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# Insider Trading and the Use of Private Information

*A. Rashad Abdel-khalik*
*Bipin B. Ajinkya*
*E. Daniel Smith*

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June 1984

# Insider Trading and the Use of Private Information

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# Insider Trading and the Use of Private Information

Abstract:

Recent research in accounting has been concerned with the managerial motivation for discretionary disclosure of private information. This paper has examined one possible incentive: profiting from insider trading. The disclosure of earnings forecasts by corporate officials was the private information studied. Several trading strategies were formulated by the use of (i) intensity of insiders' trading activities as to whether sales or purchase was the dominant trade; (2) the quality of information content of the managers' earnings predictions by comparison with the prevailing forecasts that were forumulated by financial analysts,; (3) the timing of the trade vis.a.vis managers disclosure of earnings predictions; and (4) the legality (or apparent legality) of the insider trading.

The results of the analysis for 134 companies and about 3000 trades indicate the following: (a) the signals provided by managers' earnings forecasts were superior to those provided by insider trading in terms of accumulating significant abnormal returns; (b) insiders' buying activities in conjuction with favorable earnings forecasts provided the most profitable trading strategy irrespective of whether insiders' purchasing preceded or followed the discretionary disclosure of forecasts by corporate officieals; and (c) no consistent evidence was obtained concerning the profitability of illegal trades by insiders.

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# INSIDER TRADING AND THE USE OF PRIVATE INFORMATION

The asymmetry of information between insiders and others trading in the company's shares provides the impetus for the recent research on insider trading. Managers know more than outsiders about the impact of their investment, operating and financing decisions. As rational decision makers who seek to maximize their own wealth, managers are expected to seek to profit from trading in the shares of the companies they manage. That is, they are expected to earn returns to superior information [Hakansson, 1977 and 1981].

Both Jaffe [1974] and Finnerty [1976] provided evidence suggesting the possibility of earning abnormal returns (for an extended period) using insiders' trading activity. Based on the significance of Jensen's alpha, Finnerty asserted that the evidence bears out "the fact that insiders, because probably of their access to priviliged information, can outperform the market in their stock selections" [1976, p. 1146, emphasis added]. Finnerty, however, did not investigate insiders' trading activity with respect to any particular piece of information which would be considered "privileged" for managers. Penman [1982] took that step. He examined the significance of insider trading as a determinant of excess returns during the days surrounding the announcement of earnings forecasts. Although earnings forecast information was not used directly as an independent variable, Penman used the day of the disclosure of earning forecasts (by management) as the critical event date. He reported that insiders' trading is a statistically significant explanatory variable of the abnormal returns observed in the three days surrounding the day on which earnings forecasts were announced. Monthly trades by corporate officials were used to derive an index of trades that became the independent variable in a regression equation explaining daily abnormal returns. The index of monthly trades was defined as the net of purchases before and after the forecast date. Allen (1982) evaluated the profitability of insider trading around the actual earnings (not forecast by management) announcement date, using mechanical models to generate the expectation apparently held by insiders. The results were conflicting, making Allen conclude that the relationship is "more complex than is posited by the profit trading conjecture."

Although somewhat similar in objective, the work reported in this study was carried out independently and serves as a logical extension of both the Penman and Allen studies[1]. The objective of this study is to evaluate managers' knowledge and use of private information as an incentive for voluntary public dissemination of certain accounting information. The question is whether corporate executives time their voluntary disclosure of earnings forecasts in order to facilitate and maximize the profit from trading in the shares of their own companies[2]. Thus, this paper evaluates the performance of several trading strategies that utilize insiders' knowledge of the predicted earnings per share (EPS) prior to their making it public. In a sense, this paper also examines the information content of the combined signals provided by insiders' trading (purchase or sale) and the insiders' (managers') public disclosure of predicted EPS. The approach employs different trading combinations in which one of the two information signals (disclosure of predicted EPS and insiders' trading) was conditioned on the other.

The information signals provided by corporate officials were measured by the signed deviations of the predicted EPS numbers (disclosed by corporate officials) from the EPS forecasts provided by financial analysts prior to the disclosures by insiders. Beshara [1980] used this measure in evaluating the information content or "newness" of managements' predictions of earnings. Ajinkya and Gift [1984] and Fried and Givoly [1982] have also used analysts' forecasts as the preferred surrogate of market expectations held by the public at large. The management forecast signal or "newness" measure was classified into favorable and unfavorable, depending on whether managers' prediction of EPS exceeds analysts' forecasts or vice versa.

Standardized prediction errors using the market model were used to evaluate the performance of the several trading strategies examined. Our results indicate that abnormal returns are associated with insiders' trading activities that are dominated by insiders' purchases and which are followed or preceded by a favorable forecast signal. This includes insiders' activities that could be illegal; namely, purchasing prior to the disclosure of a favorable forecast. This result is a further refinement of the results reported by Allen [1982] and Penman [1982].

## THE RESEARCH PROBLEM

The disclosure of a subset of corporate financial information is governed by the requirements promulgated by the Financial Accounting Standards Board and sanctioned by the Securities and Exchange Commission (SEC). Public disclosure of any other type of financial information is made at the discretion of management. The discretionary nature of this information disclosure prompts interest in investigating the incentives and the motivation of managers to voluntarily make certain disclosures. Of particular significance is the managers' choice to publicly disclose the numbers they predict for the income of the companies they manage.

The SEC embarked in 1973 on a campaign to seek acceptance for a rule mandating corporate officials to disclose their EPS predictions. Several proposals [SEC 1973, 1975, 1978, 1979] were made but all have been strongly opposed by corporate management. In a recent survey for the Conference Board, Lees [1981] reported that "fear of legal action by disgruntled investors if company earnings forecasts prove to be incorrect is, of course, one of the most basic reasons why managements are reluctant to disclose projections. ...(Most survey respondents) prefer to avoid exposure to potential risks simply by refraining from disclosing their internal forecasts" [1981, p. 21]. This reluctance, or perhaps resistance, of corporate executives to endorse proposals that either require or encourage them to disclose their earning predictions cannot be easily reconciled with the fact that some executives indeed voluntarily disclose their earnings predictions. Clearly, under voluntary disclosure, the threat of being held liable to a third party is diminished by not filing forecasts in an official document, but is not completely eliminated. Thus, it is important to investigate the motivation for the decisions of corporate officials to voluntarily disclose their earnings predictions.

Incentives for voluntary disclosure of earnings forecasts are not obvious because corporate officials make direct public disclosures of their earnings predictions only very infrequently. According to Penman, the 737 forecasts in his test sample "comprised 350 firms making only one forecast in the six year period, 107 firms making two forecasts, 34 making three, 15 making four, one making five, and one making six" [1980, p. 137]. Other studies provided similar evidence (e.g., Patell [1976], and Beshara [1980]). Such paucity of disclosure might be explained as a market for lemons [Akerlof, 1970] in which only the producers of superior quality commodities engage in overt signaling (Spence [1973]), except that two additional considerations do not permit this explanation to stand. First, there is no evidence to suggest that the quality of managements' forecasts that were not publicly disclosed is necessarily poor (Daily [1971]). Secondly, corporate officials of the majority of public companies do not disclose their earnings predictions. As indicated [Penman, 1980, p. 137], only 512 companies were found to have publicly disclosed (in a direct fashion) their earnings predictions over a period of six years, an average of less than 100 companies a year. Even though the Wall Street Journal is not a comprehensive source of disclosure, the majority of companies clearly do not voluntarily disclose their earnings forecasts. Accordingly, it is not possible to assert that the lack of disclosure is a signal of an inferior quality of earnings. An alternative conjecture explaining the observed infrequency of earnings forecasts by managers is provided by Ajinkya and Gift [1984], who find evidence that both favorable and unfavorable earnings information is voluntarily revealed when the prevailing (market) earnings expectations are judged by company managers to be "unrealistic" and in need of correction. Further, the market (stock prices) reacts "as if" the voluntary revelation was unbiased.

