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Inside Information and Public News: R^2 and Beyond

William O. Brown*
Claremont McKenna College

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ABSTRACT

This paper finds that the majority of stock price movements remain unexplained after controlling for both public and private information. This suggests that economists' inability to explain asset price movements is the result of either noise or naive asset pricing models.

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* Department of Economics
Claremont McKenna College
Claremont, CA 91711
Phone (909) 607-3664
Fax (909) 621-8249
wbrown@benson.mckenna.edu

I. Introduction

Traditional economic theory predicts that changes in an asset's price are caused by unanticipated events that influence the fundamental value of the underlying asset. If we are able to identify and control for such events ex-post, then we should be able to accurately explain past price movements. After the elimination of news days from a sample of common stocks, Roll (1988) is unable to explain a significant fraction of the remaining price movements. He argues that the unexplained movements in asset prices are caused "either by private information or occasional frenzy unrelated to concrete information."[1]

The purpose of this paper is to add to the existing literature by controlling for the influence of private information. The *SEC's Official Summary* is used to identify days where corporate insiders complete transactions in a company's common stock. Seyhun (1986) finds that these transactions are based on private information. The ex-post identification and elimination of insider trading days, in addition to the public news days, from the sample will allow us to determine to what extent private information is responsible for the unexplained component of stock price movements.

II. The Data

The sample consists of the thirty firms comprising the *Dow-Jones Industrial Average* from January 1, 1990 to December 31, 1992. The SEC's *Official Summary* is used to identify the days where corporate insiders acquire or dispose of shares. The *Wall Street Journal Index* is used to identify the news days for each firm. News stories occur almost daily for these large firms. In order to solve this problem, I identify and include only those stories that are major news events. The majority of news items include: announcements of layoffs, corporate mergers or spin-offs, labor problems, the firm

receiving large contracts, new product introductions, earnings reports, and top management changes.[2] The main goal is consistency in the treatment of events across firms.

III. Tests and Result

The market model was estimated eliminating the news and insider trading days as well as the four-day window surrounding the event.[3] Table 1 presents the results of controlling for the news days, the insider trading days, and both the insider trading and news days simultaneously. The average R^2 for all days is 28.95 percent. The average when excluding the news days is 32.07 percent. Excluding the private information days actually leads to a drop in the average R^2 to 28.78 percent and excluding both news days and private information days leads to an average R^2 of 31.82 percent.

The average R^2 increase of 3.1 percent from the elimination of the news days is not impressive in an explanatory sense. It is, however, higher than the 1.4 percent average increase reported for Roll's eighty-nine firms. There are some relatively large increases among the individual companies. Most notably, the R^2 for Westinghouse increases from 12.3 percent to 24.7 percent from the elimination of news days. Only three of the thirty R^2s decrease after the elimination of the news days; each of these decreases is smaller than one percent.

The results provide little support for the notion that private information is the source of the previously unexplained variation in asset prices. The average R^2 decreases by 0.17 percent and it decreases for fifteen of the thirty firms. The largest increase is only

4.21 percent while the largest decrease is 5.37 percent. The combined results suggest that the exclusion of private information days adds little the explanatory power of the model.

The nature of these tests, especially the elimination of observations that have informational content, may obscure the influence of such information. Mitchell and Mulherin (1994) provide an alternative approach to finding the relationship between news and market returns. By regressing the absolute value of the individual firm's returns on the absolute value of the *CRSP* value weighted market return and dummy variables representing news and insider trading days, I obtain these alternative estimates.

The results provided in Table 2 indicate that the news dummy is positive, as expected, for all but one of the firms. The coefficient is significant at the one- percent level for twenty firms, and at the five- percent level for three firms. The dummy variable for the insider trading days is positive as expected for eighteen of the thirty firms. The coefficient is positive and significant at the five- percent level for one firm but also negative and significant for one firm. The results indicate a stronger effect for both public and private information. However, the overall link is still weak.

IV. Conclusions

The results are similar to those of Roll (1986, 1988), Cornell (1990), and Mulherin and Mitchell (1995) in that I find the majority of asset price movements are unexplained after controlling for proxies of information flow. The most important result is that private information, as measured by the presence of legal insider trading, is not responsible for these movements. While corporate insiders earn significant abnormal returns (Seyhun (1986)), the information contained in these transactions is not responsible for unexplained

stock price movements. This leaves alternative sources of private information, noise, and the need for more complex models of asset price movements (e.g. Romer (1993), Grossman (1995)) as possible explanations for Roll's findings.

