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THE JANUARY EFFECT AND AGGREGATE INSIDER TRADING

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ABSTRACT

This study investigates the seasonal pattern of aggregate insider trading to distinguish between two competing explanations for the seasonal pattern of security returns. The first potential explanation examined is that the January effect arises from predictable changes in end of year demand for securities. The second potential explanation examined is that the January returns represent compensation for the higher risk of trading against informed traders at the turn of the year.

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This study examines aggregate insider[1] trading activity to provide a new insight into the nature of the seasonal pattern of security returns reported by Keim (1983) and others.[2] For the period from 1963 to 1979, Keim (1983) documents unexpectedly large, positive returns to small firms during the first week of January.[3] The reasons for the existence of seasonality in stock returns is not yet well understood, and hence, the January effect has become a paradox for models of equilibrium expected stock returns and the efficient markets hypothesis.

This study examines two potential explanations for the January effect. One explanation is that the positive returns in January for the small firms represent compensation for increased risk of trading against informed traders. Williams (1986) provides a formal model where greater variability in outsiders' demand for stock provides greater opportunities for insiders to hide their information motivated transactions. Glosten and Milgrom (1985) conjecture that the positive return in January may represent compensation for the increased risk of trading against informed traders at the turn of the

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[1] The Securities and Exchange Act of 1934 defines insiders as officers, directors, and shareholders of 10% or more of any equity class of securities.

[2] Banz (1981) and Reinganum (1981) document the relation between firm size and the average stock returns. See also the special issue of the Journal of Financial Economics, 1983, volume 12, entitled, Symposium on Size and Stock Returns and Other Empirical Regularities for other papers. Schwert (1983) provides an introduction and overview of the papers in this issue. Rozeff and Kinney (1976) also provide evidence on stock market seasonality.

[3] Keim (1983) finds that over the period 1963 to 1979, the average difference between the stock returns of smallest size firms and the stock returns of largest size firms equals 15% in January. Of the 15% difference, approximately 8% is realized within the first 5 trading days in January. Blume and Stambaugh (1983) and Roll (1983) show that with annual rebalancing of portfolios, the size effect is restricted to January only. Reinganum (1982) reports that the January effect is too large to be explained by misestimation of risk.

year. Presumably, the informed traders are more likely to possess nonpublic information at the turn of the year, and thereby impose greater losses on all opposing traders either by buying or selling stock. Increased trading by informed traders is expected to increase the bid-ask spread in the security. Hence, to be consistent with market efficiency, any profit opportunity to buying stock in December and selling stock in January is expected to be less that the bid-ask spread cost. A testable implication of the risk premium hypothesis is that insiders would be more likely to buy or sell stock at the turn of the year than at other times.

A second potential explanation for the January effect is that the positive excess return at the turn of the year arises due to price pressure from predictable seasonal changes in demand for different securities. For instance, tax loss selling or payment of annual bonuses at year end result in an increase in cash for individual investors. Presumably, investors take most of their tax losses in December and then wait until January to buy the stock of other small firms with the proceeds of the sales. The increase in demand (albeit predictable) for small firms at the turn of the year results in an increase in the stock prices of small firms.[4] This price pressure hypothesis is tested by examining the aggregate insider trading activity in small firms.

To observe the effects of January effect in aggregate insider trading, it is not necessary that insiders actively purchase their own firms' stocks in December and sell their own firms stocks in January. If insiders believe that the empirically documented price run-up in January in small firms represents a

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[4] The evidence on the tax-loss selling is mixed. Studies by Branch (1977), Reinganum (1983), Givoly and Ovadia (1983), and Rozeff (1985) provide evidence consistent with tax loss selling. In contrast, Brown, Keim, Kleidon, and Marsh (1983) conclude that coincidence of January effect with the end of the tax year in the U.S. is a casual not a causal association.

profit opportunity, then in addition to any other transactions they might engage in such as buying options or futures contracts in small firms in general, insiders would also be expected to adjust their planned transactions in their own firms. For instance, if an insider in a small firm planned to purchase stock in his own firm, he would profit by accelerating and completing his purchase in December. Similarly, if an insider in a small firm planned to sell his stock, he would profit by delaying his sale until after the January effect is realized. As a consequence, insider sales in December would tend to lower that the normal sales in other months, and insider purchases in December would tend to exceed normal purchases in other months.[5] Hence, net insider purchases in December would be higher than it would otherwise be. If insiders believe that the January effect represents a profit opportunity, then increasing their net purchases in December would enable insiders to capture more of the price run-up in January.

