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# ABNORMAL RETURNS TO INVESTMENT STRATEGIES BASED ON THE TIMING OF EARNINGS REPORTS

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This paper adds to recent evidence on market inefficiency in processing information in earnings reports. It documents that short positions taken in sample stocks which did not report earnings by the date expected during the sample period, 1971–1976, would have been abnormally profitable, before transaction costs. This is because late reports, on average, revealed bad news which was not anticipated in market prices prior to the report date. The magnitude of the average abnormal returns is in the order of 1.0% over 20 days but is larger for smaller firms in the sample and positively related to the length of the reporting delay. The paper also documents that long positions taken in stocks reporting early with good news would have generated abnormal returns of approximately 1.0% on average over a 20-day holding period.

## 1. Introduction

A number of papers have documented evidence of abnormal returns following earnings announcements.[1] It appears that a strategy of investing in securities the day after earnings reports on the basis of the direction of 'unexpected earnings' contained in the reports provides abnormal returns, on average, before transactions costs. Further, the size of these abnormal returns is related to the size of the (standardized) unexpected earnings and to firm size. While there are some interpretive difficulties with these results due to (experimental) uncertainty about expected normal returns, the finding of this 'anomaly' or 'market inefficiency' in security pricing appears to be consistent over alternative specifications of expected returns and methods of risk adjustment, and persistent over a considerable period of time.[2]

This paper documents anomalies associated with the timing of the release of earnings reports. It has been observed that firms tend to publish their earnings

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[1]See, for example, Latané, Jones and Rieke (1974), Joy, Litzenberger and McEnally (1977), Latané and Jones (1977), Watts (1978), and Latané and Jones (1979).

[2]See Foster, Olsen and Shevlin (1984), and Rendleman, Jones and Latané (1982).

reports on a regular, predictable basis. Chambers and Penman (1984) indicate that quarterly reporting dates can be predicted within a few days and annual reporting dates within a week with a reasonable level of accuracy, on average. However, that paper also reveals that significant deviations in the release of earnings reports from the date on which they are expected are related to the nature of the news in the report. Reports published earlier than expected tend to carry good news while reports released later than expected tend to convey bad news, as measured by the stock price reaction to the report. Similar results are reported in Kross and Schroeder (1984). While the timing of unexpectedly early reports cannot be predicted, a report is known to be late when it is not published by its expected reporting date. The analysis in Chambers and Penman (1984) indicates that the market does interpret failure to report by the expected reporting date as a signal of bad news and at that date devalues the stock price accordingly. However, that paper also documents a further negative effect on price when the late report finally arrives. This, of course, is suggestive of an anomaly in pricing: the bad news content of predictably late earnings reports is not (on average) fully reflected in prices.

In this paper we document that not only are negative unexpected stock returns evident at the date of late reports but also for some time after the report date. This suggests that a trading strategy of selling a firm short when it misses its expected reporting date and not closing the position until some time after its actual reporting date is abnormally profitable. We discover that this is so before transactions costs, and that the return is larger for smaller firms. We also document positive abnormal returns following unexpectedly early, good news reports. This suggests a strategy of buying stocks immediately after they publish early with good news.

In the next section the data used in the analysis are described. In section 3 we investigate abnormal security returns at the date of and subsequent to earnings reports for firms which differ in the timeliness of their reporting relative to assumed expected reporting dates. In section 4 the profitability of investing in late-reporting firms when they miss their expected reporting dates is analyzed. Section 5 summarizes the main results in the paper.

## 2. Data

Announcement dates of (quarterly) interim and annual earnings reports for the years 1970–1976 were collected from the *Wall Street Journal Index* for 100 randomly-selected New York Stock Exchange firms. Of a possible 2800 report dates for these firms in this seven-year period, 2756 were discovered in the *Index*, 2065 interim (quarterly) report dates and 691 annual report dates. The report date was defined as the date of the first report of earnings by the firm after the end of the relevant fiscal period. Much of the analysis in the paper relies on the specification of an expected reporting date for each report. As this

was based on the reporting date for the same fiscal period in the previous year, the results presented here pertain to reports published during the six years, 1971–1976. There were 1765 interim reports and 592 annual reports in the sample for this period. Sufficient returns data (obtained from the University of Chicago's CRSP *Daily Returns File*) were available for the analysis of 1743 interim reports and 584 annual reports. For brevity, the paper presents detailed results for interim reports only and discusses the results for annual reports in detail only when they differ from those for interim reports.

The sample is the same as that in Chambers and Penman (1984). The reader should refer to figs. 1 and 2 and table 1 of that paper for a summary of the cross-sectional and time-series variability in reporting lag times for the sample firms. From the pooled cross-sectional, time-series data, the median and mean reporting lags (measured in days from fiscal period end to the report date) are approximately 25 days for interim reports and 44 days for annual reports, with standard deviations of 9.4 days and 17.2 days, respectively. However, the average time-series standard deviation of reporting lags (within firms) is only 3.7 days for interim reports and 7.2 days for annual reports. Given that weekends naturally introduce some variation, these figures must be considered quite small.

## 3. Abnormal stock returns at the date of and subsequent to early, on-time, and late earnings reports

For the analysis in this section earnings reports are classified into three groups – early, on-time, and late reports. Early quarterly reports are defined as those published more than four (calendar) days prior to their expected reporting dates, late reports those published more than four (calendar) days after their expected dates, and 'on-time' reports those published within four days of the date expected. The four-day period chosen to classify early and late reports is approximately equal to the sample mean (within firm) standard deviation of reporting lag times from the end of the fiscal period and also approximately equal to the sample mean absolute deviation of the report date from that for the previous year. The expected reporting date is defined as the month and day of the reporting date for the same fiscal period of the previous year. Results were similar when the expected reporting date was defined as that corresponding to the average reporting lag time for the relevant fiscal period over the seven years in the sample period.

Table 1 gives estimates of mean abnormal stock returns associated with the announcement of reports in the three timeliness categories. It is a summary of a more detailed analysis in Chambers and Penman (1984). The abnormal returns cover the two-day period consisting of the *Wall Street Journal* date of the report and the previous (trading) day. A two-day announcement period was used because of evidence [in Patell and Wolfson (1982), for example] that

Table 1

Mean abnormal returns over two-day report period for early, on-time, and late interim earnings reports.[a]

| | All reports | | | Reports without other announcements | | |
|---|---|---|---|---|---|---|
| Report timeliness | No. of reports | Mean estimated abnormal return | $t$ | No. of reports | Mean estimated abnormal return | $t$ |
| > 4 days early | 239 | 0.0073 | 2.22 | 195 | 0.0099 | 2.50 |
| On-time | 1213 | 0.0008 | 0.47 | 923 | 0.0012 | 0.63 |
| > 4 days late | 291 | −0.0030 | −1.06 | 216 | −0.0069 | −1.59 |

[a]The report period covers the *Wall Street Journal* date of the report and the (trading) day before.

$t$ is the mean estimated abnormal return divided by an estimate of its standard error.

