement has on the market, and we compare this effect to that of noninformation sources of market activity such as dividend capture and program trading.

The following section reports general statistics on our public information variable. Section II describes the trading volume and returns variables that are used as measures of market activity. Section III contains our principal analysis, which shows the effect of public information on the aggregate market variables and also reports the robustness of the relation to the addition of other variables previously found to affect financial markets. The final section summarizes our results and places them in the context of ongoing theoretical research.

Table I

Summary Statistics for Dow Jones News Announcements, 1983 to 1990

This table reports the summary statistics for the number of announcements transmitted per day by Dow Jones & Company across the *Broadtape* and/or in the *Wall Street Journal*. The data source is the Dow Jones Headlines Tape, which contains every headline transmitted via the Dow Jones *Broadtape*, the *Wall Street Journal*, or both. The data cover 2,011 business days during 1983 to 1990.

Announcement Source	Average	Standard Deviation	Minimum	Maximum
All Dow Jones announcements	374.26	110.15	76	841
Broadtape followed by the *Wall Street Journal*	165.96	56.70	25	432
Broadtape only	135.76	99.18	13	662
Wall Street Journal only	72.54	16.51	30	167

I. Summary Statistics on the Public Information Variable

We use the daily number of headlines reported by Dow Jones as our primary measure of public information.[1] Dow Jones is the largest U.S. business newswire source, maintaining five wire services in addition to publishing the *Wall Street Journal* and *Barron's*. As described in Sommer (1984), Thompson, Olsen, and Dietrich (1987), and Patell and Wolfson (1982), most of the information compiled by Dow Jones originates from publicly traded companies, as the major stock exchanges require member firms to provide all material information to Dow Jones in a timely fashion. The bulk of the information processed by Dow Jones is made public via the *Wall Street Journal* and the Dow Jones News Service, the latter commonly referred to as the *Broadtape*. For the period we analyze, Dow Jones operated the *Broadtape* between the hours of 7:30 A.M. and 7:00 P.M. (EST) each business day.

The data set of Dow Jones announcements spans the period from 1983 to 1990 and comprises a total of 752,647 story headlines. During this period, there are 2,011 days on which U.S. stock exchanges were open for which we have the Dow Jones data.[2] Table I reports summary statistics of the number of announcements for the full data set as well as for three subsamples stratified by the mechanism by which the announcements are made public.

[1]The data source is the Dow Jones Headlines Tape, available at the Securities and Exchange Commission where the authors formerly worked. The Dow Jones Headlines Tape contains headlines of all Dow Jones news announcements since 1982. At our particular source, many business days are missing in 1982, and thus we begin our analysis in 1983. An alternative Dow Jones data source is its News/Retrieval service, which provides selected stories from the Dow Jones *Broadtape* and *Wall Street Journal* dating back to June 1979.

[2]For eleven trading days during the 1983 to 1990 period of analysis, data from the Dow Jones Headlines Tape are missing, and thus we drop these days from the analysis. We perform data cleanup to eliminate duplicate and Dow Jones internal systems headlines. This cleanup impacts less than 1 percent of the sample and does not have any effect on the results reported throughout.

On average, Dow Jones transmits 374 announcements per day over the sample period, with a range from 76 on December 26, 1986, to 841 on October 18, 1990.

For 44.3 percent of the announcements, Dow Jones transmits the story across the *Broadtape* and then reports the story in the *Wall Street Journal*, usually the following day.[3] For 36.3 percent of the announcements, the only means of public reporting by Dow Jones is the *Broadtape*. These announcements arguably represent less important information, since they do not receive coverage by the *Wall Street Journal*. Another 19.4 percent of the announcements become public solely via the *Wall Street Journal*. For some of the stories in this third category, Dow Jones received the information after the 7:00 P.M. closing of the *Broadtape* and chose to report the information just in the *Wall Street Journal* on the next business day. The *Wall Street Journal*-only category also includes front-page articles, feature stories, and columns such as "Heard on the Street." The presence of such regularly occurring stories explains why the *Wall Street Journal*-only category has a narrower range than the other Dow Jones categories.

As a closer look at our measure of information, Table II lists all of the Dow Jones announcements for Friday, December 26, 1986. Of the 76 Dow Jones announcements on that day, 25 crossed the *Broadtape* and then appeared in the *Wall Street Journal* the following Monday, 16 appeared only on the *Broadtape*, and 35 appeared only in the *Wall Street Journal*. This sample indicates that headlines that cross the *Broadtape*, some of which appear in the *Wall Street Journal* the following day, usually contain firm-specific information. In contrast, the *Wall Street Journal*-only category contains general economic and political news in addition to firm-specific information—for example, "OTC Short Interest Fell 3% in Month Ended Dec. 15" and "North and Casey Said to Have Met Often." The *Wall Street Journal*-only category also contains feature stories such as "Advances in Electronics Make Life Easier to Eavesdroppers." Additional examination of a randomly selected two-week period for each year in the sample indicates that the announcements presented in Table II are representative of the types of stories transmitted by Dow Jones.[4]

[3]We use the date that the story crossed the *Broadtape* rather than when it subsequently appeared in the *Wall Street Journal*, since the *Broadtape* date is when the information first becomes available to the market. For a sample of earnings and dividend announcements during 1976 to 1977, Patell and Wolfson (1982) report that the lag time from the *Broadtape* to the *Wall Street Journal* is more than one day for only 1 percent of their sample. For all types of firm-specific *Broadtape* announcements during 1983, Thompson, Olsen, and Dietrich (1987) report that the lag time exceeds one day for 7 percent of the announcements.

[4]We selected December 26, 1986 simply because it contains the fewest number of announcements and thereby allows presentation of all the announcements. The only unusual aspect of the data presented in Table II is the relative number of *Wall Street Journal*-only headlines. For December 26, 1986, *Wall Street Journal* headlines account for 46 percent of all Dow Jones headlines, whereas, for the rest of the sample, *Wall Street Journal*-only headlines account for 19 percent of all headlines. This difference occurs due to the combination of the small number of Dow Jones headlines on December 26, 1986 and the fixed number of some *Wall Street Journal* headlines such as front-page feature stories, "Heard on the Street" columns, and so forth.

Table II

Dow Jones News Announcements for December 26, 1986

This table reports all of the Dow Jones announcements for a sample day, Friday, December 26, 1986.

Panel A: *Broadtape* followed by *Wall Street Journal*
Americare Health Corp 1st Qtr Sept. 30 Net 4c a Shr Vs 12c
Big V to Have 'Substantial' Gain on Shopping Center Sale
Boston Edison Co. Elects Stephen J. Sweeney Chairman
Computer Identics Completes Financing
Computer Identics Names Henrikson Chief Executive
Computer Products See 4th Qtr Net of $500,000–$800,000
Danners Sheds Nearly Half Its Stores in Bid to Turn Profit
FHLBB Approves Southwest Gas Acquisition of Nevada Savings
Gulf & Western Unit to Redeem Senior Notes
Home Shopping Network Closes Purchase of TV Station
ISS Intl Completes Purchase of Allegheny Beverage Unit
Japan Nov. Current Account Surplus Was $8,144,000,000
Kellogg Co. Sees 'Double Digit' Rise in 4th Quarter Net
Knudsen Foods to Sell Unit Assets for $25.5 Million
Limited Partnership Completes Tender Offer for Zale Corp.
MCI Sees 4th-Quarter Charge of $500 Million–$500 Million
Media General to Take 4th Quarter Charge of $16 Million
Reagan Names Abshire as Advisor on Iran-Contra Affair
Sandy Corp. 1st Qtr Nov. 30 Loss $301,000 Vs. Net $302,000
Schering-Plough Completes Stock Repurchase Program
Standard Oil Unit Says 91% of Note Issues Tendered in Offer
Tennis Lady Inc 3rd Qtr Nov 1 Loss $505,951 Vs. Net $103,335
TS Industries Year Net 17c a Shr Vs Net Cont OP 21c
Winston Mills Inc. Agrees to Be Acquired by McGregor Corp
W.R. Graces Completes Sale of Restaurant Group in Buyout