The paper is organized as follows: Section I contains the data sources and sample characteristics of the data. The empirical results of the study are in section II and the conclusions and implications are in Section III.

I- Data and Sample Characteristics

The insider trading data for this study come from a computer tape compiled by the Securities and Exchange Commission. The tape contains more than 1.5 million transactions by insiders in all publicly held firms from January 1975 to October 1981, for a total of 82 calendar months. This study

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[5] Seyhun (1986) provides evidence of passive trading by insiders around firm-specific non-public information. For other studies of insider trading, see Finnerty (1976), Jaffe (1974), and Lorie and Niederhoffer (1968).

analyzes a sample of insider transactions in 790 firms on the daily returns file of the Center for Research in Security Prices (CRSP).[6] Of the 790 firms, 21 did not report any insider trading between 1975 and 1981. Hence, the actual number of firms analyzed is 769.

Only open market sales and purchases by insiders during 1975 to 1981 are analyzed in this study. All other types of insiders' transactions, such as private sales and purchases, exercises of options, shares acquired through a plan, etc. are excluded, since it is expected that insiders' open market sales and purchases are more likely to represent actions taken as a result of special insider information.[7] The distribution of insiders' open market sales and purchases by firm size are shown in Table I. Firm group 1 consists of firms with a market value of equity less than $25 million, group 2; between $25 million and $50 million, group 3; between $50 million and $250 million, group 4; between $250 million and $1 billion, and group 5; greater than $1 billion. While chosen randomly, this classification ensures that each size group contains more than 3000 insider transactions, while maintaining a large diversity of firm sizes from less than $25 million to more than $1 billion. The total sample contains 59,148 open market sales and purchases with a total dollar value of $11.1 billion. Of these, 24,371 are open market purchase transactions with a total dollar value of $6.8 billion and 34,777 are open market sale transactions with a total dollar value of $4.3 billion.

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[6] All 190 firms listed on option exchanges on January 1, 1977 are included in the sample. The remaining 600 firms are selected using stratified random sampling based on the value of equity on January 1, 1977. This accounts for the heavier representation of the larger firms in the sample. The sample of firms analyzed in this study are identical to those in Seyhun (1986) which contains further characterization of the sample.

[7] Numerous consistency checks on dates, prices, and shares were performed to eliminate approximately 1000 transactions containing apparent data errors out of about 60,000 transactions.

Table I

Distribution of the number of open market sales and purchases, the total dollar value of sales and purchases (in $ million), and the number of firms grouped by the average month end market value of firms' stock between January 1975 and October 1981.

	The Average Market Value of Stock					
	Less Than $25 million (Group 1)	Between $25 and $50 million (Group 2)	Between $50 and $250 million (Group 3)	Between $250 million $1 billion (Group 4)	More Than $1 billion (Group 5)	All Firms
Number of Firms	104	68	173	267	157	769
Number of Sales	1,339	1,325	5,891	14,811	11,411	34,777
Number of Purchases	2,802	1,685	4,661	8,456	6,767	24,371
Dollar value of sales	$51.3	$56.2	$550.0	$1431.7	$2235.7	$4324.7
Dollar value of purchases	$100.3	$126.2	$736.5	$1558.0	$4254.3	$6775.3
Total number of trades	4,141	3,010	10,552	23,267	18,178	59,148

II- Empirical Results

Tests presented in this section examine the seasonal distribution of insiders' transactions to test the price pressure and the risk premium hypotheses for the unusually high, positive return to small firms in January. The price pressure hypothesis states that the January effect arises from price pressure arising from seasonal changes in the demand for stocks of small firms and therefore represents a market inefficiency. The risk premium hypothesis states that the January effect represents compensation for higher risk of trading against informed traders in January.

First, the seasonal pattern of returns documented by Keim (1983) are replicated for the sample of 769 firms included in this study. It is necessary that firms included in this study must also exhibit seasonality of stock returns to have the potential of explaining the January effect. Second, the relation between seasonality of insiders' transactions and the seasonality of security returns is examined.