The second set of results excludes reports with other announcements appearing in the *Wall Street Journal Index* within five days of the earnings report date.

many reports are available on the day prior to the *Wall Street Journal* date. Expected (normal) returns at each report date for each firm were estimated as the mean of the 50 two-day returns over the 100 trading days immediately preceding the end of the fiscal period of the report. Abnormal returns were defined as the difference between actual two-day report period returns and these expected returns.[3] These abnormal (unexpected) returns are assumed to capture the surprise in the earnings announcements. Table 1 gives two sets of mean estimated abnormal returns, one covering all interim reports in the sample and the other excluding reports with other announcements appearing in the *Wall Street Journal Index* within five days of the earnings report date.

The direction and size of the mean estimated abnormal returns in table 1 indicate that interim reports published earlier than expected convey good news and those published later than expected bear bad news, on average, while on-time reports cannot be characterized as providing news in a particular direction. Comparison of the two sets of mean abnormal returns indicates that this result is not sensitive to other announcements appearing at the same time as the earnings report.

For the 70 *annual* reports published more than seven days before their expected reporting dates during the 1971–76 period, the mean estimated abnormal return over the two-day report period was 0.0118 with an associated $t$-statistic of 1.32. The mean estimated abnormal report period return for the 46 annual reports more than seven days late was −0.0115 with a $t$-statistic of −1.47. The mean estimated abnormal report period return for the 295 on-time

[3]The results were not sensitive to alternative specifications of expected returns. The $t$-values are based on estimates of the standard errors of the means that are calculated in such a way as to ensure they are unbiased, recognizing the cross-sectional dependencies in security returns. The method of calculating the mean abnormal return for each group is described fully in Chambers and Penman (1984).

annual reports (published within seven days of their expected dates) was 0.0041 with a $t$-statistic of 1.37. Seven days is approximately equal to the average standard deviation of annual reporting lag times observed in the sample and to the mean deviation of reporting dates from that for the previous year. Givoly and Palmon (1982) draw a similar inference about the relationship between the nature of the news and the timing of annual report releases based on the sign of unexpected earnings in the report. It appears that firms publish earnings reports early when they have good news and delay publishing them when they have bad news.

Note that while the mean estimated abnormal return associated with late reports in table 1 is negative, it is not as large (in absolute terms) relative to its estimated standard error as that for early reports, as indicated by the $t$ statistics. This may be due in part to the fact that some of the bad news is anticipated by the market when firms miss their expected reporting dates, as indicated in Chambers and Penman (1984). However, despite this anticipation, there is still evidence of reductions in stock prices when the bad news actually arrives.

Table 2 summarizes cumulative abnormal returns over the 50 trading days following the day that early, on-time, and late reports appeared in the *Wall Street Journal*. Within each group characterized by timeliness of the report, firms have been further classified on the basis of the nature of the news in the report. In panel A of the table, good and bad news are defined on the basis of the price reaction to the report. 'Good news' reports are those where the value of the two-day return over the report period was greater than the mean two-day return over the previous 50 two-day trading periods, and 'bad news' reports those where it was less. In panel B, good and bad news are defined on the basis of the earnings in the report relative to the expectation given by the following model:

$$\mathrm{E}(Q_{it}) = Q_{it-4} + \phi_i(Q_{it-1} - Q_{it-5}) + \delta_i, \tag{1}$$

where $Q_{it}$ is the earnings for firm $i$ in fiscal quarter $t$. The analysis was repeated, with similar results, with the earnings expectation described as

$$\mathrm{E}(Q_{it}) = Q_{it-4} + \delta_i.$$

Empirical support for these models is found in Foster (1977). Further, Foster, Olsen and Shevlin (1984) found that deviations from the predictions of these models discriminate among levels of post-report abnormal returns. The parameters of these models were estimated for each $t$ from the twenty quarters of earnings data immediately preceding the quarter. The earnings data were collected manually from *Moodys Manuals* to ensure the data were 'as reported' and not adjusted.

Table 2

Mean cumulative abnormal returns, $\bar{r}_\tau^c$, following early, on-time, and late earnings reports.[a]