In conducting a test of the signalling hypothesis at the security price level, Penman [1980] investigated the association between managements' forecasts and standardized excess daily returns for a large sample of forecasts. He concluded that

> forecasting firms do, on average, enjoy "good times" during the three months (approximately) on either side of the forecast data, and not only on the day of the forecast announcement. This concurs with the disclosure result from the T test; voluntary forecast disclosure is associated with firms which, on average, exhibit returns which are higher than those for the market as a whole, other things being held equal [1980, p. 155].

Thus, Penman's findings appear to indicate that the mere "act of disclosure" of earnings predictions by corporate officials signals the quality of the firm and increases its value. However, such a conclusion was not fully substantiated when Penman resorted to additional analysis using a split design, a portfolio consisting of firms with positive earnings forecast signals and another with negative earnings forecast signals. Prediction errors were derived from management forecasts compared against earnings forecasts generated from a mechanical (a martingale with drift) model. Penman's findings for the portfolios based on strict positive and negative forecasts errors are consistent with those reported by others (Jaggi [1978], Beshara [1980], and Ajinkya and Gift [1984]). In particular, negative prediction errors are associated with negative abnormal returns and vice versa. Hence, the hypothesis that managers voluntarily disclose their earnings predictions in order to increase the value of their shares through the mere "act of disclosure" (which itself serves as a favorable signal) is not supported; some of the predictions disclosed by corporated officials are associated with negative price changes.

The hypothesis examined in this paper tests whether insiders capitalize on (1) their informational advantage, (2) the discretion over whether or not to disclose their earning predictions, and (3) the discretion over the timing of disclosure to profit from trading on their own account. While implementing trading strategies that maximize their own trading profits (using the private knowledge of forecasted earnings) might be illegal, trading on the companies' shares by insiders after the public disclosure of information is often assumed to be legal. Under rule 10b-5 of the 1934 Securities Exchange Act, certain trading activities that executives undertake are illegal if they are based on information that is private to insiders. The objective of this paper, therefore, is to examine the extent to which insiders systematically utilize the private information about earnings predictions and the discretionary power to time their disclosure (if they elect to disclose) to earn abnormal returns. Thus, the two broad hypotheses being examined (in their null form) are:

BH.1: Managers do not earn abnormal returns on what might be illegal speculative trading strategies.

BH.2: Managers do not earn abnormal returns on legal speculative trading strategies.

## TRADING STRATEGIES

To form meaningful trading strategies that would be dependent on the information contained in managers' disclosure of EPS, it is necessary to develop a measure of the information content of the signal. The evidence presented in the literature does not lend strong support for the use of the mechanical models in deriving market expectations. Hence, financial analysts' forecasts are used in this paper as a superior surrogate of market expectations. The unexpected portion (and hence the information) of corporate earnings forecasts is measured by:

$$d_j = M_{jt,y} - A_{jt-\Delta t,y} \qquad \text{and, } d_j = \begin{cases} F \text{ for } d_j > 0 \\ \\ U \text{ for } d_j < 0 \end{cases}$$

| | | |
|---|---|---|
| where: | $M_{jt,y}$ | is the *management's* prediction of the yth year earnings per share of the jth firm announced at time t. |
| | $A_{jt-\Delta t,y}$ | is the *financial analyst's* forecast of the yth year earnings per share of the jth firm announced at time $t - \Delta t$ (the last financial analyst forecast available prior to t). |
| | $\Delta t$ | is the interval of time between the two forecasts when financial analysts are not known to have announced any revisions of their earnings' forecasts for the jth firm; this time interval varies from one firm to another and is approximately 1-3 weeks in length. |
| | F | is an indication of a favorable, or better than expected earnings forecast. |
| | U | is an indication of an unfavorable, or worse than expected, earnings forecast. |

The signal F or U is privately known to corporate officials prior to their decision to publicly disclose it. Trading by insiders (T) before the disclosure (denoted t = b) might be based on that private information. Since insiders may purchase (P) or sell (S) the shares of their own companies, then, legality aside, a profitable trading strategy for insiders to follow is to purchase shares before disclosing favorable news and to sell before disclosing unfavorable news. Similarly, insiders' trading (T) after the disclosure of the managements' earnings predictions (t = a) can consist of purchasing and selling shares of their own company. Trading after the disclosure of earnings predictions (at t = a) is more likely to be legal than illegal, although that would depend further on managers' intent and knowledge of specific information. During that period, profitable trading strategies could consist of: selling after disclosure of a favorable forecast and purchasing after disclosure of an unfavorable forecast. The four trading strategies that are expected to generate abnormal returns to insiders are summarized in Exhibit 1.

Exhibit 1

Profitable Trading Strategies

| | Trading Period | |
|---|---|---|
| Forecast (d) Signal | Before (b) | After (a) |
| Favorable (F) | P | S |
| Unfavorable (U) | S | P |

That is:

(1) Purchase before and/or sell after the disclosure of the favorable (d = F) signal.

(2) Sell before and/or purchase after the unfavorable (d = U) signal.

Both trading strategies are predicated on the viability of several assumptions. First, insiders have monopolistic knowledge of the nature of the information signal as to favorable or unfavorable. Second, managers have complete discretion and control over the timing of the disclosure of their EPS predictions. Third, insiders believe that the information signal will be impounded by the market in a manner consistent with the signal; i.e., price will increase (decrease) after the disclosure of a favorable (unfavorable) signal. Finally, managers are assumed to believe that the legality of their insider trading will not be questioned.

The first two assumptions are satisfied by the nature of private information so long as the corporate disclosure of EPS forecasts remains discretionary. As indicated earlier, recent efforts by the SEC to regulate management forecasts have failed. The third assumption has strong empirical support. The work of Patell [1976], Jaggi [1978], Penman [1980], Beshara [1980], Ajinkya and Gift [1984] and others has consistently reported the existence of a significant association between managements earnings forecasts and security prices. Similar results were reported by Abdel-khalik and Ajinkya [1982] for earnings forecasts that were private information to security analysts. These results are further validated in this paper.

The fourth assumption--legitimacy of insider trading--is more difficult to establish. Under the 1934 Act, trading on insider information is illegal and, depending on the type of offense, is punishable by fines or imprisonment.[3] Thus, it is important to explain certain research findings indicating that insider trading generates abnormal returns for eight [Jaffe, 1974], or eleven [Finnerty, 1976], months after insider transactions. Not only is such a long period of information assimilation inconsistent with the semi-strong form of market efficiency,[4] but it is also inconsistent with other evidence. On the one hand, the results of Lorie and Neiderhoffer failed to "uncover systematic exploitation of confidential information by insiders" [1968, p. 46]. On the other, Keown and Pinkerton [1981] report significant insider trading activity immediately prior to merger announcements. These conflicting results do not lend strong support for the illegality versus legality dimension of insider trading.

In general, U.S. law prohibits trading by insiders on the basis of private information about which they possess an informational advantage. Hence, insider trading based on private knowledge of forecasted EPS prior to making a public disclosure is very likely to be illegal. On the other hand, trading by corporate officials subsequent to disclosure is more likely to be legal unless the trade is a sale (that followed within a 6-month period from a purchase).