Table II shows the seasonal pattern of the monthly returns from January 1975 to October 1981 for the 769 firms included in this study. In models (1) through (5), the dependent variable is the total monthly return to the equally-weighted portfolio of firms in each of the five firm size groups. The independent variable is a dummy variable that takes a value of 1 for the month of January and 0 for other months. Model (1) shows that the returns to small firms (group 1) in January have been on average 12.9% higher than other months. This value is statistically significant and it is twenty-five times higher than the average return for months other than January. The returns for the month of January decline with increasing firm size. For large firms, (group 5) the return in January is only 1.6% higher than other months, which is not statistically distinguishable from zero. This evidence suggests that

Table II

Regression of the monthly return to the equally weighted portfolio of firms grouped by size of equity, RE_1-RE_5, against a dummy variable that takes the value of one in January and zero otherwise. Sample period is from January 1975 to December 1981. The t-statistics for estimated coefficients are shown in parentheses.c

Model number	Dependent Variable		Intercept		January Dummy	$\bar{R}^2$ Adjusted
(1)	RE_1	=	0.005 (0.6)	+	0.129 (4.3)b	0.177
(2)	RE_2	=	0.013 (1.8)	+	0.081 (3.2)b	0.099
(3)	RE_3	=	0.014 (2.0)	+	0.066 (2.7)b	0.071
(4)	RE_4	=	0.012 (2.1)	+	0.040 (2.0)a	0.036
(5)	RE_5	=	0.010 (2.0)	+	0.016 (1.0)	-0.001

a Significant at the 5% level.
b Significant at the 1% level.
c Group 1 has average size of equity less than $25 million; group 2, between $25 and $50 million; group 3, between $50 and $250 million; group 4, between $250 million and $1 billion; and group 5, greater than $1 billion.

the firms included in this study display a similar pattern of seasonality as has been documented by Keim (1983) and others, and therefore, examination of the seasonal behavior of aggregate insider trading activity is warranted.

The seasonal distribution of aggregate insider trading activity is examined using regression analysis in Table III, models (1) through (5).[8] The dependent variable is the aggregated net number of transactions by executives (ANE) for firm sizes one through five. The independent variables are dummy variables that take the value of one for the months of December and January respectively, and zero for other months. Models (1) shows that insiders in small firms generally tend to be net purchasers in their own firms. Furthermore, there is an additional significant increase in purchase activity for insiders in small firms in the month of December. Models (2) and (3) show that for medium sized firms insider trading activity at year end is not substantially different than at other months. Models (4) and (5) of Table III show that on average, insiders in larger firms tend to be net sellers in their firms. Furthermore, there is an additional decrease in their net purchases in the month of December.

Various tests are conducted to examine the sensitivity of the results in Table III to empirical methodology. First, examination of the Box-Pierce statistics at lags 6, 12, 18, and 24 indicate that there is no remaining serial correlation of the residuals. Table III reports the results of including a first order autoregressive model for the residual. Omitting the first-order autoregressive models for the residuals reduces the magnitude of

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[8] Only the open market sales and purchase transactions are included in the construction of ANE. Hence, transactions which might have an inherent seasonal component, such as acquisitions due to compensation plans, exercises of options, or conversion of securities etc., are excluded.

Table III

Regression of the monthly aggregate net number of transactions by executives in five firm size groups, ANE_1-ANE_5, against dummy variables that take the value one in December and January, respectively and zero otherwise. The sample period is from January 1975 to October 1981. The t-statistics for estimated coefficients are shown in parentheses.d

No	Dependent Variable	Intercept	December Dummy	January Dummy	Error Model	Autocorrelation of residuals r_1	r_2	r_3
(1)	ANE_1	5.09 (2.21)b	15.11 (2.63)c	5.38 (1.52)	AR(1)	.01	.03	-.13
(2)	ANE_2	-0.29 (-0.15)	-8.05 (-1.95)b	1.01 (0.26)	AR(1)	.02	-.01	-.08
(3)	ANE_3	-25.79 (-3.98)c	2.04 (0.13)	2.06 (0.14)	AR(1)	.00	-.04	.11
(4)	ANE_4	-97.16 (-7.51)c	-82.45 (-2.97)c	-8.33 (-0.32)	AR(1)	.01	-.02	.08
(5)	ANE_5	-79.33 (-9.87)c	-49.60 (-2.50)b	-7.50 (-0.40)	AR(1)	.01	.00	.18

a Significant at the 10% level.
b Significant at the 5% level.
c Significant at the 1% level.
d Firm size 1 contains firms with average size of equity less than $25 million; size 2, between $25 and $50 million; size 3, between $50 and $250 million; size 4, between $250 million and $1 billion; size 5, greater than $1 billion. For error models, AR(1) denotes a first order autoregressive process. The regressions are estimated using the ARIMA procedure in SAS.