| Day $\tau$ relative to report date | Early reports | | | | On-time reports | | | | Late reports | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Good news | | Bad news | | Good news | | Bad news | | Good news | | Bad news | |
| | $\bar{r}_\tau^c$ | $t(\bar{r}_\tau^c)$ | $\bar{r}_\tau^c$ | $t(\bar{r}_\tau^c)$ | $\bar{r}_\tau^c$ | $t(\bar{r}_\tau^c)$ | $\bar{r}_\tau^c$ | $t(\bar{r}_\tau^c)$ | $\bar{r}_\tau^c$ | $t(\bar{r}_\tau^c)$ | $\bar{r}_\tau^c$ | $t(\bar{r}_\tau^c)$ |
| *Panel A: Price-based news partitions* | | | | | | | | | | | | |
| 1 | 0.0056 | 1.98 | 0.0020 | 0.55 | 0.0018 | 2.26 | 0.0004 | 0.30 | −0.0038 | −1.71 | −0.0007 | −0.28 |
| 2 | 0.0026 | 0.85 | 0.0014 | 0.36 | 0.0007 | 0.52 | 0.0005 | 0.25 | −0.0024 | −1.19 | −0.0009 | −0.31 |
| 3 | 0.0013 | 0.32 | 0.0000 | 0.00 | 0.0001 | 0.09 | 0.0005 | 0.27 | −0.0039 | −1.86 | −0.0018 | −0.44 |
| 4 | −0.0001 | −0.02 | −0.0012 | −0.27 | −0.0001 | −0.08 | 0.0008 | 0.41 | −0.0066 | −2.30 | −0.0055 | −0.86 |
| 5 | 0.0013 | 0.28 | 0.0023 | 0.49 | 0.0005 | 0.31 | 0.0012 | 0.59 | −0.0045 | −1.45 | −0.0089 | −1.41 |
| 6 | 0.0039 | 1.08 | 0.0026 | 0.50 | 0.0002 | 0.13 | 0.0012 | 0.49 | −0.0029 | −0.69 | −0.0093 | −1.29 |
| 7 | 0.0036 | 0.85 | 0.0018 | 0.35 | −0.0002 | −0.12 | 0.0004 | 0.16 | −0.0035 | −0.79 | −0.0089 | −1.21 |
| 8 | 0.0014 | 0.28 | 0.0016 | 0.34 | 0.0004 | 0.21 | −0.0005 | −0.16 | −0.0028 | −0.61 | −0.0079 | −0.96 |
| 9 | 0.0030 | 0.58 | −0.0032 | −0.54 | 0.0012 | 0.55 | −0.0002 | −0.07 | −0.0039 | −0.77 | −0.0097 | −1.14 |
| 10 | 0.0068 | 1.21 | −0.0004 | −0.06 | 0.0020 | 1.01 | −0.0014 | −0.37 | −0.0071 | −1.50 | −0.0077 | −0.89 |
| 20 | 0.0098 | 1.09 | −0.0042 | −0.35 | 0.0000 | 0.01 | −0.0064 | −1.32 | −0.0072 | −0.93 | −0.0181 | −2.11 |
| 30 | 0.0101 | 0.83 | −0.0159 | −0.97 | −0.0024 | −0.45 | −0.0102 | −1.70 | −0.0040 | −0.42 | −0.0101 | −0.97 |
| 40 | 0.0043 | 0.30 | −0.0282 | −1.60 | 0.0003 | 0.05 | −0.0140 | −1.95 | 0.0020 | 0.25 | −0.0174 | −1.25 |
| 50 | 0.0188 | 1.10 | −0.0261 | −1.20 | 0.0084 | 0.88 | −0.0122 | −1.53 | 0.0036 | 0.35 | −0.0103 | −0.54 |
| | ($N$ = 137) | | ($N$ = 103) | | ($N$ = 617) | | ($N$ = 595) | | ($N$ = 153) | | ($N$ = 138) | |
| *Panel B: Earnings-based news partitions* | | | | | | | | | | | | |
| 1 | 0.0057 | 2.30 | 0.0046 | 1.40 | 0.0025 | 2.37 | −0.0001 | −0.05 | 0.0015 | 0.87 | −0.0063 | −2.71 |
| 2 | 0.0063 | 2.01 | −0.0007 | −0.14 | 0.0020 | 1.42 | −0.0004 | −0.20 | 0.0003 | 0.19 | −0.0020 | −0.58 |
| 3 | 0.0029 | 0.66 | 0.0010 | 0.26 | 0.0017 | 1.01 | −0.0008 | −0.40 | 0.0003 | 0.08 | −0.0035 | −1.08 |
| 4 | 0.0010 | 0.19 | 0.0030 | 0.59 | 0.0025 | 1.32 | −0.0014 | −0.76 | 0.0009 | 0.18 | −0.0062 | −1.10 |
| 5 | 0.0023 | 0.41 | 0.0037 | 0.55 | 0.0036 | 1.96 | −0.0015 | −0.82 | 0.0018 | 0.42 | −0.0098 | −1.85 |
| 6 | 0.0020 | 0.36 | 0.0058 | 0.91 | 0.0047 | 2.46 | −0.0029 | −1.94 | −0.0001 | −0.03 | −0.0102 | −1.83 |
| 7 | −0.0007 | −0.12 | 0.0105 | 1.59 | 0.0039 | 2.17 | −0.0035 | −2.17 | 0.0010 | 0.30 | −0.0127 | −1.96 |
| 8 | −0.0032 | −0.48 | 0.0109 | 1.53 | 0.0040 | 1.93 | −0.0035 | −1.83 | 0.0027 | 0.53 | −0.0146 | −2.38 |
| 9 | −0.0036 | −0.66 | 0.0115 | 1.38 | 0.0049 | 1.86 | −0.0034 | −1.57 | 0.0004 | 0.08 | −0.0154 | −3.07 |
| 10 | −0.0002 | −0.03 | 0.0193 | 1.98 | 0.0052 | 1.87 | −0.0041 | −1.58 | −0.0054 | −0.95 | −0.0090 | −1.46 |
| 20 | −0.0034 | −0.39 | 0.0228 | 1.15 | 0.0042 | 0.92 | −0.109 | −2.19 | −0.0050 | −0.58 | −0.0124 | −1.36 |
| 30 | −0.0118 | −0.94 | 0.0280 | 1.39 | −0.0001 | −0.02 | −0.0134 | −2.07 | 0.0021 | 0.17 | −0.0145 | −1.36 |
| 40 | −0.0297 | −2.03 | 0.0378 | 1.45 | 0.0030 | 0.43 | −0.0180 | −2.24 | 0.0052 | 0.38 | −0.0102 | −0.93 |
| 50 | −0.0220 | −1.26 | 0.0386 | 1.33 | 0.0079 | 0.73 | −0.0140 | −1.31 | 0.0126 | 0.70 | −0.0033 | −0.26 |
| | ($N$ = 134) | | ($N$ = 71) | | ($N$ = 612) | | ($N$ = 449) | | ($N$ = 135) | | ($N$ = 119) | |

[a] $N$ is the number of reports in the relevant group.

For priced-based partitions (panel A), good and bad news are defined by the sign of the abnormal stock return over the two-day report period.

For earnings-based partitions (panel B), good and bad news are defined by the sign of the difference between earnings reported and the expectation of earnings given by model (1).

The mean cumulative abnormal returns, $\bar{r}^{c}_{\tau}$, given in table 2 for each group of reports indicated at the top of the table were estimated as follows. Let $\tau$ be a trading day following the *Wall Street Journal* date of the earnings report. For each $\tau$ from $\tau = 1$ to $\tau = 50$ for the reports in the relevant group for fiscal quarter $q$, $q = 1, \ldots, 3$, in fiscal year $t$ in the period 1971–76, we calculated a market-adjusted portfolio abnormal return for the $N_{qt}$ firms reporting in the group for that quarter for that year as follows:

$$r_{\tau qt} = \left[ \sum_{i=1}^{N_{qt}} R^{m}_{i\tau qt}/N_{qt} \right] - \bar{R}^{m}_{qt},$$

where $R^{m}_{i\tau qt}$ is the market-adjusted return ($R_{i\tau qt} - R_{m\tau}$, where $R_{m\tau}$ is the return on the CRSP value-weighted index on day $\tau$) for firm $i$, $i = 1, N_{qt}$, on day $\tau$ for the relevant fiscal period. (As the number of firms in a group for a given quarter in a given year does not change over $\tau$, $N$ is not subscripted with $\tau$.) $\bar{R}^{m}_{qt}$ is an estimate of the 'normal' market-adjusted return for firms in the portfolio. For the analysis in panel A of table 2 this was calculated as the mean daily return minus the market return for firms in the portfolio over 100 trading days prior to the end of the fiscal period. Market returns were subtracted from firms' stock returns in the calculation of $R^{m}_{i\tau qt}$ and $\bar{R}^{m}_{qt}$ to control for *ex post* bull and bear markets which could affect cumulative abnormal returns over the period. For each fiscal period in each year a cumulative portfolio abnormal return for day $\tau$ was calculated as

$$r^{c}_{\tau qt} = \sum_{d=1}^{\tau} r_{dqt},$$

and then a mean cumulative portfolio abnormal return over all quarterly fiscal periods for all six years,

$$\bar{r}^{c}_{\tau} = \sum_{q=1}^{3} \sum_{t=1}^{6} r^{c}_{\tau qt}/18.$$

The values of $t(\bar{r}^{c}_{\tau}) = [\bar{r}^{c}_{\tau}/\hat{s}(r^{c}_{\tau qt})]\sqrt{18}$ [where $\hat{s}(r^{c}_{\tau qt})$ is the estimated standard deviation of $r^{c}_{\tau qt}$] are also reported in table 2.

For the groups identified by the sign of unexpected earnings in panel B of table 2, the estimation of 'normal' returns is problematic. Because returns prior to earnings announcement dates tend to reflect ('anticipate') the unexpected earnings as information about them gradually become available, partitions based on unexpected earnings introduce *ex post* selection bias into the estimation of normal returns from historical returns. This is not a problem with the price-based definitions of good and bad news in panel A given returns are independent over time. To mitigate this problem, 'normal' market-adjusted

portfolio returns in panel B were estimated over 100 days prior to the *beginning* of the quarter to which the earnings reports referred. Any remaining effect on the estimation of normal returns will bias the results towards the null hypothesis of no abnormal returns following earnings reports.