## METHOD

### Data

Management forecasts of annual earnings per share were gathered primarily from the Wall Street Journal Index (and some from Standard and Poors' Earnings Forecaster) for the 5-year period from 1973 through 1977. Financial analysts' forecasts were taken from Standard and Poors' Earnings Forecaster for the same 5-year period. Insider trading information was collected from the SEC's Official Summary of Insider Trading for the 7-year period 1972 through 1978. Additional screens that were applied to the data are the following:[5]

(i) Firms were restricted to NYSE listings with December 31 fiscal years.

(ii) The management forecast of earnings per share (EPS) was a point estimate or a bounded range estimate (for which the mean was used as the point estimate).

(iii) Monthly stock returns were available on the CRSP tapes for the four years preceding the year of the management forecast, the forecast year, and the year following the forecast.

(iv) At least one analyst's forecast of EPS was available in the Earnings Forecaster such that the date of the forecast (and not the issue date of the publication) was within two to three weeks prior to the date of the related management forecast. If more than one analyst forecast was available during the specified period, then the one closest to the date of the management forecast was used.

(v) Insider trading during the month of December was excluded in order to avoid confounding the motivation of the end-of-year liquidation with the one stipulated in this paper. For similar reasons, the exercising of options by insiders was excluded from the data collected on purchasing.

### Independent Variables

The availability of management earnings predictions was the most restrictive condition. About 150 firms (with 190 forecasts) satisfied all data requirements during the 1973-77 period. Additional experimental design considerations (see below) reduced this set of firms/forecasts even further. Next, the sample of management forecasts (firm/year) was classified as to whether the related net insider trading activity was primarily "sale" or "purchase," and whether such net activity occurred before or after the disclosure of the EPS forecast by corporate officials.

The consideration of insider trading extended from the six months prior, to the six months following, the related management predictions. The classification of the dominant trading activity (i.e., S = sale or P = purchase) was made on the basis of the ratio of number of shares sold to the number of total shares traded by insiders. This ratio was calculated separately for the period preceding and the period following the related management forecast. The rule of thumb applied to classify net trading activity as either S or P was the following:

- If the trading ratio was > 2/3, then insider activity = S
- If the trading ratio was < 1/3, then insider activity = P
- if the trading ratio fell between 1/3 and 2/3, then insider activity = "unclear" and the observation was dropped from the sample.

Using a classification based on the nature of the dominant insider trading activity and its timing with respect to the forecast, the sample was divided into four categories: purchase-before ($P_b$), sale-before ($S_b$), purchase-after ($P_a$), and sale-after ($S_a$).

As indicated earlier, the surprise value of predictions of earnings by corporate officials was measured in relation to earnings forecasts made by financial analysts prior to the release of management predictions. Thus, financial analyst forecasts were used as a surrogate for the prevailing earnings expectations. The forecast variable was measured (terms previously defined) as follows:

$$d_j = M_{jt} - A_{jt-\Delta t} = \begin{cases} \text{Favorable insider information for } d_j > 0 \\ \text{Unfavorable insider information for } d_j < 0 \end{cases}$$

The classification of the sample on the basis of the above independent variables is depicted in Table 1. The total number of classified forecasts is 134 (for 101 firms). The forecasts with $d_j = 0$ were excluded from the analysis. Table 2 indicates the number of insider transactions and the number of shares traded by insiders for the various cells.

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Insert Tables 1 and 2 here

---

## Table 1

### Classification of the Sample into Portfolios Based on Dominant Insider Trading Activity

| d = Tenor of Insider Information (Forecast) | Net Classification of Insider Trading | t = Time Period in Relation to Forecast Disclosure Month | |
|---|---|---|---|
| | | b | a |
| F | P | 30 | 20 |
| | S | 12 | 12 |
| U | P | 17 | 17 |
| | S | 15 | 11 |
| | Total | 74 + | 60 = 134 |

where:

P = primarily purchase; S = primarily sale
b = before disclosure; a = after disclosure
F = favorable; U = unfavorable

Table 2

Number of Insider Transactions and Shares Traded
in Thousands in Each Portfolio

(1) Number of transactions (or trades):

|  | F |  | U |  |
|---|---|---|---|---|
|  | b | a | b | a |
| Dominant insider activity |  |  |  |  |
| P | 440 | 352 | 320 | 275 |
| S | 228 | 277 | 384 | 270 |

(2) Number of shares traded in thousands:

|  |  |  |  |  |
|---|---|---|---|---|
| P | 1,478 | 1,002 | 617 | 524 |
| S | 410 | 614 | 608 | 500 |

Legend: As in Table 1.

Dependent Variable

Abnormal market reaction associated with the dual signals of insider trading and management forecasts was computed for the 13-month period surrounding the month of the forecast. Different 8-month subperiods (within the overall 13 months) were used as test periods for the various hypotheses that are discussed below. For each forecast (firm/year) in the sample the market model was estimated over a 48 month regression period just preceding the related test period:

$$\tilde{r}_{pt} = \alpha_p + \beta_p \tilde{r}_{mt} + \tilde{u}_{pt}$$

where

$\tilde{r}_{pt}$ = rate of return on stock p for month t,

$\tilde{r}_{mt}$ = rate of return on the market portfolio for month t computed from an equally weighted index,

$\alpha_p$ = intercept,

$\beta_p$ = systematic risk of stock p,

$\tilde{u}_{pt}$ = error term of stock p during month t, with the usual assumptions of Ordinary Least Squares regression, and

t = a month during the estimation period (t=1, ..., T).

Using the parameters estimated during the preceding 48 months (T = 48), monthly abnormal returns or prediction errors were generated for each test period as:

$$u_{pk} = r_{pk} - (\alpha_p + \beta_p \cdot r_{mk}) \tag{2}$$

where k = month in the test period. The raw or unstandardized cross-sectional average abnormal returns for month k ($AR_k$) and the related cumulative unstandardized abnormal returns up to month q in the test period ($CAR_q$) are calculated as:

$$AR_k = \frac{1}{N} \sum_{p=1}^{N} u_{pk} \quad (3)$$

and

$$CAR_q = \frac{1}{q} \sum_{k=1}^{q} AR_k \quad (4)$$

where N is the number of firms in the particular portfolio.

Following Patell [1976] and Hong, Kaplan and Mandelker [1978], the abnormal returns are scaled by the regression standard error ( $\sqrt{C_{pk}S_p^2}$) to yield standardized abnormal returns $V_{pk}$ as follows:

$$V_{pk} = u_{pk} / \sqrt{C_{pk}S_p^2}$$

where $$C_{pk} = 1 + \frac{1}{T} + \left[ (r_{mk} - \bar{r}_m)^2 / \sum_{t=1}^{T} (r_{mt} - \bar{r}_m)^2 \right]$$

and $$S_p^2 = \sum_{t=1}^{T} u_{pt}^2 / (T - 2)$$

where $\bar{r}_m$ = average market return over the 48 month estimation period.

The cross-sectional standardized average abnormal returns ($SAR_k$) for month k over all firms (N) in a particular portfolio is given by

$$SAR_k = V_k = \frac{1}{N} \sum_{p=1}^{N} V_{pk} \quad (6)$$

The $V_{pk}$ measure can be normalized to yield the standard-normal Z distribution as:

$$Z_{Vk} = \sum_{p=1}^{N} V_{pk}/X_t \quad (7)$$

where the variance $X_t^2$ is a function of T and is given by:

$$X_t^2 = \sum_{p=1}^{N} [(T - 2) / (T - 4)] \qquad (8)$$

Similarly, standardized cumulative abnormal returns for the pth stock (up to month $q$ in the test period) are developed as the statistic $W_{pq}$ such that:

$$W_{pq} = \sum_{k=1}^{q} u_{pk}/(qC_{pk}S_p^2)^{\frac{1}{2}} \qquad (9)$$

and the related cross-sectional average ($SCAR_q$) becomes:

$$SCAR_q = W_q = \frac{1}{N} \sum_{p=1}^{N} W_{pq} \qquad (10)$$

Again, a z-test can be constructed as:

$$Z_{W_q} = \sum_{p=1}^{N} W_{pq}/X_t \qquad (11)$$

where $X_t$ is the same as above (the square root of Equation 8).