Panel B: *Broadtape* only
Acquisition of Product Design & Engineering Completed
AHC Acquisition Extends Offer for Americare Health to Monda
AMR Unit Sees Delay in Its Purchase of Aircal's Parent
Bank of America Sells 98.3% Stake in Italian Unit
Discount Window Borrowing Averaged $263 Million in Week
Fahd Says $18 a Barrel Oil Price Is Only a Minimum
Fed Approves Centerre's Purchase of Goppert Bank
Mason Best Unit Acquires All Safeguard Business Systems Stk
Memory Metals Names O'Shaughnessy Chairman
New York City Bank Loans Rose $498 Million in Week
Reuters Sets Final Proration Factor in Instinet Offer
Service Resources Unit Sets Talks with Pandick Advisors
Times Mirror Acquires Rest of Rhode Island Catv
United Foods Sees 29c a Shr Net Gain on Sale of Facility
U.S. and Iran to Negotiate Return of $500 Million to Iran
WorldGroup Unit, KMart in Pact on Travel Services

Table II—*Continued*

Panel C: *Wall Street Journal* only
Advances in Electronics Make Life Easier to Eavesdroppers
AZP Unit Will Redeem Its 11 1/2% Mortgage Bonds
Beatrice's Americold Unit Sold in Leveraged Buyout
Boiler-Room' Sales Talk Still Fools Many Investors
Container Industries Seeks Chapter 11 Protection
Court Allows Short Sales by Holders Selling in Offer
Credit Marts: Christmas Eve Trading Brings Small Gains
Crompton & Knowles to Take $7.7 Million Charge on '86 Net
Digital Equipment Study Finds High Rate of Miscarriages
Dividend Declarations: GRELS, VHT
Docommun Inc. Sets Regular Quarterly Dividend of 5c
Dwayne Andreas Said to Gain Position as Kremlin Favorite
General Electric Co. Picks Andrews for Development Post
Heard on Street: British Gas Underwriters Lure U.S. Buyers
Hitachi, Toshiba to Assemble One-Megabit Chips in U.S.
Hong Kong's Trade Surplus Rose to $141.2 Million in Nov.
Japan Line Restructuring Plan Is Seen Helping Suitor
Japan's Draft Budget Said to Lack Growth Stimulus
Japan's Foreign Aid Becomes a Trade Issue
Lorenzo's New Airline Empire Will Test His Management Skill
MCA Said to Be Seeking Part of Motown Records
McFaddin Ventures Inc. Names Mark C. Licata President
National Micronetics Names Eric Markrud as President
North and Casey Said to Have Met Often
Olin Corp. Names Scmitt as Vice President
OTC Short Interest Fell 3% in Month Ended Dec. 15
Patten Corp. Unit Completes Private Placement of Notes
Peking to Open Stock Exchange in Early 1987
People Express Seems to Fade Even Before Takeover Vote
Peoples Heritage Sells 1.2 Million Initial Shares
Pepsi-Cola's Enrico Becomes a Highly Visible Spokesman
Some Who Purchased Parcels in Poconos Cannot Build
South Korean GNP Seen Rising 12.2% This Year
Sulpetro Ltd. Completes Sale of Assets to BP Unit
Tanden to Need More Financing to Operate in 1987

One concern with our public information variable is whether the announcements merely recount movements in the price of individual securities or the market as a whole. If such an endogeneity problem was present in the data, then any results from our analysis might be considered spurious. As one assessment of such an endogeneity bias, we randomly surveyed five days from each year in our sample. We did find some stories such as one on February 16, 1989, which read "Jamesway Can't Explain Stock Price Rise," and another from the *Broadtape* on October 19, 1987, which not surprisingly read "DJIA in Historic 508-Point Plunge as Market Collapses." Yet these stories represent less than one percent of the headlines randomly surveyed.

We conclude therefore that the endogeneity of anomalous price movements causing stories is not a serious concern in our sample.

Table III reports a breakdown of the average daily number of Dow Jones announcements by year for the 1983 to 1990 period. For the full sample and the three subsamples, the number of announcements trends upwards over time. For example, the full sample experiences an 8.7 percent annual increase in the number of average daily announcements between 1983 and 1990, with most of this increase in Dow Jones stories occurs during 1989 and 1990.[5]

To indicate patterns in news within the year, Table IV reports the occurrence of Dow Jones announcements by month. For the full sample, April, with an average of 435.59, has the largest number of announcements per day, while December, with an average of 321.34, has the least number per day. The average daily number of announcements varies noticeably by month; for both the full sample and the three subsamples, an F-test of equality of means across months rejects the null hypothesis at the 0.001 level. This variability across months is partially due to the financial reporting cycle. Over half (53.7 percent) of all New York Stock Exchange (NYSE), American Stock Exchange (AMEX), and National Association of Securities Dealers Automated Quotation system (NASDAQ) firms (5,747 firms from 1990 Compustat data) have December 31 as fiscal year end and the SEC requests that Form 10-Q

Table III

Average Daily Number of Dow Jones Announcements by Year

This table reports the average number of announcements transmitted per day by Dow Jones & Company for each year in the sample. *WSJ* is the *Wall Street Journal.*

Year	All Stories	*Broadtape* Followed by *WSJ*	*Broadtape* Only	*WSJ* Only	No. of Days
1983	305.25	163.38	74.13	67.75	251
1984	318.77	160.40	90.94	67.43	253
1985	324.38	171.52	82.31	70.56	252
1986	330.02	173.94	84.21	71.87	251
1987	350.98	176.33	103.92	70.73	247
1988	351.49	165.30	113.31	72.89	253
1989	450.06	175.02	191.33	83.71	251
1990	562.11	142.22	344.50	75.40	253

[5]Representatives at Dow Jones told us that the greater number of stories beginning in 1989 stem from (1) a broadening of news coverage by Dow Jones and (2) an increase in the speed of the *Broadtape.* Our own analysis of the data suggests that broader news coverage is the primary source of increased stories. If ticker speed were the main factor, we would expect to see a truncation in the number of stories at a limiting boundary prior to the change in transmission speed. However, we find no evidence of clustering at a truncated level in the twelve months preceding the February 1989 increase in ticker speed (the data exhibit positive skewness, rather than negative skewness that would be implied by truncation at an upward boundary). Hence, the broadening of news coverage appears to have induced an increase in ticker speed rather than vice versa.

Table IV

Dow Jones News Announcements by Month

This table reports the average number of announcements transmitted per day by Dow Jones & Company for each month in the sample. *F*-tests of the null of an equal number of announcements per month reject equality at the 0.001 level for all news announcement categories. Nonreported *F*-values reject equality across months for each year in the data set for all categories. *WSJ* is the *Wall Street Journal*.

Month	All Stories	*Broadtape* Followed by *WSJ*	*Broadtape* Only	*WSJ* Only	No. of Days
January	349.73	172.28	110.14	67.31	168
February	369.88	188.95	102.89	78.05	154
March	354.75	145.33	141.27	68.15	175
April	435.59	202.73	152.67	80.19	164
May	398.36	171.81	146.82	79.73	171
June	335.86	128.48	141.58	65.80	171
July	403.98	199.46	132.21	72.32	168
August	360.39	164.72	124.93	70.74	179
September	329.91	123.54	139.55	66.81	161
October	417.23	194.51	146.69	76.03	178
November	389.40	172.16	138.35	78.89	164
December	321.34	125.57	128.50	67.27	157
F-statistic	19.16	57.63	2.87	21.51	
(*p*-value)	(0.001)	(0.001)	(0.001)	(0.001)	

(quarterly earnings) be filed within 45 days after the end of the quarter and Form 10-K (annual earnings) be filed within 90 days after the end of the fiscal year. Consequently, these firms generally report their quarterly earnings in April, July, and October, the months having the largest number of Dow Jones announcements.

As a further analysis of patterns in news, Table V reports the average number of news announcements by day of the week. The announcements increase through Thursday and then taper off sharply on Friday. An *F*-test of the equality of means for all announcements across the days of the week rejects the null at the 0.0001 level. For the specific categories, *F*-tests indicate significance across days of the week with the exception of the *Broadtape*-only category. Similar to the relatively low number of announcements surrounding weekends, we find, in results available upon request, that the number of announcements is significantly lower on days before and after market holidays. The day-of-the-week behavior of the Dow Jones announcements resembles reported patterns in stock market trading activity (Jain and Joh (1988), Lakonishok and Maberly (1990)).