These procedures guarantee that the $r^c_{\tau qt}$ are independent, given serial independence of returns, and so the estimated standard deviations of $r^c_{\tau qt}$ are unbiased by construction. The procedures also produce a variable, $r^c_{\tau qt}$, distributed closer to normal than one based on individual security returns which are known to exhibit non-normal properties. The aggregation involved reduces the efficiency of the estimate of the standard error of $\bar{r}^c_\tau$, however. If observations are not uniformly spread over fiscal periods, the aggregated abnormal returns can be affected by a relatively few observations ($N_{qt}$) in a particular fiscal period receiving a relatively high weight in the calculation. Thus the calculated aggregate abnormal returns may reflect information about weights not available at the beginning of the sample period and thus may not reflect returns to an implemetable strategy, as pointed out by Holthausen (1983). Each calculation in the analysis was repeated weighting each observation equally to ascertain the sensitivity of the results to the aggregation method employed. Note finally that the *t*-statistics across rows in table 2 are, of course, not independent.

Of the 1743 reports in the sample, 1212 have been classified as 'on-time', 240 as 'early', and 291 as 'late' in panel A of table 2. The numbers are lower in panel B because sufficient earnings data were not available for the estimation of the earnings predication model for some firms. The mean cumulative estimated abnormal returns for on-time reports in panel A are positive but not large, with a significant value only on the day following the report date. The bad news reports in this group exhibit some negative post-report abnormal return behavior, but the effect is not strong. The earnings-based definition of good and bad news in panel B does a better job of partitioning post-report abnormal returns into positive and negative groups. These results for on-time reports are consistent with those of Foster, Olsen and Shevlin (1984) who find that price reactions to earnings reports are not related to post-report abnormal returns whereas (as observed in many papers) unexpected earnings are. For early reports, in contrast, the price-based positions produce differential mean abnormal returns and the abnormal returns are consistent with the direction of the price reaction at the report date. However, the mean abnormal returns to positions based on unexpected earnings in those early reports are in the opposite direction to those suggested by the sign of the unexpected earnings.

The most striking result in table 2 is that for late reports. For the price-based definition of news, the abnormal returns following late reports are, on average, negative for both good and bad news (although the effect is stronger for the latter). For the earnings-based partitions, the mean abnormal returns following bad news are strongly negative and those following good news are not

significantly different from zero. Thus results in the table indicate that post-report abnormal returns are related not only to the nature of the news but also to the timing of the report relative to its expected date.

As estimation was involved in the specification of the nature of the news in reports, the results could be influenced by the mis-assignment of some firms to good and bad news groups. The relatively high proportion of good news to bad news reports for the earnings-based definition of news suggests this, although this could be due to the fact that the sample period was one when earnings news was good on average. In table 3 the analysis is repeated but using a subset of the data where estimation error is less likely a consideration. Panel A covers only those reports for which the ratio of the absolute value of the two-day report period return to the mean of the absolute values of returns over the 50 previous two-day trading periods was greater than 1.0. Thus reports for which the observed return variability at the report date is assessed to be no higher than usual are excluded. If this ratio is a measure of the amount of information in the report, the analysis excludes those reports which carry 'no news'. Panel B covers only those reports for which the absolute value of standardized unexpected earnings was greater than 0.8, where the standardization is by the standard prediction error of the forecast model estimated over the 20 quarters of earnings data prior to the relevant report.

Even with the refinement, the price-based partition does not discriminate very well amongst post-report abnormal returns for on-time reports, whereas the earnings-based partition does. Again, unexpected earnings do not differentiate (directionally) the abnormal returns following early reports. In comparison, the price-based partition does and abnormal returns following early reports which affected prices significantly in a positive direction (in panel A) are stronger than the corresponding returns in table 2. The results for early bad-news reports in panel A also suggest positive post-report abnormal returns, at least in the first several days. Note, however, that the result partially reflects the observation weighting involved in the calculation of the mean abnormal returns. The arithmetic means of the 41 individual security cumulative abnormal returns were 0.0139 at $\tau = 5$, 0.0014 at $\tau = 10$, $-0.0089$ at $\tau = 20$, and $-0.0311$ at $\tau = 50$. It is worthwhile to note further that post-report abnormal returns for early reports with 'no news' ($|\text{report period return}/\text{mean absolute returns}| \leq 1.0$) were negative for both positive and negative price reactions at the report date. Thus it appears that the price reaction on the report date (both in direction and size) is important in predicting post-report returns for early reports. In particular, reports which arrive early (as a surprise) with significant good news (as indicated by the price response) are followed on average by positive abnormal returns. As observed for all early reports in table 2, the direction of the mean abnormal returns following early reports grouped on the unexpected earnings in panel B of table 3 is opposite to that implied by the sign of the unexpected earnings. This is unexplained. It is not due to

Table 3

Mean cumulative abnormal returns, $\bar{r}_\tau^c$, following early, on-time, and late interim earnings reports associated with above normal return variability (panel A) and standardized unexpected earnings greater than 0.8 (panel B).[a]