The experimental design used the 8 portfolios (shown in Table 1) formed by the $2^3$ combinations of the three independent variables. For each of these 8 portfolios, the monthly average standardized returns ($AR_k$), the cumulative average standardized returns ($SCAR_q$), and the related test statistics (($Z_V$ and $Z_W$) were calculated for various test periods.

The test periods were designed to evaluate the impact of insider trading activity conditional on the forecast information signal (F or U) and vice versa. The period(s) chosen had to cover the impact of both the insider trading and the management forecast. From the results of several past studies, it can be assumed that the market reaction to forecast information is unlikely to persist beyond a month following the forecast month. The insider trading period was limited to six months before or after the month of forecast. Here, the periods chosen for examination were months -6 to +1 and months -1 to +6, assuming that month 0 was the forecast month. In adopting the test periods, two additional considerations were that:

(i) the period should be more than 6 months long, which is the legally limiting period after which the profits earned from insider trading need not be turned back to the firm, and
(ii) all periods used in calculating returns should be of the same length, in order to avoid biases resulting from differences in investment horizons.

## Operational Hypothesis

This section derives operational hypotheses related to the primary focus of this study, that is, evaluating the outcome of various insider trading strategies. At a later stage (in the Results section), a subsidary hypothesis that essentially verifies the information content of the forecast signal (per se) is presented.

### (1). Insider Trading and Favorable Forecasts:

As stated earlier, it would be illegal for managers to use their private knowledge as insiders to trade in the shares of their own companies. One profitable strategy would be to purchase one's own company's shares before the disclosure of a favorable EPS predicion. A similar alternative strategy would involve a sale of shares ( held by insiders since the beginning of the test period) just after the disclosure of favorable information. These trading combinations were evaluated under two conditions depending on whether the signals conveyed to the market by the dominant trading activity of insiders were consistent (C) or inconsistent (I) with the information content of managers' EPS predictions. This additional partitioning was done to admit the possibility that "outside" market participants may evaluate and react differently depending on whether the two information signals (the trade and the forecast) emanating from the firm were either internally consistent or inconsistent. The related four combinations are:

Consistent signals:
Case 1: Purchase before a favorable forecast (possibly illegal)
Case 2: Purchase after a favorable forecast (legal)

Inconsistent Signals:
Case 3: Sale after a favorable forecast (possibly illegal)
Case 4: Sale before a favorable forecast (legal)

The profitability of the various insider trading combinations associated with the favorable forecast signal is examined in the hypotheses below. Two test periods are used to test all hypotheses. Both periods encompass the effect of the forecast. But one period encompasses the trading while the other does not. Thus, the period -1 to +6 months relative to the forecast month (month 0) contains the forecast as well as the trading activity after (i.e., $P_a$ or $S_a$) the forecast, but not the trading activity in the six months prior to the forecast. Similarly, the period -6 to +1 months contains the forecast and only the trading activity before the forecast (i.e., $P_b$ or $S_b$). As a result, the observed market returns during a particular period will depend upon whether the period effectively contains only one signal (the forecast), two consistent signals, or two inconsistent signals.

For the favorable (F) forecast signal, the above discussion leads to the following operational hypotheses for the two test periods (in their expectational form):

$H_{11}$: SCAR $(P_b|F) > 0$ for [-1/+6] (One signal only)

SCAR $(P_b|F) > 0$ for [-6/+1] (Two consistent signals)

$H_{12}$: SCAR $(S_a|F) = 0$ for [-1/+6] (Two inconsisternt signals)

SCAR $(S_a|F) > 0$ for [-6/+1] (One signal only)

$H_{21}$: SCAR $(P_a|F) > 0$ for [-1/+6] (Two consistent signals)

SCAR $(P_a|F) > 0$ for [-6/+1] (One signal only)

$H_{22}$: SCAR $(S_b|F) > 0$ for [-1/+6] (One signal only)

SCAR $(S_b|F) = 0$ for [-6/+1] (Two inconsistent signals)

Note that SCAR stands for standardized cumulative average abnormal returns and $P_b$, $P_a$, $S_a$ and $S_b$ signify purchase-before, purchase-after, sale-after and sale-before, respectively.

(2) Insider Trading and Unfavorable Forecasts:

The unfavorable EPS forecast signal and the type of insider trading activity involve four combinations as follows:

Consistent Signals:
Case 5: Sale before an unfavorable forecast (possibly illegal)
Case 6: Sale after an unfavorable forecast (legal)

Inconsistent Signals:
Case 7: Purchase after an unfavorable forecast (possibly illegal)
Case 8: Purchase before an unfavorable forecast (legal)

Given the unfavorable forecast signal, insiders could profit by engaging in the following two trading combinations: "sell before" and/or "purchase after" the disclosure of the unfavorable forecast. Hence, using the two test periods, the followig operational hypotheses are generated for the unfavoravle (U) forecast signal:

$H_{31}$: SCAR $(S_b|U) < 0$ for [-1/+6] (One signal only)

SCAR $(S_b|U) < 0$ for [-6/+1] (Two consistent signals)

$H_{32}$: SCAR $(P_a|U) = 0$ for [-1/+6] (Two inconsistent signals)

SCAR $(P_a|U) < 0$ for [-6/+1] (One Signal only)

$H_{41}$: SCAR $(S_a|U) < 0$ for [-1/+6] (Two consistent signals)

SCAR $(S_a|U) < 0$ for [-6/+1] (One signal only)

$H_{42}$: SCAR $(P_b|U) < 0$ for [-1/+6] (One signal only)

SCAR $(P_b|U) = 0$ for [-6/+1] (Two inconsistent signals)

Finally, note that the trade|forecast combinations in $H_{11}$, $H_{12}$, $H_{31}$ and $H_{32}$ are strategies that would imply possible illegal trading by corporate insiders, while the combinations in $H_{21}$, $H_{22}$, $H_{41}$ and $H_{42}$ are incompatible with such profit motives.

# RESULTS

## A. Profitabilty of Insider Trading Strategies

The results pertaining to the trading combinations associated with the favorable forecast signal are presented in Table 3 and those pertaining to the unfavorable forecast signal are presented in Table 4.

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Insert Tables 3 and 4 here

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Results are also provided in each table for a sub-sample that is labeled "intensive trading sample", which is restricted to the firms/forecasts that were associated with insider trading of more than 5000 shares during the test period. This sub-sample consists of 79 firms and 112 forecasts, relative to the full sample of 101 firms and 134 forecasts.