II. Measures of Market Activity

We next provide an overview of the time-series behavior of the data to be studied in the analysis of the impact of public information on the stock

Table V

Dow Jones News Announcements by Day of the Week

This table reports the average number of announcements transmitted by Dow Jones & Company by day of the week. *F*-tests of the null of an equal number of announcements by day of the week are reported for each news announcement category. Nonreported *F*-values indicate inequality across days of the week for each year in the data set for each category with the following exceptions: All Stories (1990), *Broadtape* Only (1984 and 1985, 1988 and 1990). *WSJ* is the *Wall Street Journal*.

Day of the Week	All Stories	*Broadtape* Followed by *WSJ*	*Broadtape* Only	*WSJ* Only	No. of Days
Monday	366.75	156.95	130.70	79.10	384
Tuesday	379.38	175.24	138.12	66.02	412
Wednesday	378.61	172.08	135.98	70.55	413
Thursday	396.39	181.53	142.10	72.76	404
Friday	349.47	143.13	131.55	74.78	401
F-statistic	10.17	32.11	0.90	37.06	
(*p*-value)	(0.0001)	(0.0001)	(0.462)	(0.0001)	

market. Figures 1 to 4 display daily averages, by month, for the total number of Dow Jones news announcements, combined dollar trading volume on the NYSE, AMEX, and over the counter (OTC), and two measures of aggregate price changes over the 1983 to 1990 period. Figure 1 indicates the slight increase in public information during 1983 through 1988 and the very large increase in 1989 and 1990 that was reported in Table II. Figure 2 shows a substantial increase in aggregate trading volume during the 1983 to 1990 period, peaking in October 1987 around the time of the stock market crash.

Figures 3 and 4 plot the two measures of aggregate price changes. Figure 3 reports the absolute value of the daily market return aggregated across the NYSE, AMEX, and OTC. Figure 4 provides a complementary price change measure that sums the absolute value of the daily return of each NYSE, AMEX, and OTC firm, thus providing a measure of aggregate firm-specific return volatility. The plots of both return measures have a steep spike around the 1987 crash and a smaller spike towards the end of 1990 around the Iraqi invasion of Kuwait. The aggregate firm-specific return in Figure 4 generally has larger values than the absolute-value market return in Figure 3; the average daily value of the aggregate firm-specific return is 1.32 percent, over twice that of the absolute-value market return, which is 0.61 percent.

These figures suggest two potential problems with the examination we propose: (1) spurious results driven by similar, positive trends in the public information measure and trading volume data and (2) a market-crash impact on the returns measures. We account for the trends by taking differences from a twenty-day moving average of the public information measure and trading volume. While differencing may cause some loss of information, it avoids spurious findings brought about by joint time trends and other factors

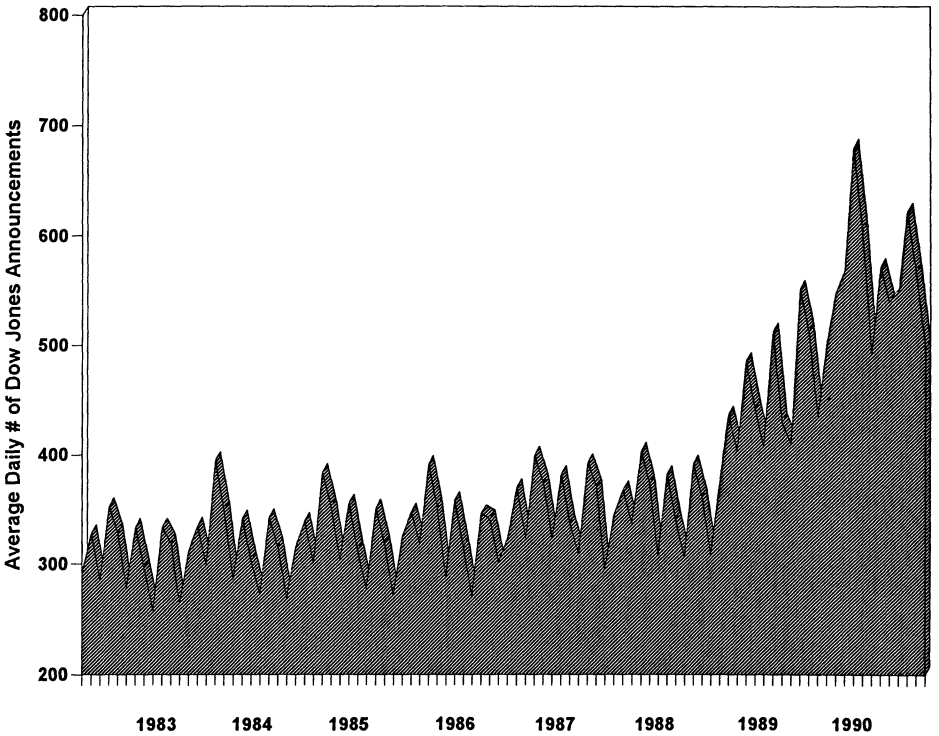

Figure 1. Average daily number of Dow Jones announcements by month, January 1983 to December 1990. The data source is the Dow Jones Headline Tape, which covers every headline transmitted via the Dow Jones *Broadtape*, the *Wall Street Journal*, or both.

(Granger and Newbold (1974), Nelson and Kang (1984)).[6] We opt for differences from a twenty-day moving average rather than first differences for two reasons: (1) to avoid the loss of information around clustering of high levels of news over certain periods and (2) to eliminate dependence on day-of-the-week patterns in news and market activity. Although differencing on twenty-day moving averages has the above-mentioned advantages, specifications using levels and first differences provide results similar to those reported in the text. With respect to the spike in returns in October 1987, we check the robustness of our analysis of the full sample with a subsample that excludes the three-week period surrounding the 1987 crash (week before, week of, and week after). We find that this exclusion produces results similar to that of the full sample reported throughout.

As reported in Table VI, the measures of market activity from the 1983 to 1990 period exhibit day-of-the-week patterns similar to those found in prior studies. Note that the estimates for the dummy variables represent the

[6]Although the monthly plots of volume and news show evidence of trends, tests of the daily data suggested by Nelson (1973) and Dickey, Bell, and Miller (1986) reject nonstationarity in the news and volume series. Nonetheless, we use differencing of the data as a crude method of detrending the data to avoid any spurious findings brought about by the joint time trends visible in Tables I and II.

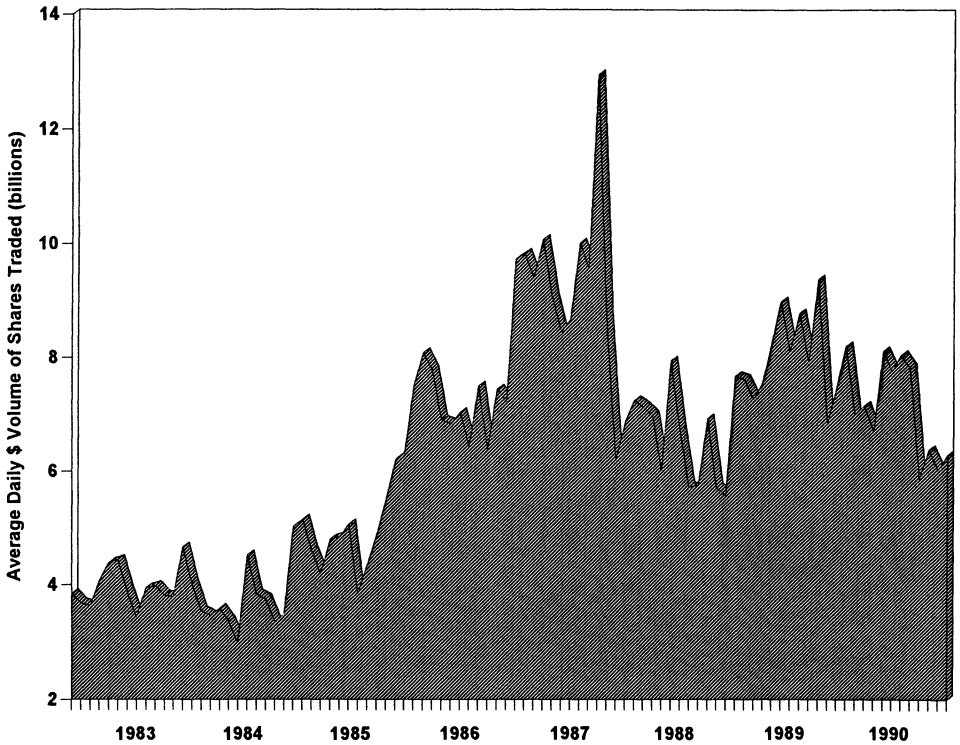

Figure 2. Average daily dollar volume by month, January 1983 to December 1990. The aggregate daily dollar volume across the NYSE, AMEX, and OTC is estimated by multiplying daily shares traded on each exchange times the average price of a traded share on a given exchange in a given month. Shares traded on the NYSE come from *Barron's*, and shares traded on AMEX and the OTC come from the *S&P Daily Stock Price Record.*