| Day $\tau$ relative to report date | Early reports | | | | On-time reports | | | | Late reports | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Good news | | Bad news | | Good news | | Bad news | | Good news | | Bad news | |
| | $\bar{r}_\tau^c$ | $t(\bar{r}_\tau^c)$ | $\bar{r}_\tau^c$ | $t(\bar{r}_\tau^c)$ | $\bar{r}_\tau^c$ | $t(\bar{r}_\tau^c)$ | $\bar{r}_\tau^c$ | $t(\bar{r}_\tau^c)$ | $\bar{r}_\tau^c$ | $t(\bar{r}_\tau^c)$ | $\bar{r}_\tau^c$ | $t(\bar{r}_\tau^c)$ |
| *Panel A: Price-based news partitions, \|Report return\|/mean abs. returns > 1.0* | | | | | | | | | | | | |
| 1 | 0.0114 | 3.30 | 0.0062 | 1.08 | 0.0030 | 2.74 | 0.0005 | 0.24 | −0.0011 | −0.46 | −0.0028 | −0.57 |
| 2 | 0.0059 | 1.12 | 0.0095 | 1.55 | 0.0021 | 1.22 | 0.0015 | 0.57 | −0.0016 | −0.54 | 0.0007 | 0.11 |
| 3 | 0.0050 | 0.83 | 0.0116 | 1.69 | 0.0021 | 1.09 | 0.0021 | 0.76 | −0.0052 | −1.59 | −0.0009 | −0.12 |
| 4 | 0.0049 | 0.77 | 0.0122 | 1.57 | 0.0026 | 1.16 | 0.0028 | 1.00 | −0.0066 | −1.60 | −0.0100 | −0.92 |
| 5 | 0.0068 | 1.05 | 0.0178 | 1.83 | 0.0031 | 1.36 | 0.0014 | 0.46 | −0.0020 | −0.37 | −0.0057 | −0.77 |
| 6 | 0.0091 | 1.60 | 0.0178 | 1.99 | 0.0016 | 0.55 | 0.0020 | 0.57 | 0.0037 | 0.62 | −0.0044 | −0.60 |
| 7 | 0.0090 | 1.54 | 0.0195 | 2.19 | 0.0010 | 0.33 | 0.0017 | 0.50 | 0.0009 | 0.13 | −0.0123 | −1.25 |
| 8 | 0.0069 | 1.00 | 0.0170 | 1.80 | 0.0021 | 0.75 | 0.0025 | 0.64 | −0.0006 | −0.09 | −0.0158 | −1.28 |
| 9 | 0.0103 | 1.41 | 0.0031 | 0.27 | 0.0028 | 1.04 | 0.0034 | 0.86 | −0.0059 | −0.75 | −0.0212 | −1.87 |
| 10 | 0.0178 | 2.48 | 0.0075 | 0.64 | 0.0033 | 1.22 | 0.0004 | 0.09 | −0.0093 | −1.22 | −0.0175 | −1.26 |
| 20 | 0.0234 | 2.09 | 0.0012 | 0.08 | 0.0008 | 0.15 | −0.0088 | −1.35 | −0.0159 | −1.57 | −0.0216 | −1.43 |
| 30 | 0.0142 | 0.89 | 0.0037 | 0.20 | 0.0017 | 0.23 | −0.0101 | −1.33 | −0.0047 | −0.39 | −0.0327 | −1.82 |
| 40 | 0.0148 | 0.84 | −0.0065 | −0.33 | 0.0016 | 0.19 | −0.0144 | −1.52 | −0.0009 | −0.07 | −0.0216 | −0.98 |
| 50 | 0.0303 | 1.39 | −0.0166 | −0.50 | 0.0106 | 1.04 | −0.0080 | −0.73 | −0.0005 | −0.04 | −0.0163 | −0.57 |
| | ($N = 83$) | | ($N = 41$) | | ($N = 324$) | | ($N = 216$) | | ($N = 72$) | | ($N = 64$) | |
| *Panel B: Earnings-based news partitions, \|Standardized unexpected earnings\| > 0.8* | | | | | | | | | | | | |
| 1 | 0.0100 | 2.27 | −0.0016 | −0.34 | 0.0026 | 2.10 | −0.0032 | −1.27 | −0.0001 | −0.05 | −0.0189 | −3.02 |
| 2 | 0.0069 | 1.11 | −0.0065 | −0.98 | 0.0021 | 0.95 | −0.0024 | −0.79 | −0.0038 | −1.10 | −0.0063 | −1.20 |
| 3 | 0.0073 | 0.91 | 0.0018 | 0.25 | 0.0039 | 1.56 | −0.0031 | −0.86 | −0.0042 | −0.92 | −0.0072 | −0.95 |
| 4 | 0.0079 | 0.87 | 0.0032 | 0.38 | 0.0057 | 2.22 | −0.0025 | −0.79 | −0.0047 | −0.79 | −0.0143 | −1.66 |
| 5 | 0.0073 | 0.78 | 0.0147 | 1.45 | 0.0055 | 2.22 | −0.0021 | −0.70 | −0.0067 | −1.19 | −0.0172 | −1.59 |
| 6 | 0.0061 | 0.70 | 0.0192 | 1.67 | 0.0081 | 3.13 | −0.0027 | −1.11 | −0.0006 | −0.14 | −0.0234 | −2.08 |
| 7 | 0.0030 | 0.30 | 0.0239 | 1.81 | 0.0064 | 2.41 | −0.0020 | −0.65 | 0.0020 | 0.42 | −0.0305 | −2.40 |
| 8 | −0.0009 | −0.09 | 0.0264 | 2.40 | 0.0085 | 3.03 | 0.0003 | 0.09 | 0.0070 | 1.31 | −0.0348 | −2.65 |
| 9 | −0.0010 | −0.12 | 0.0276 | 2.36 | 0.0093 | 3.20 | 0.0001 | 0.03 | 0.0089 | 1.70 | −0.0410 | −2.96 |
| 10 | 0.0060 | 0.66 | 0.0229 | 1.75 | 0.0119 | 4.07 | −0.0011 | −0.29 | 0.0008 | 0.13 | −0.0343 | −2.93 |
| 20 | −0.0077 | −0.60 | 0.0226 | 0.91 | 0.0155 | 3.24 | −0.0101 | −1.93 | 0.0131 | 1.31 | −0.0347 | −2.15 |
| 30 | −0.0225 | −1.44 | 0.0538 | 2.07 | 0.0122 | 2.01 | −0.0124 | −1.72 | 0.0069 | 0.39 | −0.0488 | −2.08 |
| 40 | −0.0466 | −2.38 | 0.0519 | 1.46 | 0.0164 | 2.11 | −0.0168 | −1.40 | 0.0071 | 0.36 | −0.0364 | −1.31 |
| 50 | −0.0477 | −1.82 | 0.0747 | 1.65 | 0.0201 | 1.73 | −0.0111 | −0.84 | 0.0184 | 0.62 | −0.0412 | −1.17 |
| | ($N = 63$) | | ($N = 36$) | | ($N = 287$) | | ($N = 222$) | | ($N = 67$) | | ($N = 53$) | |

[a] See notes to table 2.

particular outliers and is robust over alternative estimates of expected returns (including setting them to zero). Interestingly, Kross and Schroeder (1984) indicate that the sign and size of 'unexpected earnings' does not discriminate particularly well among price reactions at announcement dates for early (and late) reports, and this may be so for post-report returns also. Of course, one must entertain the possibility that these results are sample specific.

With respect to the late reports in table 3, the overall result is one of relatively large negative mean abnormal returns. Positive unexpected earnings do appear to separate out firms with positive post-report abnormal returns but negative unexpected earnings are associated with large negative returns compared with those for on-time reports. In sum, the results in table 3 reinforce the result in table 2 that post-report abnormal returns are related to report timing as well as the nature of the news in the report.

The results here are consistent over different fiscal quarters and sub-periods of the sample period. This reduces the possibility that they are determined by outliers. Further, similar results were obtained when all return observations were weighted equally (with the exception noted above). Thus the results do not simply reflect a relatively strong weighting of a few observations in the abnormal return aggregations. Also the results are exaggerated where more extreme cutoffs for the filtering criteria in table 3 were used. All this points to a certain robustness of the results within the sample. Note that the results probably underestimate cumulative post-report abnormal returns because of the imprecision in specifying the expected report date and because many reports are available on the day prior to the *Wall Street Journal* date of the report so that, in these cases, returns for day $\tau = 0$ should be treated as post-report returns.

Similar results to those presented here were observed for annual reports except that positive mean cumulative abnormal returns were observed following late, good-news reports and the negative mean cumulative abnormal returns for late, bad-news reports were not evident until later in the post-report period. The mean cumulative abnormal returns for bad-news reports more than seven days late (corresponding to those in panel A of table 3) were 0.0078 (with the $t$-value of 0.35) on day $\tau = 10$, $-0.0149$ ($-0.30$) on day $\tau = 20$, and $-0.0448$ ($-1.04$) on day $\tau = 50$.

## 4. Returns to trading strategies based on the delay of earnings reports

Anomalies in the pricing of securities can be inferred when positions taken on the basis of 'publicly-available' information systematically return abnormal rewards. The results in tables 2 and 3 suggest that taking long positions in stocks on the day following early reports with significant good news effects on prices yields abnormal returns, as do short positions on the day after late reports. With regard to the latter, there is a piece of information that can be

exploited to enhance the return, however. As indicated in table 1, these late reports are also associated with negative abnormal returns over the report period (days, $\tau = -1$ and $\tau = 0$) on average. Further, unlike early or on-time reports, their lateness is known when they miss their expected reporting dates. Hence a strategy of selling firms short when they miss their expected reporting dates and maintaining this position through their actual reporting dates until some time after may prove to be particularly profitable. This strategy will also pick up any anticipation of forthcoming late, bad news by the market as reports become progressively later. However, it will also pick up the good news effects of the late, good-news reports and the effects of reports that appear just one or two days late (classified as 'on time' in tables 2 and 3) which may or may not carry bad news.