For the favorable forecast signal (Table 3), the only hypothesis that was not confirmed was $H_{22}$ for the period -1/+6. Even though this period encompassed the effect of one signal only (the favorable forecast), the result suggests that favorable forecasts which follow a period of selling by insiders appear to have their effect diluted and do not lead to a positive market reaction. Note that although the precise gain to specific insiders from their trading activities is not measured here, it is clear from the results of $H_{12}$, for example, that postponement of the sale until after the favorable forecast allows

Table 3

Profitability of Possible Trading Strategies
by Insiders Given a Favorable EPS Forecast

| Hypothesis Tested | Insiders' Dominant Trading Activity | Time of Trade in Relation to Management Forecast | Consistency of Insider Trading and Management Forecast Signals | Test Months Relative to Forecast Disclosure | Hypothesis Expectation for Abnormal Returns | Z-test Values For SCAR | |
|---|---|---|---|---|---|---|---|
| | | | | | | Full Sample* | Sample of Intensive Trading** |
| $H_{11}$ | Purchase | before | C | -1/+6 | > 0 | 3.45 (a) | 3.4 (a) |
| | | | | -6/+1 | > 0 | 2.69 (a) | 3.5 (a) |
| $H_{12}$ | Sale | after | I | -1/+6 | = 0 | 0.38 | -1.31 |
| | | | | -6/+1 | > 0 | 3.19 (a) | 1.35 |
| $H_{21}$ | Purchase | after | C | -1/+6 | > 0 | 2.46 (a) | 3.3 (a) |
| | | | | -6/+1 | > 0 | 1.64 (b) | 1.85 (b) |
| $H_{22}$ | Sale | before | I | -1/+6 | > 0 | 0.65 | 0.39 |
| | | | | -6/+1 | = 0 | 1.29 | 0.80 |

(a) Statistically significant at a probability level below 0.01.
(b) Statistically significant at a probability level of 0.05.
* The full sample consists of 101 firms and 134 forecasts.
** The intensive trading sample consists of firms with total insider trading of more than 5000 shares

Profitability of Possible Trading Strategies
by Insiders Given a Unfavorable EPS Forecast

| Hypothesis Tested | Insiders' Dominant Trading Activity | Time of Trade in Relation to Management Forecast | Consistency of Insider Trading and Management Forecast Signals | Test Months Relative to Forecast Disclosure | Hypothesis Expectation for Abnormal Returns | Z-test Values For SCAR | |
|---|---|---|---|---|---|---|---|
| | | | | | | Full Sample* | Sample of Intensive Trading** |
| $H_{31}$ | Sale | before | C | -1/+6 | < 0 | -0.34 | -0.40 |
| | | | | -6/+1 | < 0 | 0.35 | 1.06 |
| $H_{32}$ | Purchase | after | I | -1/+6 | = 0 | +0.43 | +0.20 |
| | | | | -6/+1 | < 0 | -0.07 | -0.51 |
| $H_{41}$ | Sale | after | C | -1/+6 | < 0 | -0.87 | -0.47 |
| | | | | -6/+1 | < 0 | -0.28 | -0.07 |
| $H_{42}$ | Purchase | before | I | -1/+6 | < 0 | 0.8 | 1.14 |
| | | | | -6/+1 | = 0 | -1.2 | -0.8 |

* The full sample consists of 101 firms and 134 forecasts.

** The intensive trading sample consists of firms with total insider trading of more than 5000 shares during the test period. This sample consists of 79 firms and 112 forecasts.

insiders to benefit from the positive forecast effect (see results for period -6/+1).

For the unfavorable forecast signal (Table 4), the results indicate that most (though not all) of the signs for SCAR are negative as expected, but significance levels are not reached. In two cases, even the signs are opposite to those expected. For the case of $H_{31}$ (period -6/+1), the two consistent signals of insider sales and unfavorable forecast should have led to a negative reaction, but the observed returns are positive (though not significant). This finding is difficult to explain. Also, for the case of $H_{42}$ (period -1/+6), the only signal contained in this period is the unfavorable forecast signal, and hence the reaction should be negative. The observed positive result seems to suggest that the market appears to discount the effect of unfavorable forecasts which are preceeded by significant insider purchasing activity. Note, however, that this finding is similar to the apparent anomaly observed above in the case of $H_{22}$ (period -1/+6). Together, they seem to suggest that the market reaction to the forecast (whether favorable or unfavorable) is substantially diluted if the actual insider trading activity that preceeds the forecast is "inconsistent" with the forecast signal.

The results also suggest a general, though weak, inference about insider selling activities. The results for $H_{41}$ (period -1/+6), as well as those in Table 3, appear to suggest that the market does not view selling activity as a signal that necessarily implies private information use. The lack of a strong negative reaction to selling activity perhaps indicates that the market views such activity as being consistent with diverse motivations, not just those related to profit-taking from discretionary disclosures.

To enable the reader to evaluate the economic significance (in terms of the levels and the time patterns) of the returns associated with the different insider trading/management forecast combinations, the unstandardized cumulative abnormal returns are depicted in Figure 1 (Panels A through D).

Insert Figure 1 here

### B. Returns Associated With Knowledge of Management EPS Forecasts

As discussed earlier, the validity of the insider trading strategies hinges on the assumption that insiders believe that a favorable (unfavorable) EPS prediction will result in a positive (negative) stock market reaction. Although results of prior research studies (Patell, 1976; Jaggi, 1978; and Penman, 1980) have confirmed the validity of such an assumption, it is important, in the interest of internal validity, to establish that this relationship holds for the particular sample used in this study.

To test the hypothesis that insiders' EPS predictions are impounded in security prices in a direction consistent with the nature of the signal conveyed, the following abnormal return metric is used:

$$\bar{D}(F - U)_K = (SAR_K|F - SAR_K|U)$$

Unstandardized Cummulative Abnormal Returns (CAR$_q$)