deviation of the particular day from the average value of the given variable. The measure of daily dollar volume aggregated across the NYSE, AMEX, and OTC is relatively low on Mondays (12 percent below average) and significantly above average on Wednesdays (6 percent above average) and Thursdays (5 percent above average). There is also evidence, albeit weaker, of day-of-the-week patterns in the magnitude of stock returns. Consistent with Fama (1965), the absolute value of market returns as well as the related measure that sums the absolute value of firm-specific returns are higher on Mondays than other days of the week. Such seasonalities may be tied to the day-of-the-week patterns exhibited by the measure of public information.

III. The Relation between Public Information and Market Activity

A. Correlation Analysis of Public Information and Market Activity

As an initial look at the relation between public information and market activity, we report correlation coefficients between the different categories of

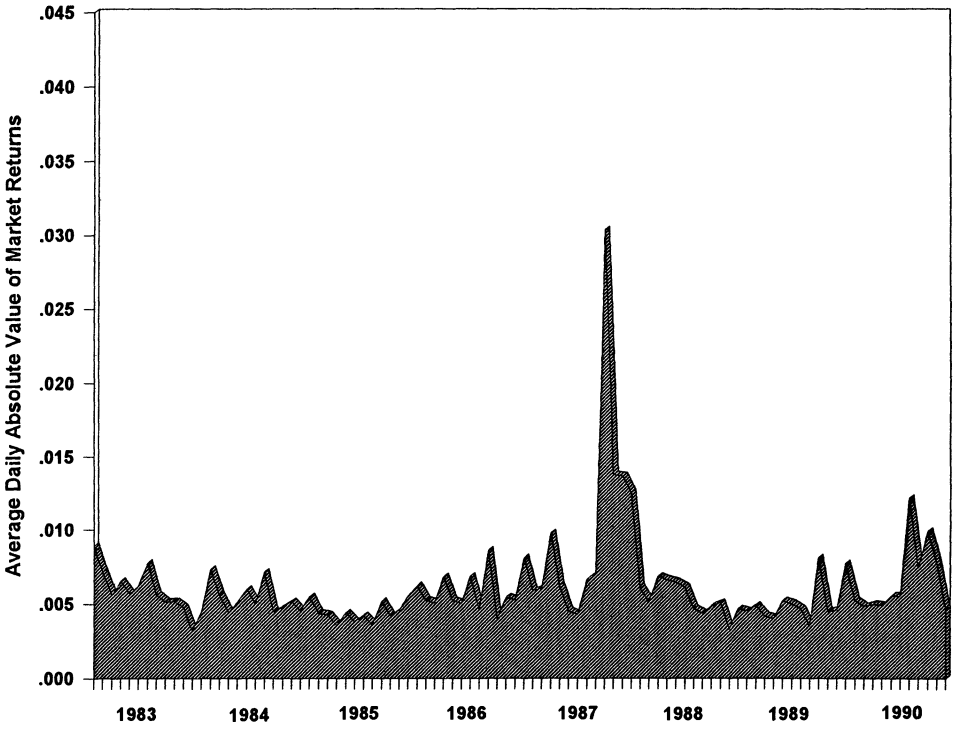

Figure 3. Average daily absolute value of market returns by month, January 1983 to December 1990. The absolute value of market returns is the absolute value of the CRSP value-weighted daily return aggregated across the NYSE, AMEX, and OTC.

announcements and trading volume, the absolute value of market returns, and the sum of the absolute value of individual firm returns from the NYSE, AMEX, and OTC. We study all three measures of trading activity and each announcement category across all three exchanges to see if the relation between public information and market activity is affected by announcement type or trading location.

For news announcements and trading volume, we take differences from twenty-day moving averages of natural logarithms. We collect the daily trading volume data for the NYSE from *Barron's* and for the AMEX and OTC from the *Standard & Poor's Daily Stock Price Record.* We also create an aggregate measure of trading volume that sums the product of the daily number of shares traded and the average monthly price of the shares traded on each exchange. The absolute value of market returns comes from the value-weighted price indexes of the NYSE, AMEX, OTC, and all three exchanges combined. The measure of firm-specific returns sums the value-weighted absolute value of the return of each firm traded on the NYSE, AMEX, and OTC for each exchange separately as well as a measure across all three exchanges.

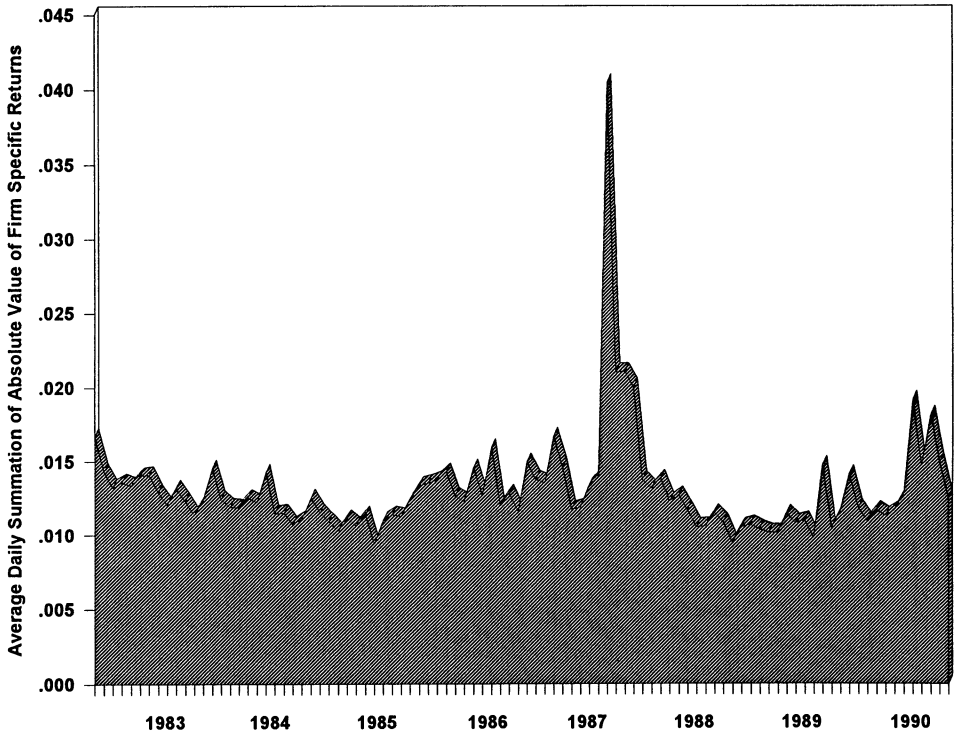

Figure 4. Average daily summation of the absolute value of firm-specific returns by month, January 1983 to December 1990. The summation of the absolute value of firm-specific returns is the sum of the absolute value of the daily returns of all firms on the NYSE, AMEX, and OTC.

The results of the correlation analysis are reported in Table VII. The correlation coefficient for news announcements and trading volume are reported in Panel A. For the broadest category of all stories and total trading volume across all exchanges, the correlation coefficient is 0.367 (p-value = 0.0001). Correlation coefficients for subcategories of news and exchanges are smaller, albeit positive, and are statistically significant with the exception of the coefficient for the AMEX-*Wall Street Journal*-only category.

Panel B of Table VII reports the correlation coefficients between the news categories and the absolute value of marketwide stock returns. For the broadest category of all stories and the value-weighted summed absolute value of returns across all exchanges, the correlation coefficient is 0.055 (p-value = 0.013). The correlation coefficients for the subcategories of news and market returns are generally positive and significant and are in the 4 to 8 percent range—the exception is the *Broadtape*-only category where the correlation coefficients are all statistically insignificant. The correlation between the absolute value of market returns and news is smaller in magnitude than that between news and trading volume.