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Table 1
R^2s from Estimating the Market Model for All Days, Non-Insider Trading Days, and non-News Days

	All Days	Excluding Private Info/ Insider Trading Days		Excluding Public Info/ News Days		Excluding Public and Private Info Days	
	R^2	R^2	Change	R^2	Change	R^2	Change
Alcoa	0.2357	0.2482	0.0125	0.2644	0.0287	0.2819	0.0462
Allied Signal	0.1715	0.1722	0.0007	0.2124	0.0409	0.2241	0.0526
Amer Express	0.3095	0.3067	-0.0028	0.3495	0.0400	0.3548	0.0453
ATT	0.3464	0.3576	0.0112	0.3781	0.0317	0.3850	0.0386
Boeing	0.3124	0.3149	0.0025	0.3348	0.0224	0.3502	0.0378
Bethlehem Steel	0.1461	0.1336	-0.0125	0.1495	0.0034	0.1384	-0.0077
Caterpillar	0.1698	0.1815	0.0117	0.1779	0.0081	0.1779	0.0081
Chevron	0.2267	0.2321	0.0054	0.2456	0.0189	0.2577	0.0310
Coca-Cola	0.5015	0.4921	-0.0094	0.5428	0.0413	0.5437	0.0422
Disney	0.3500	0.3420	-0.0080	0.3703	0.0203	0.3583	0.0083
Du Pont	0.3869	0.4086	0.0217	0.4188	0.0319	0.4252	0.0383
Exxon	0.2106	0.2140	0.0034	0.2048	-0.0058	0.2106	0.0000
General Electric	0.5399	0.5248	-0.0151	0.5379	-0.0020	0.5225	-0.0174
General Motors	0.2913	0.2877	-0.0036	0.3548	0.0635	0.3991	0.1078
Goodyear	0.1091	0.1050	-0.0041	0.1365	0.0274	0.1386	0.0295
IBM	0.2509	0.1972	-0.0537	0.3294	0.0785	0.2714	0.0205
Intl Paper	0.3032	0.3031	-0.0001	0.2996	-0.0036	0.2967	-0.0065
Kodak	0.2588	0.2675	0.0087	0.3263	0.0675	0.3292	0.0704
McDonalds	0.3101	0.2737	-0.0364	0.3171	0.0070	0.2905	-0.0196
Merck	0.4431	0.4605	0.0174	0.4666	0.0235	0.4751	0.0320
MMM	0.4160	0.4050	-0.0110	0.4510	0.0350	0.4414	0.0254
Morgan (J. P.)	0.3182	0.3500	0.0318	0.3222	0.0040	0.3569	0.0387
Procter&Gamble	0.4419	0.4840	0.0421	0.4843	0.0424	0.3989	-0.0430
Philip Morris	0.4376	0.4102	-0.0274	0.4567	0.0191	0.4354	-0.0022
Sears	0.2416	0.2437	0.0021	0.2915	0.0499	0.3079	0.0663
Texaco	0.1450	0.1271	-0.0179	0.1461	0.0011	0.1281	-0.0169
Union Carbide	0.1928	0.1962	0.0034	0.2325	0.0397	0.2335	0.0407
United Tech	0.2357	0.2362	0.0005	0.2797	0.0440	0.2842	0.0485
Westinghouse	0.1230	0.1055	-0.0175	0.2447	0.1217	0.2324	0.1094
Woolworth	0.2595	0.2517	-0.0078	0.2962	0.0367	0.2977	0.0382
Average	0.2895	0.2878	-0.0017	0.3207	0.0312	0.3182	0.0288
Median	0.2754	0.2706	0.0002	0.3197	0.0302	0.3028	0.0349
Maximum	0.5399	0.5248	0.0421	0.5428	0.1217	0.5437	0.1094
Minimum	0.1091	0.1050	-0.0537	0.1365	-0.0058	0.1281	-0.0430

Table 2
The Cross Sectional Influence of
Public News and Private News on Security Returns

The results are from estimating the following model:

$$r_{it} = \alpha_{it} + \beta_{it}\ \text{VWRETD}\ \gamma_{1it}\text{NEWS} + \gamma_{2it}\text{INSIDER TRADING} + \varepsilon_{it}$$

where VWRETD is the CRSP value weighted return, NEWS is a dummy variable that is equal to one if there is a major public news story about firm i on that day, and INSIDER TRADING is a dummy variable that is equal to one if there if insider trading is reported to have occurred for firm i on that day. Significance at the 1 percent and 5 percent levels are noted by the superscripts a and b.

Firm	Intercept	VWRETD	News	Insider	R^2	ADJ R^2
Alcoa	0.009130 15.350[a]	0.513961 7.029[a]	0.004880 3.687[a]	-0.001035 -1.851	0.0852	0.0816
Allied Signal	0.009011 12.814[a]	0.615604 7.331[a]	0.006437 4.442[a]	-0.001032 -1.305	0.0918	0.0882
Amer Express	0.009293 11.899[a]	1.141189 11.936[a]	0.005551 3.963[a]	0.001719 1.272	0.1720	0.1687
ATT	0.006546 13.660[a]	0.720851 12.199[a]	0.002163 3.088[a]	-0.001467 -1.585	0.1817	0.1785
Boeing	0.006898 11.181[a]	1.005033 13.079[a]	0.002167 2.075[b]	0.000139 0.131	0.1887	0.1855
Beth. Steel	0.016626 16.984[a]	0.505771 4.185[a]	0.003761 1.832	-0.001885 -0.953	0.0267	0.0228
Caterpillar	0.009257 14.041[a]	0.585342 6.975[a]	0.004809 4.081[a]	0.002512 1.427	0.0837	0.0801
Chevron	0.007178 17.202[a]	0.342091 6.517[a]	0.001161 1.341	-0.000147 -0.130	0.0556	0.0518
Coca-Cola	0.005042 10.184[a]	1.098789 17.853[a]	0.005399 5.246[a]	-0.000447 -0.501	0.3177	0.3150
Disney	0.007474 13.645[a]	0.854601 12.637[a]	0.001211 1.056	0.000209 0.225	0.1749	0.1716
Du Pont	0.005995 11.277[a]	0.918709 14.601[a]	0.003986 3.851[a]	0.001067 1.847	0.2264	0.2234
Exxon	0.006613 15.505[a]	0.437061 8.439[a]	0.000358 0.581	0.000190 0.309	0.0864	0.0828
General Electric	0.004237 10.457[a]	1.018890 19.611[a]	0.002165 2.455[b]	0.000611 0.413	0.3445	0.3419