for Insider Trading/Management Forecast Combinations

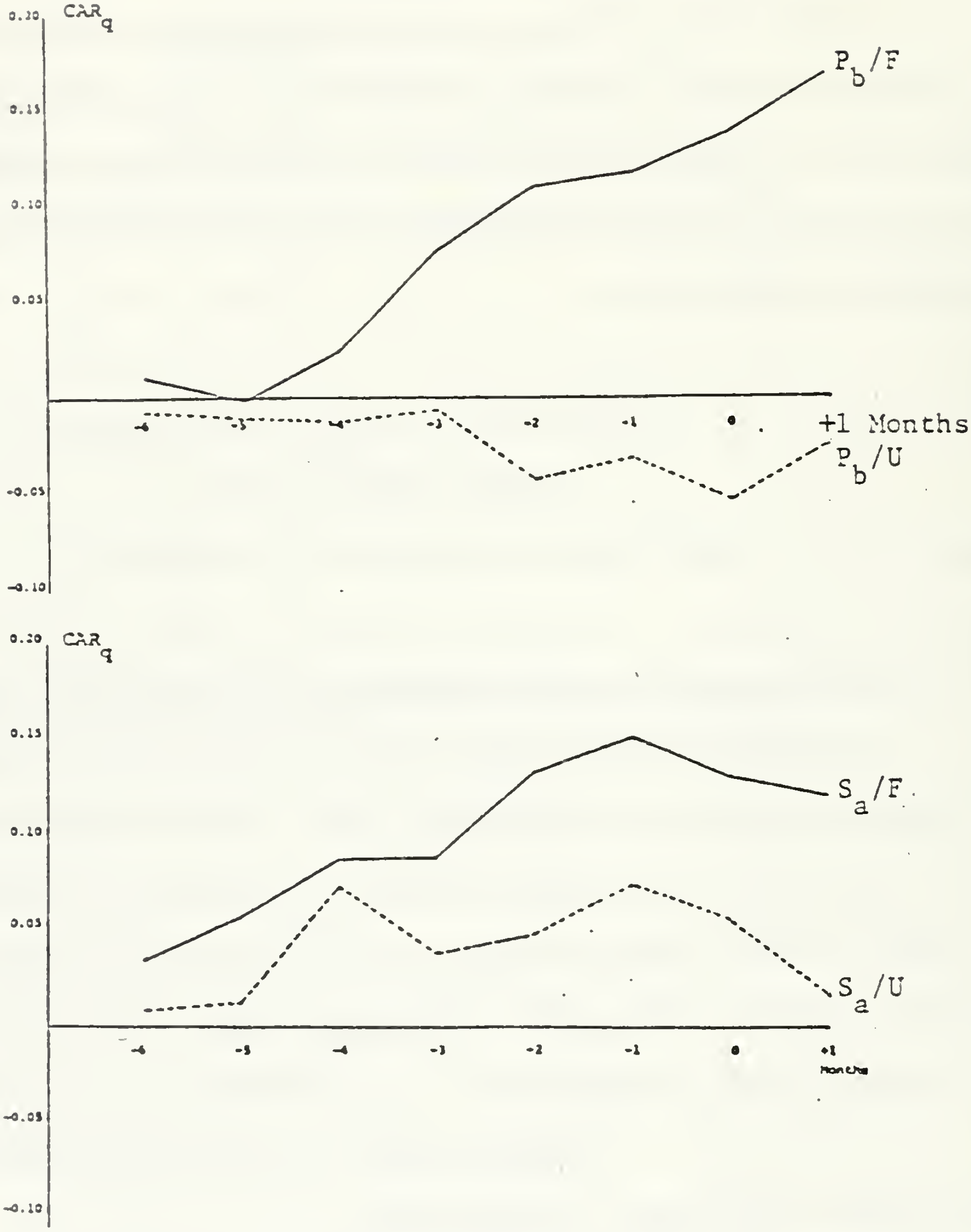

FIGURE 1 (PANEL A)

Legend:

P$_b$, S$_a$ : Insiders' trades were primarily "purchase before" or "sale after" the announcement of EPS forecast by management, respectively.

F, U : Management forecast of EPS was favorable or unfavorable relative to just prior analyst's forecast, respectively.

Time : Month "0" was the month in which management announced their EPS forecast.

Unstandardized Cumulative Abnormal Returns ($CAR_q$)

for Insider Trading/Management Forecast Combinations

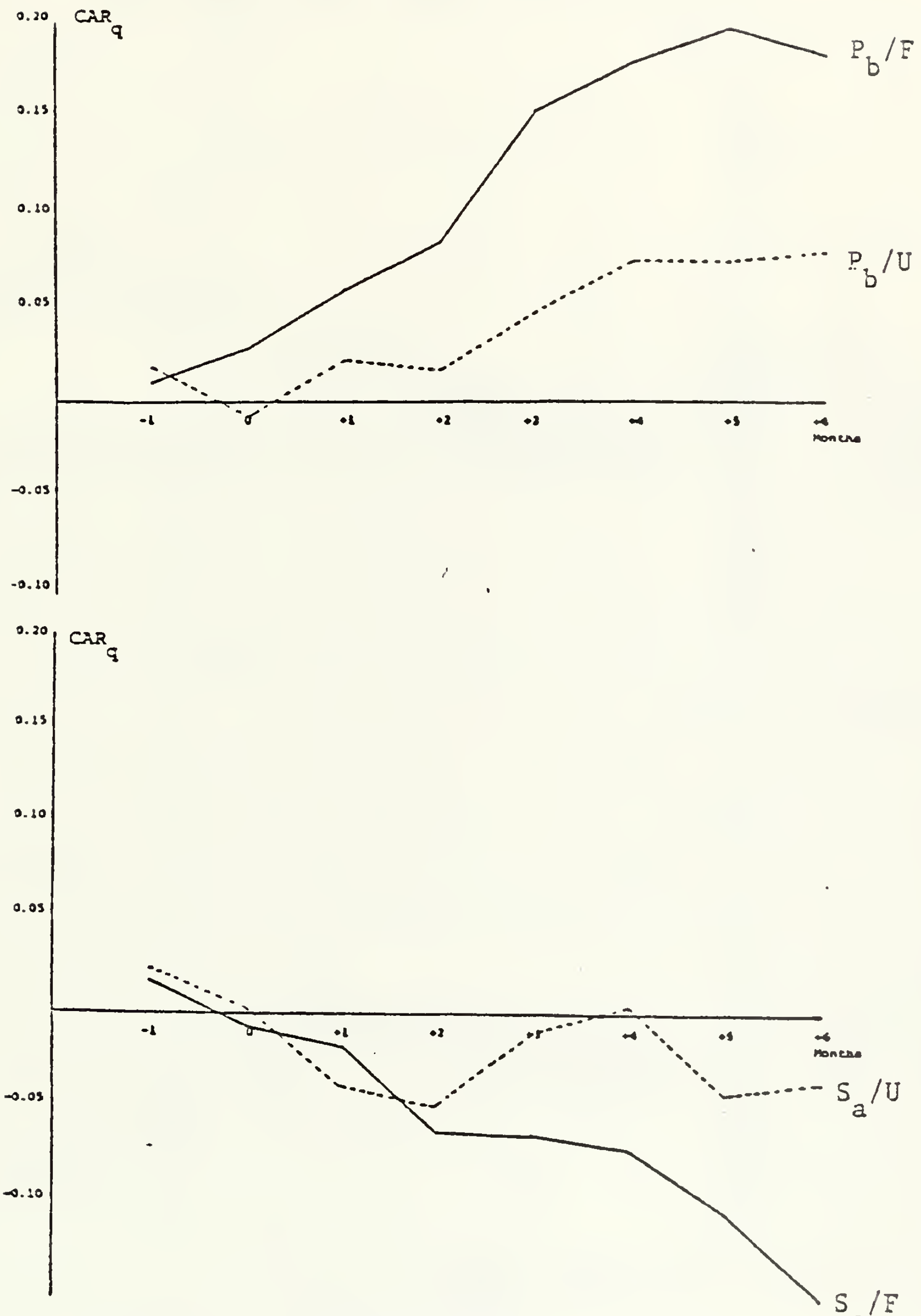

FIGURE 1 (PANEL B)

Legend:

$P_b$, $S_a$ : Insiders' trades were primarily "purchase before" or "sale after" the announcement of EPS forecast by management, respectively.

F, U : Management forecast of EPS was favorable or unfavorable relative to just prior analyst's forecast, respectively.

Time : Month "0" was the month in which management announced their EPS forecast.

Unstandardized Cummulative Abnormal Returns ($CAR_q$)