Table VI

Day-of-the-Week Patterns in Market Activity

This table reports day-of-the-week patterns in three measures of market activity. Trading Volume is the difference from the twenty-day moving average of the natural log of the aggregate dollar volume on the NYSE, AMEX, and OTC, where daily dollar volume is estimated by multiplying daily shares traded times the average price of a traded share in a given month. Absolute Value of Market Returns is the absolute value of the CRSP value-weighted daily return aggregated across the NYSE, AMEX, and OTC. Absolute Value of Firm-Specific Returns is the value-weighted sum of the absolute value of the daily return of all firms on the NYSE, AMEX, and OTC. Monday through Friday are day-of-the-week dummy variables where each coefficient represents the deviation of that day from the average value of the given variable. The t-statistics reported in parentheses test the null that the value on a particular day of the week is equal to the same measure on the other four days of the week. d.f. is degrees of freedom.

	Trading Volume	Absolute Value of Market Returns	Absolute Value of Firm-Specific Returns
Monday	−0.123	0.0008	0.0006
	(−11.41)	(1.96)	(1.70)
Tuesday	0.010	−0.0000	0.0001
	(0.95)	(−0.07)	(0.20)
Wednesday	0.057	−0.0006	−0.0002
	(5.45)	(−1.46)	(−0.70)
Thursday	0.050	−0.0001	−0.0001
	(4.75)	(−0.21)	(−0.33)
Friday	0.006	−0.0001	−0.0004
	(0.53)	(−0.26)	(−0.39)
Adjusted R^2	0.068	0.002	0.004
d.f.	1,986	1,986	1,986

The relatively weak relation between the news variable and marketwide stock returns may stem from the fact that many news announcements are firm specific in nature and may not be expected to have a systematic effect on a market index, possibly because the announcements prognosticate distributional effects across firms rather than the allocative effects for the entire economy. To better model the effect of firm-specific information, Panel C of Table VII reports the correlation between the news variables and the sum of the absolute value of the daily return of the individual firms on each exchange. For the broadest category of all stories and the value-weighted, summed, firm-specific returns across all exchanges, the correlation coefficient is 0.112 (p-value = 0.0001). The correlation coefficients for the subcategories are all positive and, except for the *Broadtape*-only category, are statistically significant. The coefficients of firm-specific returns and news are roughly twice the size of those for news and market returns but are smaller than those between news and trading volume.[7]

[7]As an additional means of analyzing the relation between information and stock returns, we correlated the daily number of news announcements with *intraday* volatility as measured by the standard deviation of the hourly returns of the S&P 500 Index. The results of this analysis, available upon request, mirrored those reported in the text.

Table VII

Correlation Coefficients of Dow Jones News Announcements and Market Activity

This table reports the correlation between the categories of news announcements and the measures of market activity. The cell entries represent correlation coefficients between differences from twenty-day moving averages of the news categories and measures of market activity. p-Levels are in parentheses. All calculations incorporate 1,991 observations, as 20 observations are lost due to moving average calculations. Panel A correlates news with trading volume, which is measured as the difference from a twenty-day moving average of the natural log of the daily number of shares traded on the New York Stock Exchange (NYSE), the American Stock Exchange (AMEX), and the Over the Counter Market (OTC). Trading volume data for the NYSE come from *Barron's* and for the AMEX and OTC from the *S&P Daily Stock Price Record.* The Total category entails the combined dollar value of the NYSE, AMEX, and OTC, where dollar value is the product of the daily number of shares traded and the average monthly price of a given exchange. Panel B correlates news with the absolute value of the daily value-weighted return of the NYSE, AMEX, and OTC as reported on CRSP. Total represents the value-weighted return of all three exchanges. Panel C correlates news with the value-weighted sum of the absolute value of each firm's return on the NYSE, AMEX, and OTC. Total is computed by weighting by the market capitalization of each exchange. *WSJ* is the *Wall Street Journal.*

	All Stories	*Broadtape* Followed by *WSJ*	*Broadtape* Only	*WSJ* Only
Panel A: Number of Announcements and Trading Volume				
NYSE	0.363	0.304	0.246	0.120
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
AMEX	0.207	0.158	0.184	0.028
	(0.0001)	(0.0001)	(0.0001)	(0.220)
OTC	0.322	0.261	0.262	0.047
	(0.0001)	(0.0001)	(0.0001)	(0.030)
Total	0.367	0.310	0.248	0.112
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Panel B: Number of Announcements and the Absolute Value of Market Returns				
NYSE	0.055	0.060	−0.004	0.039
	(0.014)	(0.007)	(0.869)	(0.081)
AMEX	0.070	0.065	0.012	0.061
	(0.002)	(0.004)	(0.579)	(0.006)
OTC	0.079	0.071	0.006	0.088
	(0.000)	(0.002)	(0.791)	(0.000)
Total	0.055	0.060	−0.003	0.039
	(0.013)	(0.007)	(0.886)	(0.078)
Panel C: Number of Announcements and Summed Absolute Value of Firm-Specific Returns				
NYSE	0.108	0.105	0.013	0.084
	(0.0001)	(0.0001)	(0.560)	(0.0001)
AMEX	0.108	0.099	0.25	0.097
	(0.0001)	(0.0001)	(0.274)	(0.0001)
OTC	0.120	0.113	0.021	0.095
	(0.0001)	(0.0001)	(0.341)	(0.0001)
Total	0.112	0.109	0.015	0.088
	(0.0001)	(0.0001)	(0.509)	(0.0001)

Another possible reason for the relatively weak relation between news and market returns is that our public information variable does not capture the importance of particular news stories. As one proxy for news importance, we make use of a reporting procedure of Dow Jones that assigns codes to each story identifying specific firms, industries, financial markets, business subjects, countries, economic conditions, and government agencies. The more important the story, the greater the number of codes assigned by Dow Jones. For example, an earnings announcement by a small NASDAQ firm might be coded only by the company's ticker symbol, while an announcement of a merger involving a large NYSE firm might have several codes identifying industries, competing firms, and government agencies. The average number of codes per day is 847, indicating that the average story is assigned slightly more than two codes. The number of codes per day ranges from 192 to 2,788.

We estimate correlations between the number of codes and the three measures of trading activity. The results, available upon request, resemble those for news stories reported in Table VII. The correlation coefficients between codes and trading volume range from 0.20 to 0.30. Those for the absolute value of market returns average 0.05, while those for the summed absolute value of firm-specific returns average 0.10. The lack of improved results stems largely from the fact that the correlation between the daily number of announcements and codes is 0.882.

When interpreting the results of the correlation analysis, it must be remembered that, although the Dow Jones database represents a comprehensive measure of public information, it remains an imperfect proxy because many of the announcements in the data entail stale news and feature stories that do not convey new information and would not therefore be expected to induce trading activity. As one means of putting the correlation results in perspective, consider a world in which Dow Jones announcements have the distribution reported in Table I (mean = 374, standard deviation = 110) but where, on average, only half the announcements have information content that generates trading volume. Given this assumed mean information content of 0.50 and further assuming that the standard deviation of information content equals 0.40, we ran simulations of the relation between news announcements and trading volume and obtained a correlation coefficient of 0.37. Altering the simulation parameters produced intuitive results—stronger information content gives a larger correlation coefficient, while weaker content gives a smaller correlation coefficient. As a whole, the results of the relatively straightforward simulation analysis suggest that the correlation coefficients reported in Table VII are consistent with fairly reasonable assumptions about the information content of Dow Jones news announcements. Moreover, as we show below, the results found in the correlation analysis are robust to the inclusion of other variables known to affect market activity.

B. Regression Analysis of Public Information and Market Activity

We next perform regression analysis of public information and market activity. Univariate regressions allow us to gauge the economic significance of

the relation between Dow Jones announcements and aggregate market movements. Because the correlation results are similar across news types and by exchanges, the regression analysis focuses on the aggregate data for volume and returns across all three exchanges as the measures of market activity and on the total number of announcements per day as the measure of public information.