Panel A of table 4 presents the results of such a strategy for the sample firms. It reports mean cumulative estimated abnormal returns from holding late-reporting stocks during different periods after their expected reporting dates, as defined by headings over each set of results. The periods include the actual report date and some period after the report date. The expected reporting date in all cases is the date of the report for the same fiscal period in the previous year. The values of $\bar{r}_\tau^c$ are calculated in the same way as those in tables 2 and 3 except that, as the component firms in the calculations for each $\tau$ can change (as indicated in the table), the 'normal', market-adjusted portfolio return for day $\tau$, $\bar{R}_{qt}^m$, was re-estimated for each $\tau$.

The first set of results in panel A of table 4 (headed 'All late reports') gives mean cumulative estimated abnormal returns from investing in all late-reporting firms in the sample on the (trading) day after their expected reporting dates and holding them until 10 (trading) days after their actual reporting dates. Here $\tau$ represents trading day relative to expected reporting dates. All 582 late-reporting stocks are held in the portfolio for at least 10 days (until $\tau = 10$). However, as the difference between actual reporting date and expected reporting date differs over firms (because some report later than others) and as no stock is held longer than 10 days after its actual reporting date, stocks are dropped from the portfolio on different days after $\tau = 10$. For example, firms reporting on $\tau = 1$ (the day after their expected reporting dates) are dropped from the portfolio on $\tau = 11$ onwards, those reporting on $\tau = 2$ are dropped from the portfolio on $\tau = 12$ onwards, and so on. Stocks remaining in the portfolio on any day $\tau$ are those for which $\tau$ is still within 10 days of the actual report date. Note that firms remaining in the calculations on any $\tau$ are in the original portfolio on $\tau = 1$ and thus the cumulative abnormal returns over $\tau$ are estimates of cumulative abnormal returns to an implementable strategy.

The mean cumulative abnormal returns are negative (except for day $\tau = 1$) and significantly so (for a one-tail test) on day $\tau = 12$. Investing in stocks the day immediately after their expected reporting dates picks up the effects of those reports that are merely a few days late which are less likely to carry bad

## Table 4

Mean cumulative abnormal returns, $\bar{r}_\tau^c$, from investing in late interim reporting firms during periods defined relative to expected reporting dates and actual reporting dates.[a]

*Panel A: Investment periods after expected reporting date which incorporate actual reporting date*

| Day $\tau$ in investment period | All late reports: Period from expected reporting date + 1 to actual reporting date + 10 | | | Reports 4 or more days late: Period from expected reporting date + 4 to actual reporting date + 10 | | | Reports 10 or more days late: Period from expected reporting date + 10 to actual reporting date + 20 | | | Reports of small firms 4 or more days late: Period from expected reporting date + 4 to actual reporting date + 10 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $N$ | $\bar{r}_\tau^c$ | $t(\bar{r}_\tau^c)$ | $N$ | $\bar{r}_\tau^c$ | $t(\bar{r}_\tau^c)$ | $N$ | $\bar{r}_\tau^c$ | $t(\bar{r}_\tau^c)$ | $N$ | $\bar{r}_\tau^c$ | $t(\bar{r}_\tau^c)$ |
| 1 | 582 | 0.0006 | 0.51 | 212 | −0.0031 | −1.25 | 24 | 0.0071 | 1.05 | 122 | −0.0046 | −1.21 |
| 2 | 582 | −0.0009 | −0.54 | 212 | −0.0009 | −0.38 | 24 | 0.0049 | 0.65 | 122 | −0.0002 | −0.06 |
| 3 | 582 | −0.0011 | −0.51 | 212 | −0.0031 | −1.23 | 24 | 0.0038 | 0.51 | 122 | −0.0037 | −0.88 |
| 4 | 582 | −0.0035 | −1.53 | 212 | −0.0030 | −1.14 | 24 | 0.0020 | 0.43 | 122 | −0.0055 | −1.22 |
| 5 | 582 | −0.0030 | −1.13 | 212 | −0.0035 | −1.29 | 24 | −0.0068 | −0.98 | 122 | −0.0062 | −1.20 |
| 6 | 582 | −0.0026 | −1.00 | 212 | −0.0049 | −1.64 | 24 | −0.0023 | −0.22 | 122 | −0.0095 | −1.42 |
| 7 | 582 | −0.0033 | −1.08 | 212 | −0.0048 | −1.52 | 24 | −0.0030 | −0.28 | 122 | −0.0086 | −1.22 |
| 8 | 582 | −0.0029 | −1.00 | 212 | −0.0054 | −1.42 | 24 | −0.0074 | −0.80 | 122 | −0.0099 | −1.47 |
| 9 | 582 | −0.0048 | −1.47 | 212 | −0.0071 | −2.04 | 24 | −0.0137 | −1.24 | 122 | −0.0124 | −2.00 |
| 10 | 582 | −0.0048 | −1.48 | 212 | −0.0053 | −1.37 | 24 | −0.0221 | −2.17 | 122 | −0.0110 | −1.77 |
| 12 | 306 | −0.0070 | −1.89 | 75 | −0.0060 | −1.61 | 24 | −0.0219 | −2.12 | 43 | −0.0126 | −1.95 |
| 15 | 75 | −0.0058 | −1.09 | 35 | −0.0095 | −1.64 | 24 | −0.0357 | −2.04 | 20 | −0.0226 | −1.91 |
| 17 | 45 | −0.0013 | −0.19 | 20 | −0.0124 | −1.35 | 24 | −0.0372 | −2.23 | 9 | −0.0337 | −1.32 |
| 20 | 20 | −0.0116 | −1.14 | 12 | −0.0342 | −1.44 | 24 | −0.0423 | −2.73 | 6 | −0.0680 | −1.52 |
| 25 | 9 | −0.0338 | −1.38 | 4 | −0.0819 | −1.89 | 9 | −0.1015 | −2.82 | 3 | −0.0922 | −1.34 |
| 30 | 3 | −0.1046 | −1.27 | 3 | −0.1532 | −1.77 | 4 | −0.1607 | −1.91 | 3 | −0.1383 | −1.50 |