for Insider Trading/Management Forecast Combinations

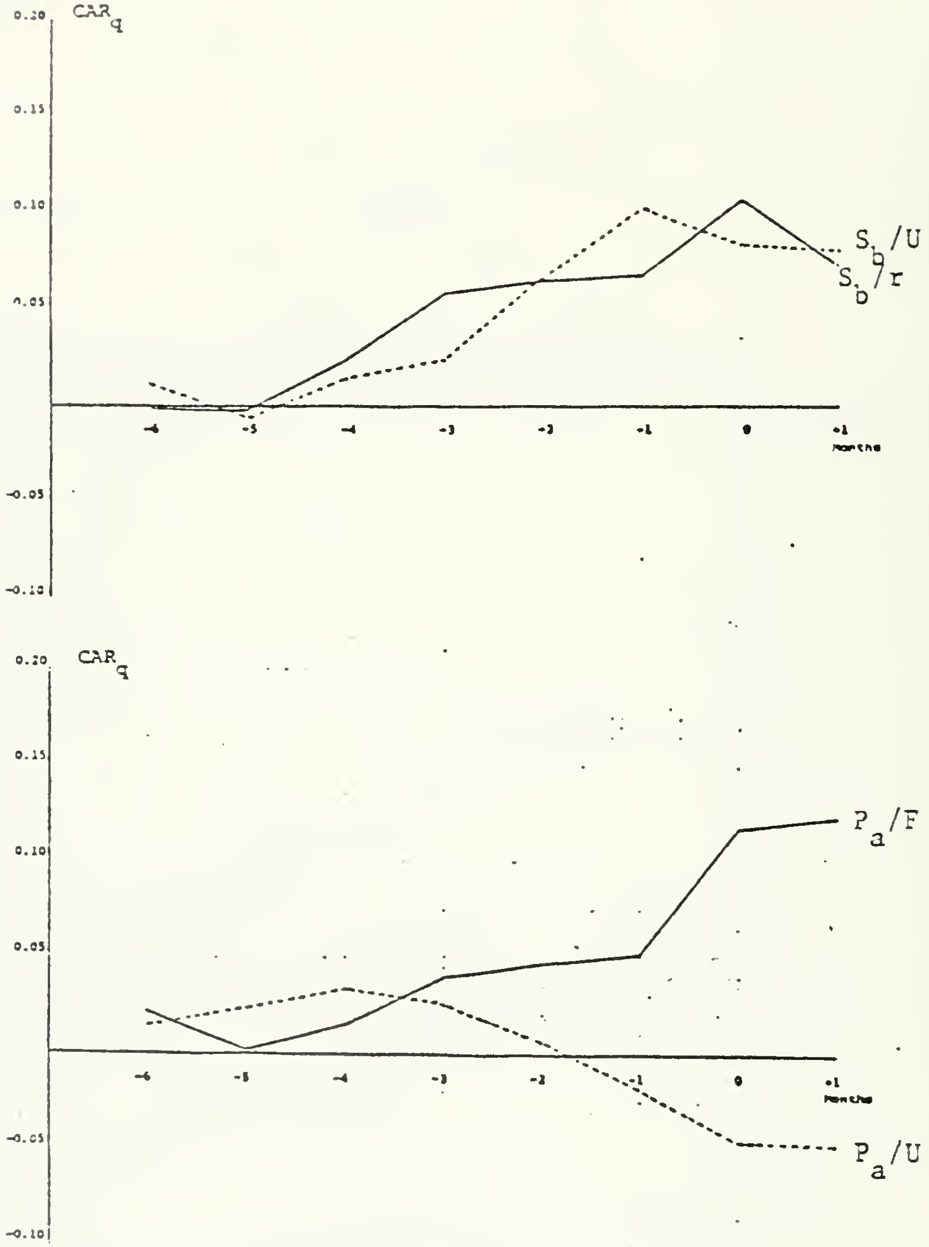

FIGURE 1 (PANEL C)

Legend:

$S_b$, $P_a$ : Insiders' trades were primarily "sale before" or "purchase after" the announcement of EPS forecast by management, respectively.

F, U : Management forecast of EPS was favorable or unfavorable relative to just prior analyst's forecast, respectively.

Time : Month "0" was the month in which management announced their EPS forecast.

Unstandardized Cummulative Abnormal Returns ($CAR_q$)

for Insider Trading/Mangement Forecast Combinations

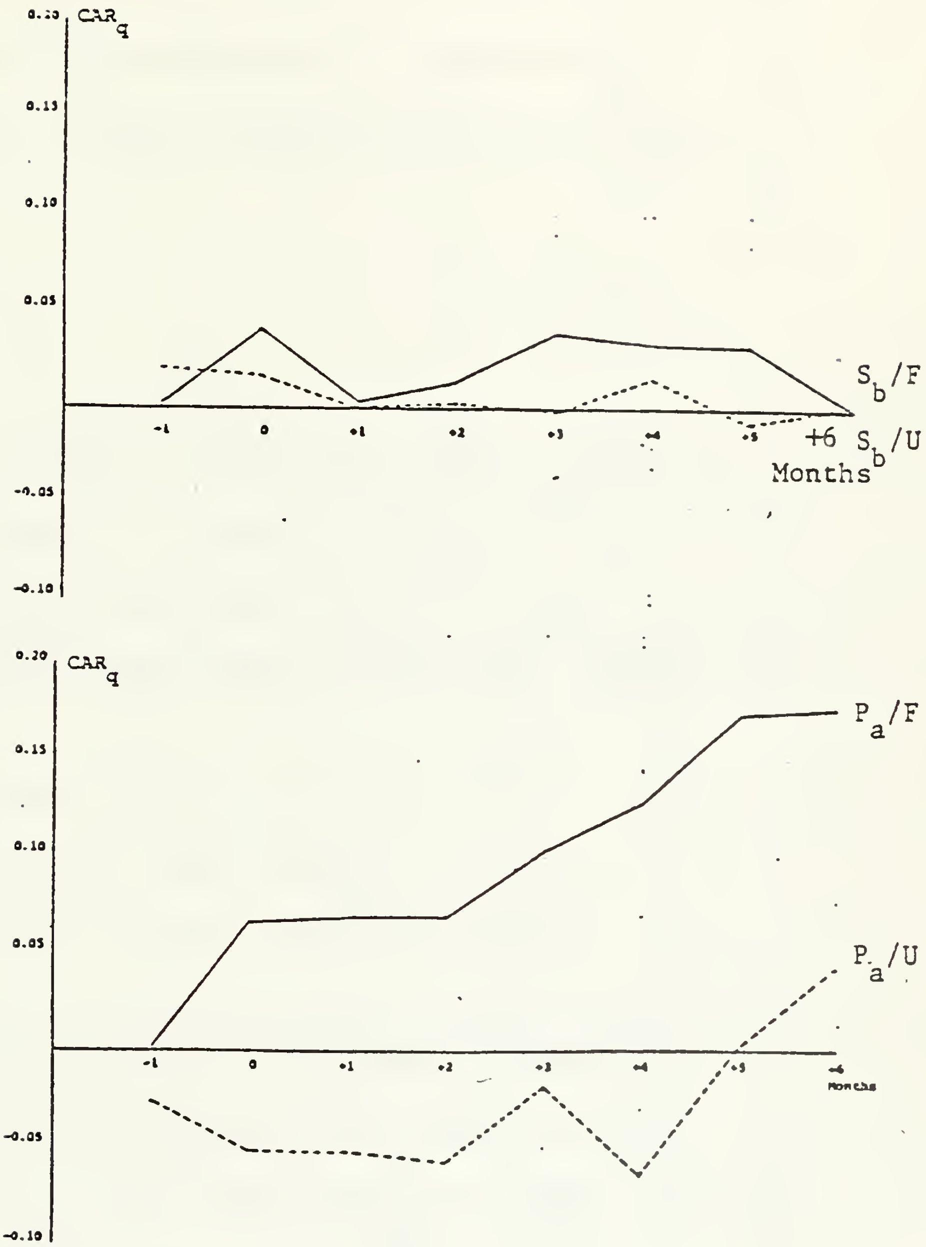

FIGURE 1 (PANEL D)

Legend:

$S_b$, $P_a$ : Insiders' trades were primarily "sale before" or "purchase after" the announcement of EPS forecast by management, respectively.

F, U : Management forecast of EPI was favorable or unfavorable relative to just prior analyst's forecast, respectively.

Time : Month "0" was the month in which management announced their EPS forecast.

Since prices are supposed to decrease after the release of an unfavorable forecast, the expectation for $SAR_k | U$ is negative. Hence, D(F - U) is the abnormal standardized returns associated with the information content of the forecast signal(s). The related hypothesis is:

$$H_5: \bar{D}(F-U) > 0$$

In order to restrict the testing of this hypothesis to effects of management forecasts only (unrelated to effects of insider trading activity per se), particular combinations of portfolios/time-periods were examined. The results are depicted in Table 5.