Panel A of Table VIII reports the univariate regressions between public information and the three measures of market activity. The first column displays the news-volume regression. The coefficient for the number of an-

Table VIII

Regressions of News Announcements and Market Activity

This table reports regressions between news and market activity. Each regression has an unreported intercept. Trading Volume is the difference from the twenty-day moving average of the natural log of the aggregate dollar volume on the NYSE, AMEX, and OTC, where daily dollar volume is estimated by multiplying daily shares traded times the average price of a traded share in a given month. Absolute Value of Market Returns is the absolute value of the CRSP value-weighted daily return aggregated across the NYSE, AMEX, and OTC. Absolute Value of Firm-Specific Returns is the value-weighted sum of the absolute value of the daily return of all firms on the NYSE, AMEX, and OTC. Number of announcements is the difference from a twenty-day moving average of the natural log of the total number of announcements reported daily on the Dow Jones *Broadtape* and/or in the *Wall Street Journal*. In Panel B, Monday through Friday are day-of-the-week dummy variables where each coefficient represents the deviation of that day from the average value of the given variable, and the t-statistics reported in parentheses test whether the value on a particular day of the week is equal to the same measure on the other days of the week. d.f. is degrees of freedom.

	Trading Volume	Absolute Value of Market Returns	Absolute Value of Firm-Specific Returns
Panel A: Simple Regressions (Coefficient/(t-Statistic))			
Number of announcements	0.377	0.0021	0.0037
	(17.61)	(2.47)	(5.03)
Adjusted R^2	0.135	0.003	0.012
d.f.	1,989	1,989	1,989
Panel B: Regressions Including Day-of-the-Week Dummy Variables (Coefficient/(t-Statistic))			
Number of announcements	0.374	0.0023	0.0039
	(17.56)	(2.67)	(5.15)
Monday	−0.116	0.0008	0.0007
	(−11.50)	(1.99)	(1.88)
Tuesday	0.001	−0.0001	−0.0000
	(0.009)	(−0.020)	(−0.03)
Wednesday	0.051	−0.0006	−0.0003
	(5.16)	(−1.45)	(−0.83)
Thursday	0.022	−0.0003	−0.0004
	(2.20)	(−0.75)	(−1.22)
Friday	0.042	0.0002	0.0001
	(4.17)	(0.37)	(0.18)
Adjusted R^2	0.194	0.006	0.015
d.f.	1,985	1,985	1,985

nouncements is positive and is significant at the 0.0001 level. The coefficient is also economically important—a 100 percent increase in the number of stories results in a 38 percent increase in aggregate trading volume.

The second column in Panel A of Table VIII reports the univariate regression between the absolute value of value-weighted market returns and the number of news announcements. The coefficient on the news variable is positive and significant. The estimate suggests that a 100 percent increase in news announcements leads to a 0.21 percent increase in the absolute value of the market return. Considering that the market return variable has a mean of 0.61 percent and a standard deviation of 0.73 percent, the response in returns to such a large increase in public information appears small.

Panel A of Table VIII also presents a regression between news announcements and the sum of the absolute value of value-weighted firm-specific returns. The coefficient on the news variable is positive and, as expected, the level of significance is higher than that for the market returns regression. As in the correlation analysis, however, the relation between news and firm-specific returns is not as strong as that between news and trading volume.

The correlation analysis and the univariate regressions suggest a direct, albeit weak in some cases, relation between news and market activity. This relation may explain the common day-of-the-week patterns of information, volume, and returns. On the other hand, the observed relation between news and market activity may be spurious and stem from an unobserved day-of-the-week factor that influences both sets of variables.

To account for day-of-the-week effects, Panel B of Table VIII reports regressions of news and market activity that include dummy variables for each day of the week. The first column reports the trading volume regression. The addition of the day-of-the-week dummies does not affect the coefficient of the Dow Jones announcement variable. For the most part, moreover, the day-of-the-week pattern in trading volume in the regression including news headlines resembles that reported in Table VI. The only exception is trading volume on Friday—accounting for its below-average number of news headlines, Friday volume is relatively high. By contrast, trading volume on Monday remains low even after accounting for the fact that the release of news stories on Monday is below average.

The results for the market returns variables are also not noticeably altered by the addition of the day-of-the-week variables. Moreover, the coefficients on the day dummies are not materially different from the patterns of the returns variables reported in Table VI. In general, the relation between news and market activity is robust to day-of-the-week factors.

C. Accounting for the Importance of Public Information

One potential weakness in our analysis is that the simple count of the daily number of Dow Jones headlines does not account for the varying importance of news across stories. A surprise announcement about war, an announcement concerning the overall state of the economy, or the takeover of a *Fortune* 100 company might be expected to have a greater effect on the

market than an earnings announcement of a small OTC firm. In the correlation analysis, we used the number of Dow Jones codes per story as a proxy for the importance of public information; however, the results did not improve significantly.

As another method of accounting for news importance, we employ two dummy variables: one for days having large *New York Times* front-page headlines and another for days having at least 1 of 17 monthly macroeconomic announcements. The *New York Times* headline variable gives weight to days having major world events that can be expected to affect the information presented to the market. The macroeconomic variable measures days when actively followed information is revealed to the market.

The choice of the *New York Times* as a source of news importance is based on prior findings by Niederhoffer (1971) and Cutler, Poterba, and Summers (1989) that lead stories in that newspaper are associated with above-average price movements. We follow the approach of the prior papers and canvas the *New York Times* over the 1983 to 1990 sample period for front-page lead headlines that span three columns or more. During the sample period, consisting of 2,922 calendar days, there are 229 days with three-column, front-page *New York Times* headlines, 89 days with four-column headlines, and 81 days with six-column headlines. With a few exceptions, these headlines all have national or international importance. To proxy important news as reported by the *New York Times*, we create a dummy variable that has a value of 1 for days when the information related to the large headlines reached the market and 0 otherwise. Modifying the specification of this variable by altering the column-width hurdle and by partitioning across types of news has no effect on any of the results reported.

The second measure of news importance is a dummy variable equal to one on days having at least 1 of 17 monthly macroeconomic announcements. The list of announcements is reported in Table IX. The occurrence of the announcements was found by searching the "Economic Calendar" of the Monday edition of the *New York Times*. All dates were confirmed by reviewing the news summaries on the front page of the *Wall Street Journal* on the day following the announcement. A small fraction of dates was changed to be consistent with the actual occurrence reported in the *Wall Street Journal*. Eight occurrences of announcements were dropped because they fell on Good Friday when the securities markets were closed. Four announcement dates could not be verified and were also dropped from the analysis. As shown in Table IX, the announcements exhibit marked day-of-the-week patterns, with Monday having a below-average number of announcements and Friday having an above-average number.[8]

[8]The 17 announcements reported in Table IX resemble the macroeconomic announcements studied by Ederington and Lee (1993) for the 1988 to 1990 period. We do not include two of the announcements used by these authors, gross national product and the National Association of Purchasing Managers Survey, because of inconsistent reporting during our period of study.

Table IX

Monthly Macroeconomic Announcements 1983 to 1990

This table reports the day-of-the-week occurrence of 17 monthly macroeconomic announcements that are reported in the "Economic Calendar" of the *New York Times*. All dates were verified by checking the actual announcement date as reported the following day in the *Wall Street Journal*. Independent observations accounts for multiple announcements on the same date. Business inventories, construction spending, employment (3 observations), leading indicators, personal income, and the producer price index have less than 96 total observations (8 years × 12 months) because of the occurrence of an announcement(s) on Good Friday. Merchandise trade balance (2 observations), New home sales and the federal budget each had a date(s) that could not be determined.

Announcement	Monday	Tuesday	Wednesday	Thursday	Friday	Total
Business inventories	25	3	24	18	25	95
Capacity utilization	30	12	21	14	19	96
Construction spending	35	20	13	14	13	95
Consumer credit	20	15	15	17	29	96
Consumer price index	0	31	24	11	30	96
Durable goods orders	0	42	19	16	19	96
Employment	0	0	2	2	89	93
Factory orders	11	22	28	20	15	96
Housing starts	2	32	34	17	31	96
Industrial production	6	19	18	11	42	96
Leading indicators	3	25	24	13	30	95
Merchandise trade balance	2	17	22	20	33	94
New home sales	13	30	25	9	17	94
Personal income	16	7	23	25	24	95
Producer price index	1	1	0	4	89	95
Retail sales	0	24	17	30	25	96
Federal budget	21	21	18	14	21	95
Total	185	321	327	255	531	1619
Independent observations	152	219	221	200	319	1111

Table X reports regressions including the *New York Times* and Macroeconomic Announcement dummy variables. As shown in the first column, the two proxies for news importance have no significant effect on trading volume. Moreover, the coefficient on the news variable is not affected by the inclusion of the *New York Times* and the macroeconomic dummy variables.