*Panel B: Investment period from day prior to expected reporting date to two days prior to actual reporting date*

| Day $\tau$ relative to expected reporting date | All late reports | | | Reports 4 or more days late | | | Reports 10 or more days late | | | Reports of small firms 4 or more days late | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $N$ | $\bar{r}_\tau^c$ | $t(\bar{r}_\tau^c)$ | $N$ | $\bar{r}_\tau^c$ | $t(\bar{r}_\tau^c)$ | $N$ | $\bar{r}_\tau^c$ | $t(\bar{r}_\tau^c)$ | $N$ | $\bar{r}_\tau^c$ | $t(\bar{r}_\tau^c)$ |
| −1 | 582 | −0.0002 | −0.23 | 212 | −0.0031 | −1.86 | 24 | −0.0017 | −0.40 | 122 | −0.0028 | −0.97 |
| 0 | 425 | −0.0002 | −0.17 | 212 | −0.0038 | −1.41 | 24 | −0.0046 | −1.26 | 122 | −0.0028 | −0.97 |
| 1 | 306 | −0.0004 | −0.16 | 212 | −0.0031 | −0.76 | 24 | −0.0020 | −0.24 | 122 | 0.0024 | 0.37 |
| 2 | 212 | −0.0017 | −0.56 | 212 | −0.0016 | −0.61 | 24 | 0.0014 | 0.16 | 122 | −0.0001 | −0.02 |
| 3 | 119 | −0.0020 | −0.65 | 119 | −0.0020 | −0.66 | 24 | −0.0013 | −0.11 | 69 | 0.0008 | 0.15 |
| 4 | 75 | −0.0042 | −0.86 | 75 | −0.0041 | −0.84 | 24 | −0.0151 | −1.43 | 43 | −0.0028 | −0.39 |
| 5 | 58 | 0.0055 | 0.73 | 58 | 0.0055 | 0.71 | 24 | −0.0086 | −0.73 | 31 | 0.0129 | 0.96 |
| 6 | 45 | −0.0033 | −0.33 | 45 | −0.0032 | −0.31 | 24 | −0.0184 | −1.37 | 23 | 0.0039 | 0.20 |
| 7 | 35 | −0.0016 | −0.15 | 35 | −0.0016 | −0.14 | 24 | −0.0204 | −1.60 | 20 | 0.0029 | 0.14 |
| 8 | 24 | 0.0064 | 0.52 | 24 | 0.0065 | 0.53 | 24 | −0.0122 | −1.10 | 12 | 0.0182 | 0.59 |
| 9 | 20 | 0.0128 | 0.80 | 20 | 0.0129 | 0.83 | 20 | −0.0085 | −0.51 | 9 | 0.0328 | 0.79 |
| 10 | 19 | 0.0121 | 0.72 | 19 | 0.0122 | 0.77 | 19 | −0.0092 | −0.65 | 8 | 0.0406 | 0.83 |
| 15 | 6 | 0.0216 | 0.57 | 6 | 0.0217 | 0.57 | 6 | −0.0282 | −0.60 | 3 | 0.0456 | 0.42 |

[a] $N$ is the number of securities in the calculation.
Small firms are those with stock market values less than the median stock market value for all firms in the sample at the end of the month prior to the report month.

news. The difference in the number of firms in the calculations for $\tau = 10$ and $\tau = 12$ indicates that, of the 582 firms which missed their expected report dates, 276 reported within two days after the expected date, not significantly late.

The second set of results in panel A gives mean cumulative abnormal returns from taking positions in firms which were at least four days late in reporting. The positions are taken four days after the expected reporting date. The observed mean cumulative abnormal returns are generally larger than the corresponding figures in the first panel indicating that this strategy has filtered out some non-bad-news reports which come out relatively promptly after their expected reporting dates. A similar analysis for 306 firms which reported at least three days late (not reported in the table) resulted in a mean cumulative abnormal return at day $\tau = 10$ of $-0.0102$ (with a $t$-value of $-2.11$).

In both of the first two sets of results in panel A the mean cumulative abnormal returns are relatively large (in a negative direction) for large values of $\tau$, although the number of firms which remain in the portfolio (with relatively late reports) for values of $\tau$ over 20 is small. This suggests a short strategy is particularly profitable for very late reporting firms. The third set of results in panel A of table 4 gives results from investing in firms which are at least ten days late in reporting. Positions are taken on the tenth day after the expected date and held until twenty days after the actual reporting date. While the number of reports covered here is small relative to the total sample, the mean cumulative abnormal returns for these very late reporting firms are considerably larger (in a negative direction). For the 45 firms in the sample reporting at least eight days late, the mean cumulative abnormal return at day $\tau = 20$ (not reported in the table) was $-0.0250$ (with a $t$-value of $-0.99$). For the nine firms reporting at least fifteen days late, the mean cumulative abnormal return at day $\tau = 20$ was $-0.0525$ (with $t$-value of $-1.25$).

The final set of results in panel A of table 4 presents results from a replication of the analysis for reports four or more days late for relatively small firms only. Small firms are defined as those whose stock market values at the end of the month prior to the month of the report were less than the median stock market value for all firms in the sample at that time. If small firms are not as closely followed as large firms, one might expect the timing strategy to be more profitable with these firms. The results indicate this is so. For values of $\tau$ greater than 3, the mean cumulative abnormal returns are approximately twice those in the second panel.

Replication of the analysis for firms missing their expected reporting date by at least one day on small firms produced results differing from those on the left of panel A by a similar order of magnitude: with 314 'small' firms in the portfolio on $\tau = 10$, the mean cumulative abnormal return was $-0.0090$ with a $t$-value of $-1.92$, and with 175 'small' firms in the portfolio on $\tau = 12$, the mean cumulative abnormal return was $-0.0130$, with a $t$-value of $-2.64$. Further, replications with 'large' firms with market values larger than the

median market value produced mean cumulative abnormal returns which were in fact positive (although not significantly different from zero). Thus the result appears to be primarily a small-firm result. Note, however, that, as firms that have been defined here as 'small' are NYSE firms, they are probably larger at the median than relatively small firms on other exchanges.

The results in panel A of table 4, in sum, suggest that taking short positions in stocks when they miss their expected reporting dates is abnormally profitable before transactions costs. The measures of abnormal return are conservative because of the (experimental) uncertainty about the expected reporting date. A longer time series of report dates and an analysis of the reporting behavior of each firm individually probably would increase the precision in classifying reports as late. In this respect, the results for firms reporting more than ten days late are significant for these are firms for which there is a high probability that they were indeed late in reporting, given the average absolute deviation of reporting dates from that in the previous year for all interim reports in the sample was only four days. A survivorship bias in the data probably works against the result because some bad news firms have not survived. The $t$-values reported are probably also conservative because the aggregation involved in grouping firms to deal with cross-sectional dependence in returns reduces the efficiency of the estimate of the standard errors of the mean abnormal returns.[4]

Similar strategies to those in panel A of table 4 were performed with annual reports. However, the results did not produce significant abnormal returns in a consistent direction. The results for the post-report abnormal returns for late annual reports reported at the end of section 3 may explain this.

The periods covered by the implementable investment strategies in panel A of table 4 include a period before the actual reporting date (but after the expected reporting date), the actual report date, and a period after the actual reporting date. Panel B of the table reports four sets of abnormal returns from investing in the late-reporting stocks covered by the corresponding set in panel A from the day prior to their expected reporting dates to two days prior to their actual reporting dates. This period excludes the actual reporting date (and days after) but includes the expected reporting date (day $\tau = 0$). This strategy is not, of course, implementable because one does not know which firms will miss their expected reporting dates when the hypothetical position is taken. However, it captures the degree to which prices anticipate pending bad news over the period during which reports are delayed. Given market efficiency, one

[4] On this point see Brown and Warner (1984, sec. 6.2). The grouping procedure, designed to produce cross-sectionally independent cumulative abnormal returns, can induce such correlation if the period over which expected ('normal') returns for one quarter are estimated coincides with the period over which abnormal returns are observed for the previous quarter. As a check, tests were repeated using reports for non-adjacent fiscal periods with similar results.

would expect failure to report by the expected reporting date to be a signal of forthcoming bad news which would be reflected in prices.