the estimated coefficients slightly, but does not affect the statistical significance levels of the estimated coefficients. Hence, the findings are not sensitive to the inclusion of the error term models. Furthermore, the Kolmogorov statistics indicate that residuals are approximately normally distributed.

To test the sensitivity of the results in Table III to the definition of the insider trading activity, standardized aggregate net number of transactions is used as the dependent variable. Standardization refers to netting out the sample mean and dividing by the sample standard deviation of the net number of transactions for each firm. Hence, standardization ensures that each firm gets approximately the same weight in aggregation. Using as the dependent variable standardized aggregate net number of transactions resulted as somewhat less significant regression coefficient estimates. The tests in Table III are also repeated using as dependent variables both standardized and unstandardized aggregate dollar value of insider trading and aggregate proportion of the firms traded by insiders. These tests result in coefficient estimates similar in signs as those in Table III, but statistically insignificant for the small firms. These findings suggest that passive trading by insiders in some small firms tend to be more pronounced than others. Furthermore, dollar value of insider trading is less sensitive to seasonal pattern of security returns. Consequently, the findings in Table III are to be interpreted in a limited sense as capturing an average trading trends by insiders.

The evidence shown in Table III suggests that the aggregate insider trading in small firms is substantially different than the aggregate insider trading in larger firms in the month of December. It appears that insiders in small firms accelerate their planned stock purchases and delay their planned

stock sales in December to take advantage of the positive return in January. The evidence presented in Table III is consistent with the joint hypothesis that insiders in small firms are aware of the seasonal pattern of returns in their own firms and regard the positive return in January as a profit opportunity.

The evidence in Table III also does not indicate any increased selling activity in January for small firms. Hence, insiders do not seem to be actively buying their own firms' stock in December, and then selling the stock in January.[9] This finding is consistent with the interpretation that the seasonal pattern of aggregate insider trading is more likely to be due to passive adjustments by insiders rather than actively buying and selling their own firms' stock to exploit the January effect.

The price pressure hypothesis predicts that a strong purchase activity by investors during January puts upward pressure on the stock price of small firms. Model (1) in Table III indicates that insiders in small firms increase their net purchases of stock slightly in January. However, the regression coefficient of the January dummy variable is not statistically significant at the 10% level. Furthermore, the results (not shown) using as the dependent variable the standardized aggregate net number of transactions also do not indicate a significant increase in purchase activity by insiders in the month of January. Hence, whatever is the source of the price pressure, the available evidence suggests that the January price pressure in small firms does not come from insiders' transactions.

To test the compensation for risk hypothesis, Table IV examines the insider trading activity in December and January without regard to the

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[9] Section 16 (b) of the Securities and Exchange Act of 1934 requires that profits obtained from transactions within a six-month period be returned to the corporation.

direction of transactions. As a measure of insider trading activity, absolute value of the net number of insider transactions for each firm is computed and summed across firms. This measure, denoted as AANE, captures the seasonal changes in insider trading activity in each firm without netting out purchases in one firm against sales in another firm. If the January effect were to represent compensation for the expected losses to informed traders, then the month of January is expected to be characterized by an increased insider trading in either direction.

Table IV, models (1) through (5) show that the month of December brings about increased insider trading in all firms, not just the small firms. In each model, the coefficient estimate of the December dummy variable is positive and statistically significant. A plausible interpretation of this evidence is that tax related trading in December leads to substantially higher trading in all firms, and not just small firms. In contrast with December, January is not characterized by increased insider trading activity. In models (1) through (5), the coefficient estimate of the January dummy variable is insignificant. Hence, on average, the level of insider trading activity in January is not distinguishable from the level of insider trading activity during any other month excluding December. This evidence suggests that for an uninformed trader, the expected losses to corporate insiders would be no higher in January than in other months.