In contrast to trading volume, the *New York Times* variable is significantly related to both measures of stock returns. The magnitude of the coefficient is comparable to that of the number of news stories, and the addition of the *New York Times* variable adds to the explanatory power of the regressions. The contrasting results between volume and returns are consistent with the French-Roll (1986) notion that purely public information such as that reported by the *New York Times* can be incorporated into prices without significant trading volume. The macroeconomic announcement dummy variable has no significant effect on either measure of market returns.

Table X

Regressions of News and Market Activity with Proxies for News Importance

This table reports regressions between news and market activity, with proxies for news importance. Each regression has an unreported intercept and t-statistics are reported in parentheses. Trading volume is the difference from the twenty-day moving average of the natural log of the aggregate dollar volume on the NYSE, AMEX, and OTC, where daily dollar volume is estimated by multiplying daily shares traded times the average price of a traded share in a given month. Absolute value of market returns is the absolute value of the CRSP value-weighted daily return aggregated across the NYSE, AMEX, and OTC. Absolute Value of Firm-Specific Returns is the value-weighted sum of the absolute value of the daily return of all firms on the NYSE, AMEX, and OTC. Number of announcements is the difference from a twenty-day moving average of the natural log of the total number of announcements reported daily on the Dow Jones *Broadtape* and/or in the *Wall Street Journal*. *New York Times* is a dummy variable that equals 1 for major world events appearing as headlines of 3 columns or more on the front page of the *New York Times*. Macroeconomic announcements is a dummy variable equal to 1 on days having at least one of the 17 major monthly announcements reported in the "Economic Calendar" of the Monday edition of the *New York Times* as described in Table IX. Monday through Friday are day-of-the-week dummy variables where each coefficient represents the deviation of that day from the average value of the given variable, and the t-statistics reported in parentheses test whether the value on a particular weekday is equal to the same measure on other days of the week. d.f. is degrees of freedom.

	Trading Volume	Absolute Value of Market Returns	Absolute Value of Firm-Specific Returns
No. of announcements	0.372	0.0025	0.0039
	(17.27)	(2.79)	(5.19)
New York Times	0.0045	0.0018	0.0019
	(0.42)	(4.00)	(4.97)
Macroeconomic announcements	0.0083	−0.0001	0.0002
	(1.01)	(−0.18)	(0.60)
Monday	−0.114	0.0007	0.0006
	(−11.22)	(1.65)	(1.59)
Tuesday	0.001	−0.0001	0.0000
	(0.13)	(−0.13)	(0.08)
Wednesday	0.051	−0.0006	−0.0003
	(5.18)	(−1.48)	(−0.84)
Thursday	0.023	−0.0003	−0.0004
	(2.28)	(−0.72)	(−1.12)
Friday	0.040	0.0003	0.0001
	(3.78)	(0.59)	(0.24)
Adjusted R^2	0.194	0.014	0.027
d.f.	1983	1983	1983

D. Noninformation Sources of Market Activity

We next consider noninformation sources of market activity such as dividend capture and index futures expiration. After a characterization of these variables, we add them to the regression analysis to assess the robustness of the above results and to compare the relative effects of news and noninformation variables on market activity.

Numerous researchers have shown the effect of dividend capture on trading volume for individual firms (e.g., Lakonishok and Vermaelen (1986)). Yet, to our knowledge, no one has tested whether dividend capture has measurable effects on aggregate volume. We measure dividend capture for the total stock market in a simple fashion. We sum the value of shares traded for dividend-paying stocks on the day prior to the ex-dividend date. We focus on the day prior to the ex day, rather than the ex day itself, because, at least for our sample period, dividend capture was more obvious on the day prior to the ex day. We find that ex-dividend stocks account for 1.7 percent of trading volume on the ex date and account for 3 percent of volume on the day prior. The year 1988 stands out in particular. The trading due to dividend capture on the ex date during 1988 equals 2 percent of market volume, which is not noticeably different from the other years, but dividend-capture trading on the cum date accounts for 7 percent of volume during 1988. These estimates are roughly identical to that reported by the *Wall Street Journal* as obtained from the Securities Industry Association.

As an overview of the effect of conspicuous dividend capture, Table XI displays the twenty days for which the greatest percentage of aggregate trading volume comes from trading in ex-dividend stocks on the day prior to the ex-dividend date. Consider the first date, July 13, 1988. On this day, 42.58 percent of the total value of shares traded on the NYSE, AMEX, and NASDAQ occur in 23 ex-dividend stocks. This large fraction of dividend-capture trading was not due to an abnormally high number of ex-dividend stocks since the average daily number of ex-dividend stocks over the sample period is 42. Furthermore, two stocks—Pacific Enterprises and US West—accounted for virtually all of the trading in the 23 ex-dividend stocks. For Pacific Enterprises, over 28 million shares traded for a total value of $1.35 billion, whereas 38 million shares of US West traded for a total value of $2.11 billion. To put this data in perspective, note that the value traded in these two stocks on this one date exceeds the total value of all shares traded on U.S. exchanges for 193 of the 2,022 trading days (9.3 percent) in the 1983 to 1990 sample period.

Under conventional dividend-capture trading strategy where purchases on the cum date are followed by sales on the ex date, we would also expect substantial trading in these stocks on July 14, 1988, the ex-dividend date. That is not the case here as these 23 ex-dividend stocks account for only 1 percent of the total value of transactions on July 14. Instead, both sides of the dividend-capture strategy occur on the cum date. Using individual stock sales data from the Fitch Group, we find that the roundtrip dividend-capture transactions occur solely on July 13 for Pacific Enterprises and US West. For example, between 9:44 and 11:39 A.M. on July 13, 14.3 million shares of Pacific Enterprises were purchased at $47 per share in four block transactions, and the same number of shares were sold at $46.13 per share in eight block transactions (the dividend payout was 87 cents, identical to the price difference). This practice of buying and selling concurrently is possible because the stock exchanges allow investors to accelerate or delay the delivery

Table XI

Aggregate Trading Volume Due to Dividend Capture on Day Prior to Ex-Dividend Date

This table reports the twenty days in the 1983 to 1990 sample period for which the greatest percentage of aggregate trading volume comes from the trading in ex-dividend stocks on the day prior to the ex-dividend date. Percentage Value Traded by Ex-Dividend Stocks is the value of shares traded for stocks that were ex-dividend as a fraction of the shares traded for the entire market. Percentage of Stocks that Were Ex-Dividend is the number of ex-dividend stocks divided by the total number of listed firms. *Z*-Statistic for Abnormal No. of Ex-Dividend Stocks is based on the average fraction of ex-dividend stocks, which is 0.62 percent per day. Total $ Market Volume is the total dollar value of all listed stocks in billions. *Z*-Statistic for Abnormal Market Volume is based on the average and standard deviation for the particular year.

Date	Percentage Value Traded by Ex-Dividend Stocks	Percentage of Stocks that Were Ex-Dividend	*Z*-Statistic for Abnormal No. of Ex-Dividend Stocks	Total $ Market Volume (billions)	*Z*-Statistic for Abnormal Market Volume
July 13, 1988	42.58	0.36	−0.45	8.34	1.35
June 27, 1988	41.53	0.53	−0.16	9.70	2.38
July 1, 1988	38.24	0.60	−0.05	8.78	1.69
July 25, 1988	34.16	1.07	0.75	7.84	0.98
February 4, 1988	33.86	0.58	−0.07	7.26	0.54
May 5, 1988	32.05	0.41	−0.36	6.61	0.05
May 16, 1988	31.08	0.36	−0.45	5.86	−0.52
January 25, 1988	29.56	0.92	0.51	9.77	2.44
April 4, 1988	29.52	0.53	−0.16	7.25	0.53
May 9, 1988	27.13	1.04	0.70	6.22	−0.25
August 3, 1988	26.76	0.78	0.27	7.61	0.80
May 26, 1988	24.67	1.22	1.01	6.10	−0.34
January 29, 1988	24.28	1.12	0.89	8.15	1.21
June 30, 1988	22.25	0.95	0.55	8.95	1.82
May 31, 1988	22.12	0.38	−0.40	8.78	1.69
August 9, 1988	21.89	0.30	−0.55	7.59	0.79
December 22, 1988	21.19	3.90	5.51	5.95	−0.45
December 23, 1987	21.67	3.56	4.93	7.41	−0.79
June 3, 1988	20.60	1.88	2.11	7.40	0.64
February 12, 1988	20.50	0.58	−0.07	6.87	0.24
Z-Statistic for average abnormal no. of ex-dividend stocks and market volume			0.03		3.31

date. As a result, the 14.3 million shares sold on July 13 did not clear until the day following the record date as a consequence of extended delivery. The simultaneity of the transactions virtually eliminates the pricing risks that would be incurred from a lengthier holding period.