General Motors	0.009918 13.288[a]	0.924875 10.774[a]	0.003403 4.033[a]	-0.001179 -2.013[b]	0.1471	0.1437
Goodyear	0.012069 14.738[a]	0.710767 7.106[a]	0.003541 2.361[b]	-0.000594 -0.437	0.0700	0.0663
IBM	0.007438 13.132[a]	0.491296 7.051[a]	0.004064 5.358[a]	-0.000526 -0.810	0.0937	0.0901
Intl Paper	0.007434 15.106[a]	0.715692 11.598[a]	0.001125 0.968	0.000299 0.337	0.1523	0.1490
Kodak	0.006962 11.556[a]	0.778289 10.497[a]	0.006571 4.711[a]	0.000535 0.519	0.1514	0.1481
McDonalds	0.008113 14.749[a]	0.728243 10.680[a]	0.005499 4.306[a]	0.000963 1.967[b]	0.1554	0.1521
Merck	0.006199 12.729[a]	0.870567 14.894[a]	0.001206 1.244	-0.000198 -0.291	0.2292	0.2261
MMM	0.004231 11.584[a]	0.700663 15.100[a]	0.005157 4.800[a]	0.000650 0.698	0.2564	0.2534
Morgan (J. P.)	0.007744 12.910[a]	0.822524 11.233[a]	0.006419 4.669[a]	-0.000187 -0.283	0.1627	0.1594
Proc. & Gamb.	0.004749 10.341[a]	0.890451 16.533[a]	0.004464 5.054[a]	0.000155 0.392	0.2827	0.2799
Philip Morris	0.005897 12.522[a]	0.876664 15.395[a]	-0.00034 -0.38	0.000386 0.467	0.2402	0.2371
Sears	0.008092 12.662[a]	0.821898 10.372[a]	0.003442 3.410[a]	0.000758 0.460	0.1346	0.1311
Texaco	0.007213 16.334[a]	0.349116 6.495[a]	0.003258 2.872[a]	0.001059 1.609	0.0618	0.0580
United Carbide	0.010328 14.353[a]	0.610044 6.693[a]	0.008872 5.633[a]	0.002666 0.935	0.0938	0.0902
United Tech.	0.007508 13.006[a]	0.617514 8.611[a]	0.005356 4.563[a]	0.000427 0.438	0.1098	0.1063
Westinghouse	0.012017 12.408[a]	0.485997 4.020[a]	0.007465 4.373[a]	-0.000934 -0.556	0.0459	0.0422
Woolworth	0.007997 12.387[a]	0.788746 10.000[a]	0.007116 4.192[a]	0.000913 0.938	0.1296	0.1262

ENDNOTES

[1] Cornell (1990) uses abnormal trading volume as a proxy for both public and private information flows. He finds that the elimination of high volume days from his sample allows for a larger increase in explanatory power than Roll's approach but still leaves the majority of the movements unexplained. This approach does not allow him to distinguish between public and private information.

[2] The number of public news days and insider trading days for each of the thirty companies is as follows: Alcoa (23, 82), Allied Signal (26, 70), ATT (50, 33), American Express (35, 34), Boeing (39, 25), Bethlehem Steel (26, 21), Caterpillar (31, 15), Chevron (25,16), Coca-Cola (27,32), Disney (28,31), Du Pont (27,75), Exxon (41, 47), General Electric (24, 10), General Motors (66,141), Goodyear (31, 29), IBM (55, 57), International Paper (21, 31), Kodak (22, 39), McDonalds (21, 97), Merck (27, 54), Minnesota Mining and Manufacturing (14, 18), Morgan (J.P.) (21, 75), Procter & Gamble (28, 127), Philip Morris (32, 39), Sears (44,17), Texaco (17, 43), United Carbide (25, 8), United Technology (28, 36), Westinghouse (32, 35), Woolworth (16, 42).

[3] Event windows of various lengths were tried; they all produced similar results I eliminate days following the event to make sure that any feedback effects where market participants react to other market participants' reaction to the news are fully captured (Grossman (1995)) .