The results in Table IV are also replicated by using as the dependent variable the standardized, aggregate absolute value of net number of transactions.[10] The results using standardized dependent variable are similar

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[10] Standardization refers to netting out the sample mean and dividing by the sample standard deviation of the absolute value of net number of transactions in each firm before summing across firms. Standardization ensures that each firm receives approximately the same weight in the regressions.

Table IV

Nonlinear regression of the monthly aggregate absolute value of net number of transactions by executives, $AANE_1$-$AANE_5$, against dummy variables that take the value one in December and January, respectively and zero otherwise. The sample period is from January 1975 to October 1981. The t-statistics for estimated coefficients are shown in parentheses.c

No	Dependent Variable	Intercept	December Dummy	January Dummy	Error Model	Autocorrelation of residuals r1	r2	r3
(1)	$AANE_1$	10.62 (25.00)b	6.21 (4.13)b	1.23 (0.88)	-	.00	.08	.02
(2)	$AANE_2$	8.62 (18.42)b	4.88 (2.95)b	0.09 (0.06)	-	.00	.01	-.04
(3)	$AANE_3$	41.40 (18.90)b	9.54 (1.93)a	2.44 (0.53)	AR(1)	-.01	.14	.04
(4)	$AANE_4$	107.14 (19.19)b	38.20 (3.49)b	8.97 (0.87)	AR(1)	.08	-.02	.06
(5)	$AANE_5$	84.32 (24.83)b	27.87 (3.14)b	-4.89 (-0.59)	AR(1)	.04	.01	.12

a Significant at the 10% level.
b Significant at the 1% level.
c Firm size 1 contains firms with average size of equity less than $25 million; size 2, between $25 and $50 million; size 3, between $50 and $250 million; size 4, between $250 million and $1 billion; size 5, greater than $1 billion. For error models, AR(1) denotes a first order autoregressive process. The regressions are estimated using the ARIMA procedure in SAS.

to the results shown in Table IV. This finding suggests that the results in Table IV are not due to a few outlier firms.

While not shown, further examination of the insider trading activity by calendar weeks shows that most of the increased insider trading activity in the month of December occurs during the third week of December. Furthermore, the first week of January is not characterized by increased level of insider trading. Hence, it appears that the timing of the increased level of insider trading does not correspond with the timing of higher returns to small firms.

Assuming that the overall trading by all informed investors and trading by corporate insiders are positively correlated, the evidence presented in Table IV is inconsistent with the risk premium hypothesis since corporate insiders in small firms are not more likely to trade in January than in other months. Instead, the evidence suggests that corporate insiders in all firms are more likely trade in the month of December, presumably due to tax reasons. Hence, lack of significant increase in insider trading activity in January is inconsistent with a scenario which suggests that the price run-up in January represents compensation for greater expected losses to informed traders. This finding is also consistent with Blume and Stambaugh (1983) who report that the bid-ask spread bias in returns of small firms is not significantly higher in January than in other months. The finding still leaves open the possibility that a portion of the January effect can be a risk premium for other types of risk which have a January seasonal component.[11]

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[11] Chan, Chen, and Hsieh (1985) report that a portion of the returns to small firms in January represents compensation for risk. One component of risk is measured by the difference between return to low-grade bonds and long-term government bonds which itself has a January seasonal.

III- Conclusions and Implications

The evidence presented in this paper suggests that corporate insiders in small firms adjust their transactions at year-end. Evidence indicates that insiders in small firms tend to accelerate their planned stock purchases and postpone their stock sales in December. This pattern of insider trading in small firms contrasts with an opposite pattern of insider trading in larger firms. Becoming net purchasers of stock in December enables insiders in small firms to capture more of the positive return in January. Hence, this evidence is consistent with a scenario where insiders regard the price run-up in January as a profit opportunity. However, examination of the aggregate insider trading activity in January indicates that any price pressure on the prices of small firms in January does not come from increased insider purchases of stock, since corporate insiders do not significantly increase their stock purchases in January.

The evidence presented in the paper is also inconsistent with a scenario which suggests that the price run-up in small firms in January represents compensation for increased expected losses to informed traders such as corporate insiders. The evidence shows that insider trading activity in small firms does not significantly increase in January. Hence, an uninformed trader in small firms is not more likely to trade against an informed insider in January than in other months. Consequently, the price run-up in small firms in January cannot be interpreted as compensation for greater expected losses against informed traders in January.

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