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Insert Table 5 here

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The test periods for portfolios 1 and 2 are chosen to limit the impact to the forecast signal only. Note that the test period for portfolio 1 covers the forecast disclosure period and the period after the forecast, while the dominant insider trading activity for these firms is confined primarily to the period before the forecast. The reverse is true for portfolio 2. The t-tests for these two portfolios are significant in the correct direction and indicate that a trading strategy based on private knowledge of forthcoming EPS predictions would generate significant abnormal returns. Portfolios 3 and 4 are constructed so as to neutralize the effect of related insider trading activity, thus

Stadardized Abnormal Returns Associated with Knowledge
of EPS Forecasts
$(SAR_k | F - SAR_k | U)$

| Portfolio | Time of Trading Activity in Relation to EPS Forecast | Test Period Relative to EPS Forecast (Months) | $\bar{D}(F - U)$ Comparisons | t-value of $\bar{D}(F - U)$ (significance level) |
|---|---|---|---|---|
| 1 | Before | -1/+6 | $[P_b | F - P_b | U]$ and<br>$[S_b | F - S_b | U]$ | 2.34<br>(0.03) |
| 2 | After | -6/+1 | $[P_a | F - P_a | U]$ and<br>$[S_a | F - S_a | U]$ | 3.09<br>(0.01) |
| 3 | Before and After | -1/+6 | $[(P_b + S_b + P_a + S_a) | F -$<br>$(P_b + S_b + P_a + S_a) | U]$ | 2.79<br>(0.01) |
| 4 | Before and After | -6/+1 | $[(P_b + S_b + P_a + S_a) | F-$<br>$(P_b + S_b + P_a + S_a) | U]$ | 3.84<br>(0.001) |

capturing only the forecast effect. Here again the t-values are significant, indicating that EPS forecasts by managers are potent signals. These findings lend credence to the logic of the trading strategies formulated earlier for testing the existence and extent of illegal trading by insiders based on knowledge of forecast information.

## CONCLUDING COMMENTS

Managers' discretionary disclosures of accounting information are an important part of the financial information used by securities markets. Their motivation in making these disclosures has been the subject of much recent interest (e.g., Penman, 1982; Leftwich, Watts and Zimmerman, 1982). This paper evaluates the hypothesis that managers time their voluntary information disclosures in order to profit from trading in the shares of their own firms. The voluntary dissemination of annual earnings predictions by corporate officials was the particular discretionary disclosure studied in this paper.

Comparing managers' predictions of EPS with prevailing market's earnings expectations (as measured by analysts' forecasts) resulted in partitioning the information content of forecasts into good news and bad news. Several trading strategies of buying or selling (before or after the disclosure of good or bad news) were formulated. These strategies were labelled as those comprising consistent or inconsistent signals as viewed by external market participants. Furthermore, each trading combination was classified as either legal or (possibly) illegal activity, depending on the likelihood that managers had exploited their knowledge of the forecasts, or timed the release of such forecast information so that it would render their trading more profitable. Thus, while the study by Penman (1982) evaluated the impact of the announcement of forecast disclosure by corporate managers on security prices, this paper evaluated the profitability of various trading strategies based on the specific information content (favorable or unfavorable) of managers' predictions of earnings per share.

The results obtained in this study might be summarized as follows:

1. Trading strategies that are based on the information content of the managers' predictions of earnings dominate those that are based on the signals provided by insiders' trading activities.

2. Profitable trading strategies were consistently obtained by following the joint signal of (a) favorable earnings forecasts and (b) purchasing by insiders. That is, significant abnormal returns were earned following either of the following two strategies:
   (i) buy and hold when a favorable forecast was preceded by heavy buying by insiders; and
   (ii) buy and hold when heavy buying by insiders was preceded by a favorable forecast.

   The two signals of favorable forecast and heavy purchasing activity by insiders are viewed as mutually reinforcing signals of managers' views about the prospects of the companies. On the other hand, selling activity does not seem to be looked upon as a significant signal.

3. The test results did not generate a consistent pattern for the profitability of observed trading combinations that are likely to be illegal -- that is, timing the trade relative to the disclosure of insider information so as to earn profits or avoid the incurrence of a loss.

Although Penman (1982) did not use the explicit information content of managers' earnings forecasts, he concluded by suggesting that the evidence supports the assumption that managers profitably exploit inside information. However, closer inspection of Penman's analysis (rather than his conclusion) may render his results consistent with the details of the results reported in this paper. In particular, Penman evaluated the association between an index of insider trading (called T) and abnormal returns around the date of managers' earnings forecast announcements. The index T consisted of a comparison between the sum of (a) net purchases by insiders before the disclosure of earnings forecasts, and (b) net purchases by insiders after the disclosure. Hence, if purchasing activity is the dominant signal, then obtaining a positive and significant coefficient for the explanatory variable T is compatible with the one-sided scenario of a significant association between the purchasing (but not necessarily selling) activities of insiders and abnormal returns. But, like Allen's study, Penman did not evaluate the explicit information content for managers' forecasts, and the details of abnormal returns associated with only selling activities are not available. In summary, the analysis conducted in this study uses an explicit measure of the information content of managers' forecasts (relative to analysts' forecasts) and provides a detailed test of several possible combinations of the two signals of interest (the forecast and the insider trading).

As with most studies dealing with insider trading, this paper relied on the SEC's Official Summary to obtain information on insider trading. However, the Official Summary is conceptually incomplete in that trading by those who might have access to inside information but are not corporate officials (or otherwise covered by the SEC's "insider" definition) are not included in the summary. Furthermore, insider trading on options might be more profitable than insider trading on stocks because of the low transaction costs (and margin requirements) associated with trading on options. The Official Summary does not include insider trading on options other than that directly related to the exercise of options. Finally, disclosure of earnings forecasts by corporate officials might no be made directly (since strong evidence is available about the significant level of indirect releases of forecasts through analysts). These observations tend to limit the generalizability of the obtained results.

# Footnotes

1. Work on this project started in 1980. Not placing much confidence in the results of a smaller sample led us to collect more data and tighten the research design. The results are unaltered, however.

2. Fearing an increase in insider trading violations despite its vigorous enforcement efforts in recent years, the SEC submitted a new bill to Congress in late 1982 that would toughen the sanctions for violations (see SEC Release "Insider Trading Sanctions Act," 1982). A recent case reported in the Wall Street Journal (September 27, 1983) relates to the topic of this paper. The SEC charged two officials of Warner Communications Inc.'s Atari subsidiary with illegally selling Warner securities shortly before Warner announced that its earnings for 1982 would be below analysts' expectations (and its stock plummeted). Note also that the implied measure of market expectations used is analysts' forecasts (as used in this study).

3. Section 32 of the 1934 Securities Exchange Act (as amended) provides penalties up to $10,000 or not more than five years imprisonment for violation of any provision of the Securities Act. Furthermore, short selling by insiders is unlawful.

4. In the Fama sense of market efficiency, the securities market is considered semi-strong form efficient if it processes all publicly available information quickly and in an unbiased manner. Much of the empirical evidence to date supports the semi-strong form of market efficiency. Since the results reported by Finnerty (1976) and Jaffe (1974) indicate that the use of insider trading to formulate trading strategies could yield significant abnormal profits for a period of up to 11 months after the trade, it is implied that the market had not processed the signals of insider trading for that long a period. Such an implication is inconsistent with all the empirical evidence that supports semi-strong form efficiency.

5. Our data on management forecasts is part of a data base compiled by two different Ph.D. candidates for their own dissertation related work. All other data was collected explicitly for this study.

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