The timing of dividend capture described for July 13 is typical of the dates displayed in Table XI. On these dates a small percentage of listed stocks accounts for a substantial portion of aggregate trading volume. The *Z*-statistic of 0.03 for average abnormal number of ex-dividend stocks indicates

that the high percentage of trading attributed to dividend capture is not the result of an abnormally large number of ex-dividend stocks on these 20 days. Furthermore, the high percentage of volume accounted for by these stocks is not driven by low market volume; instead, these days are associated with a higher aggregate value of shares traded (Z-statistic is 3.31). Another noticeable feature of the data is that 19 of the 20 dates occur in 1988, with the one exception taking place in late 1987. This 1988 period is well-known for dividend capture on the part of Japanese life insurance companies and is consistent with the dividend-capture strategy of executing the complete roundtrip transaction on the day prior to the ex-dividend date.[9] While the average percentage on the cum date for these 20 days is 28.28 percent, the percentage of aggregate value transacted for these stocks on the ex-dividend date is only 4.24 percent (not reported in Table XI). In summary, these results suggest that, for the purposes of our study, it is important to account for dividend-capture trading on the day prior to the ex-dividend date.

In addition to dividend capture, the expanded regressions also account for index futures expiration. Stoll and Whaley (1987) report above-average volume on days when S&P 500 Index futures contracts expire. Their evidence is consistent with the notion that much of the volume on triple-witching Fridays is not information driven, but instead reflects arbitrageurs unwinding their positions in the stock market on the quarterly expiration of S&P 500 Index futures contracts. To control for this noninformational trading volume, we include a dummy variable taking the value of 1 for triple-witching Fridays and 0 otherwise.

E. Expanded Regressions of News and Market Activity

The regressions including the dividend capture and triple-witching variables are reported in Table XII. The trading volume regression reported in the first column indicates that the noninformation sources of market activity do indeed have a significant effect on the value of shares traded. Both dividend capture and triple-witching days are positively and significantly related to trading volume, although the magnitude of the coefficients and the statistical significance of the two variables are smaller than that of the Dow Jones announcements variable. A percentage point increase in the ratio of volume for ex-dividend stocks over volume for all stocks on the cum day is associated with a 0.29 percent increase in aggregate dollar trading volume.

[9]Japanese life insurance companies sought dividends during the 1988 period for regulatory reasons. While Japanese life insurance companies realized enormous capital gains during the 1980s, Japanese law required that payment to policyholders come from current income such as dividends. In 1989, Japan altered its law to allow the passage of some capital gains to policyholders and their dividend-capture practice largely subsided.

While U.S. tax law allows U.S. corporations to exclude 70 percent of their dividend income from taxation, the stock must be held for 46 days. Consequently, while some of the activity on the cum date may be attributable to U.S. corporations, the trading on the ex date is not. In addition, the long holding period increases the risk to the U.S. corporations, and thus they employ this practice to a lesser degree.

Table XII

Regressions of News and Market Activity Including Noninformation Sources of Market Activity

This table reports regressions between news and market activity and includes proxies for news importance and measures of noninformation sources of market activity. Each regression has an unreported intercept, and t-statistics are reported in parentheses. Dividend capture is the percentage of value of shares traded by ex-dividend stocks on the day prior to the ex-dividend date. Triple witching is a dummy variable that equals 1 for dates of S&P 500 Index futures contract expirations. All other variables are defined in Table X. d.f. is degrees of freedom.

	Trading Volume	Absolute Value of Market Returns	Absolute Value of Firm-Specific Returns
No. of announcements	0.375	0.0026	0.0040
	(17.50)	(2.91)	(5.30)
New York Times	0.003	0.0018	0.0019
	(0.33)	(3.98)	(4.94)
Macroeconomic announcements	0.008	−0.0001	0.0002
	(1.03)	(−0.16)	(0.63)
Dividend capture	0.294	0.0056	0.0052
	(2.93)	(1.34)	(1.47)
Triple witching	0.196	−0.0008	−0.0004
	(6.08)	(−0.60)	(−0.37)
Monday	−0.113	0.0006	0.0005
	(−11.15)	(1.51)	(1.45)
Tuesday	0.009	0.0000	0.0001
	(0.95)	(0.03)	(0.27)
Wednesday	0.058	−0.0006	−0.0002
	(5.91)	(−1.36)	(−0.70)
Thursday	0.024	−0.0003	−0.0004
	(2.45)	(−0.71)	(−1.10)
Friday	0.021	0.0002	0.0000
	(2.00)	(0.44)	(0.04)
Adjusted R^2	0.211	0.015	0.028
d.f.	1981	1981	1981

Similarly, the volume on triple-witching dates is almost 20 percent higher than non-triple-witching Fridays, consistent with the findings of Stoll and Whaley (1987).

The addition of dividend capture and triple-witching days increases the explanatory power in the trading volume regression but does not materially alter the coefficient on the announcements variable. As one might expect, the addition of the triple-witching dummy lessens the magnitude of the Friday day dummy. Otherwise, the addition of the noninformation sources of market activity does not alter the day-of-the-week pattern in trading volume.

The addition of the noninformation sources of trading volume has little effect on the specifications of market and firm-specific returns. The coefficient of dividend capture is positive, while the coefficient of the triple-witching dummy is negative in both the market and summed firm-specific regressions. Neither of the coefficients is more than two standard deviations from zero. These results are consistent with the conventional wisdom that dividend

capture leaves no footprints and that triple-witching trading has no material effect on daily volatility. As in the expanded trading volume regression, the coefficient on the Dow Jones announcements variable maintains a magnitude and significance comparable to the simple regression analysis.

IV. Summary and Concluding Comments

We study the relation between the number of news stories reported daily by Dow Jones and measures of market activity including trading volume, the absolute value of market returns, and the sum of the absolute value of firm-specific returns. We find that the number of news stories and market activity are directly related and share common day-of-the-week patterns. The relation between news and market activity remains significant in regressions that control for the day of the week.

The relation between public information and market activity is also robust to analysis that includes two proxies for news importance—the size of *New York Times* headlines and a dummy variable for days having at least one of 17 major macroeconomic announcements. The days having large *New York Times* headlines have market returns of above-average magnitude, while trading volume on those days is not significantly different than that for the full sample. Neither trading volume nor market returns is significantly different on days having macroeconomic announcements.

The relation between news and market activity is also robust to the inclusion of noninformation sources of market activity as measured by dividend capture and triple-witching trading. At the same time, aggregate market volume is positively and significantly related to both dividend-capture trading and a dummy variable for triple-witching days, indicating in a simple fashion why volume and information are not perfectly correlated. By contrast, the measures of market and firm-specific returns are not significantly related to the noninformation sources of trading activity.

While we find a direct, robust relation between Dow Jones news stories and stock market activity, the observed relation is often as weak as that reported in prior research. Because of the comprehensive nature of the Dow Jones database, the results give credible confirmation as to the difficulty of linking volume and volatility to observed measures of information. The combined evidence suggests the complexity of the relation between public information and the stock market. Hence, the continued development of models in the genre of Harris and Raviv (1993), Kandel and Pearson (1993), and Kim and Verrecchia (1994) seems warranted. In the meanwhile, one would hope that a circuit breaker remains in place on the regulatory mentality of "what is not fully understood must be regulated."

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