With the exception of the results for 'small' firms which may not be as closely followed in the market, the values in panel B do suggest some anticipation of the bad news. However, the results are not very strong. For example, for reports four or more days late, the results suggest some effect on day $\tau = -1$ (which may be the expected date given the *Wall Street Journal* usually publishes earning reports the day after their release) but not after. Not surprisingly, the results are stronger for reports ten or more days late. However, a comparison of these results with those in panel A points to the conclusion that the market is inefficient in anticipating the predictable bad news, most of which is reflected in prices on or after the report date.

As always, the results are conditional upon the specification of normal returns. Using observed mean returns in a previous period avoids problems of specification and measurement of factors relevant to the description of securities' expected returns. The assumptions are that these factors are reflected in the estimated mean return and mean returns are stationary (on average over all firms in the relevant aggregation) over the period that abnormal returns are observed.[5] The observed negative abnormal returns could be due to the fact that, for the specific late-reporting stocks in the sample, returns were unusually high during the period over which normal returns were estimated. The mean returns of late-reporting firms over the estimation period were compared with those of early and on-time reporters and in fact were below those of these groups.

The inferences from the tables are made on the basis of observed $t$-values. To avoid the distributional assumptions necessary for such inferences, we conducted the following analysis.[6] For firms which had not reported interim results within three days after their expected reporting dates, we calculated a return for the ten-trading-day (two-week) period beginning the fourth day after the expected date. For firms which published their reports more than three days early we also calculated a ten-day return beginning the day after their actual reporting dates. These returns are returns to investing in the stocks after their expected reporting dates and before their actual reporting dates if they were more than three days late in reporting, and returns to investing in stocks after their actual reporting dates if their reports were more than three days

[5] On these points, see Cornell (1979) and Brown and Warner (1984). 'Normal' returns were estimated over varying time periods prior to the observation period with little difference in results. Appropriate to the Capital Asset Pricing Model, mean (OLS) estimated systematic risks for each group analyzed in the paper were estimated over a period prior to the observation period. They were found to be close to unity, with the exception of that for the group of firms reporting ten or more days late in table 4 whose mean estimated systematic risk was 0.78. The abnormal returns for this group cannot be explained by risk adjustment, however, if estimated 'normal' returns reflect this level of risk.

[6] This test was suggested by Jim Ohlson.

Table 5

Joint frequencies of timing and price signals and ten-day investment return outcomes (relative frequencies of signals given return outcomes are given in parentheses).

| Signals | Standardized return intervals | | | | | | Totals |
|---|---|---|---|---|---|---|---|
| | $< -2.0$ | $\geq -2.0$ $< -1.0$ | $\geq -1.0$ $< 0.0$ | $\geq 0.0$ $\leq 1.0$ | $> 1.0$ $\leq 2.0$ | $> 2.0$ | |
| Report is late | 3 (0.60) | 36 (0.67) | 83 (0.46) | 64 (0.46) | 21 (0.41) | 5 (0.63) | 212 (0.49) |
| Report is early with good news | 0 (0.00) | 3 (0.06) | 20 (0.11) | 29 (0.21) | 16 (0.31) | 1 (0.13) | 69 (0.16) |
| Report is early with bad news | 0 (0.00) | 5 (0.09) | 17 (0.09) | 15 (0.11) | 6 (0.12) | 1 (0.13) | 44 (0.10) |
| Report is early with no news | 2 (0.40) | 10 (0.19) | 59 (0.33) | 31 (0.22) | 8 (0.16) | 1 (0.13) | 111 (0.25) |
| Totals | 5 (1.00) | 54 (1.00) | 179 (1.00) | 139 (1.00) | 51 (1.00) | 8 (1.00) | 436 (1.00) |

early, respectively. These ten-day returns were standardized by their estimated standard deviations, estimated from returns during a period prior to the return period. We then partitioned these standardized returns for firms into five groups as described across the columns of table 5. The test assesses whether these outcomes (states) are independent of signals available prior to the ten-day return periods. For the analysis we expanded the signal space from the early/late dichotomy by distinguishing between early reports that carried significant good news, those carrying significant bad news, and those conveying no news. Again, significant news, no news, good and bad news are assessed by reference to the stock price behavior over the two-day report period, as before. The complete signal space is described by the row captions in table 5.

Market efficiency implies that differential returns cannot be predicted on the basis of these (widely-disseminated) signals. In this experiment it implies (statistical) independence between signals and outcomes. In the cells of table 5 the joint frequencies of the respective signals and states are given. A comparison of these frequencies with those implied by the marginal frequencies conditional upon independence reveals a lack of independence. The relevant chi-square statistic (with nine degrees of freedom) has a value of 27.08, significant at the 0.002 level.[7] Under the frequencies in each cell we also report the estimated conditional probabilities of the relevant signals given the states, estimated from the relative frequencies. A comparison of these conditional probabilities with the estimated marginal signal probabilities (given in

[7]For the calculation of this statistic, observations with standardized returns less than $-1.0$ were grouped together as were those with standardized returns greater than 1.0, to give four return groups. This avoids problems with small expected frequencies in cells. If the frequencies in the extreme return groups are representative of those in the population, the calculated chi-square statistic is conservative.

parentheses under the row totals) reveals that the probability of getting a 'late report' signal when firms returns are going to be negative is relatively high while the probability of getting an 'early, good news' signal under these conditions is relatively low. The probability of getting an 'early, good news' signal is relatively high when returns after the report are going to be postive and significantly large.[8]

These results are not independent of those earlier, of course. However they strengthen those results because they provide for statistical inference under less stringent assumptions. Further, it is assuring to observe the same result under procedures which, because of the partitioning involved, use less information.

## 5. Conclusions

The tests in this paper indicate that 'abnormal returns' (before transactions costs) could have been earned from investing in the stocks of the sample firms on the basis of information about the timing of their earnings reports. Profitable positions could have been taken in both short and long short directions. Short positions taken after firms missed their expected quarterly reporting dates and held until after their actual reporting dates were abnormally profitable due to (on average) negative abnormal returns when reports came out late and in periods following the report date. Long positions taken in firms the day after they reported early with news that affects prices positively were also abnormally profitable due to a persistent upward revaluation (on average) of the stocks of these firms after their report dates. The abnormal returns to the long position are consistent with accumulated evidence that stock prices are relatively slow in adjusting to information in earnings reports. The abnormal returns to the short position indicate further that stock prices do not fully reflect information about pending bad news when firms are late with their earnings reports.

The latter result is significant for another reason. Not only is it evidence of a tendency for firms to delay reporting bad earnings news but also it provides an explanation for that delay: if the market does not fully reflect pending bad news when it is delayed, there may be an incentive for managers to delay disclosure of that news and thus delay the effect of the news on stock prices.

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[8] One disturbing aspect of the 'late report' strategy is the number of cases where the ten-day return is greater than +2.0 standard deviations. While only 90 positive returns are observed for late reports compared with 122 negatives, five of the positives are greater than +2.0 while only three of the negatives are less than −2.0.

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