Some Insider Sales Are Positive Signals

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Not all insider sales are the same. In the study reported here, a variable for shares traded as a percentage of insiders' holdings was used to separate information-driven sales from sales driven by liquidity or risk-reduction needs. In the insider trades from 1987 through 2002, only large sales that also accounted for large percentages of insiders' holdings predicted significantly negative future abnormal returns. Small sales that accounted for small percentages of shares owned not only did not predict poor performance but were correlated with significantly positive abnormal returns. The percentage of shares owned by insiders is also useful for predicting future returns following insider purchases.

Corporate insiders possess information about their companies before outside investors, and they seem to profit from trading in their own company stock. With the exception of a recent study of stocks on the relatively small Oslo Stock Exchange by Eckbo and Smith (1998), most studies have suggested that insiders have superior information and earn positive abnormal returns (Jaffe 1974; Seyhun 1986, 1998; Rozeff and Zaman 1988; Lin and Howe 1990; Lakonishok and Lee 2001).

Studies of managerial decisions also suggest that managers are better informed than outside investors about their companies' prospects. For example, Ikenberry, Lakonishok, and Vermaelen (1995) found that corporate share repurchases predict high future returns, and Loughran and Ritter (1995) reported poor returns following new equity issues.

Studies on insider trading that investigated whether outside investors can profit by mimicking insider trades reached differing conclusions. Seyhun (1986) and Rozeff and Zaman (1988) showed that after transaction costs are taken into account, imitating insiders produces no abnormal profit. Bettis, Vickrey, and Vickrey (1997), however, found that outsiders can earn abnormal profits after transaction costs by imitating high-ranking insiders who make large-volume trades.

Our study concentrates on the information content of insider trades rather than direct applicability of the findings. For example, we do not address transaction costs for several practical and, we believe, important reasons. First, trading costs change over time as markets evolve, and at any time, different managers have different trading costs, so it is hard to know what level of cost is relevant. As of this writing, some managers can trade for less than 10 bps but others are paying more than 100 bps. More importantly, from the point of view of many professional investment managers, whether a strategy can or cannot cover transaction costs is seldom the issue in decision making. Most active managers use multiple information signals to make buy and sell decisions, so any signal with information content may be useful. In a practical application, the degree to which one signal is correlated with another is often more important than the signal itself. A redundant signal is not useful, whereas an independent, even if weak, signal can provide a competitive advantage. Finally, from the perspective of how markets actually function, and given that managers use multiple signals, the existence of any persistent and statistically significant anomaly is useful because it raises questions about market efficiency.

Most studies show an asymmetry in the prediction of subsequent stock performance between insider sales and insider purchases. Insider purchases are typically associated with positive future abnormal returns, whereas insider sales tend to predict smaller, sometimes insignificant, future abnormal returns. For example, Lakonishok and Lee found in their sample that stocks that experienced net buying by company managers earned an abnormal return of 2.0 percent in the following year but stocks that experienced net selling had an abnormal return of only –0.1 percent in the same interval.

The asymmetry between insider purchases and sales reflects differences in the information content of these actions. When an insider purchases company shares, the primary reason is to make

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money; the buyer probably thinks the stock is undervalued at the time of purchase. So, for that insider purchase to be associated with good future returns is not surprising.

As for insider selling, the motivation most commonly assumed and tested in the literature is the insider's belief that the company stock is overvalued. If the insider possesses useful information, this type of sale should signal poor returns ahead. An insider may sell, however, simply to raise funds for liquidity or to diversify a portfolio. Such sales should not have a negative implication. In fact, if the insider thinks highly of the company's prospects but needs to raise money, the insider might sell only a little of his or her holding and keep the rest in hopes of future appreciation. A small sale, then, would provide a positive signal with respect to future returns.

There is, of course, no way of clearly identifying whether an insider sale is motivated by perceived overvaluation of the stock, the liquidity needs of the owner, or the owner's need to reduce risk by diversifying. On the U.S. SEC forms for insider transactions, insiders do not need to state any reason for their trades. Even if the rules were changed to require the disclosure of intent, such rules would be unenforceable; insiders would be likely to say that their sales were for liquidity needs or risk diversification just to avoid the appearance of trading on insider information.

Most previous studies made no attempt to separate information-driven trades from liquidity- or risk-driven trades. They treated all insider sales the same. Some studies did focus on insider trades involving large numbers of shares, however, on the premise that larger trades are more likely to be motivated by perceived mispricing than are smaller trades (Bettis et al.). Seyhun (1998) reported that larger insider trades are associated with larger subsequent abnormal returns.

In the study reported here, we went a step further by using insiders' share holdings, which are reported on the SEC forms insiders fill out for their trades, to measure the information content of insider sales. Specifically, we calculated the shares traded as a percentage of shares owned and used the ratio to separate informational sales from non-informational sales. We hypothesized that if an insider sells shares because of a negative view on the company's outlook, the seller is likely to sell a larger percentage of his or her holding than if the sale is only for liquidity needs. Thus, we expected insider sales that represent a large percentage of shares owned to be associated with negative future returns. We hypothesized that sales constituting a small fraction of holdings would predict positive future returns.

Data and Methodology

Our sample covers insider transactions from 1987 through 2002. Data from 1987 through 2000 come from Thomson Financial, and we compiled data for 2001 and 2002 from daily files available from Washington Services. As Lakonishok and Lee did, we included in the sample only open-market transactions of at least 100 shares. We excluded insider purchases of shares through exercise of options but included subsequent open-market sales of these shares. To clean up the data, we excluded all transactions missing a transaction date, report date, or price and those with a transaction date later than the report date. Also, to avoid counting the same transaction multiple times, we excluded amended filings.

Previous studies examined trades by different types of insiders (Rozeff and Zaman 1998; Seyhun 1998; Lakonishok and Lee). Our focus, however, was not on evaluating the strength of the insider trading signal for different types of insiders but on the usefulness of holdings data for understanding the impact of highly informed trades. Therefore, we limited our sample to trades by CEOs, chairs of the board, chief financial officers, presidents, and vice presidents.

Unlike studies that counted each trade reported as a separate transaction, our study combined trades that were executed on the same date but reported separately. We thereby reduced the number of transactions by roughly 20 percent, to 512,133 transactions. **Table 1** reports the number of shares (and their dollar values) bought and sold by insiders each year from 1987 through 2002. Sales accounted for 67 percent of all transactions, 76 percent of all shares, and 93 percent of all values transacted.

A steady increase in insider transactions occurred in the 1987–2002 period up until the end of the 1990s bull market. On average, in each year, insiders transacted trades in 4,704 companies' shares, for an average of 6.8 trades per company.

Whereas most previous studies adopted the event-study methodology to analyze abnormal returns following the report of insider transactions, in this study (following Lakonishok and Lee), we based portfolios on reported insider trades in the six months prior to the portfolio formation date. But unlike Lakonishok and Lee, who used annual rebalances to examine returns in subsequent periods of up to three years, we formed portfolios at the end of each calendar quarter and analyzed the returns in the following quarter. Use of shorter and nonoverlapping periods for performance measurement may have caused us to miss abnormal returns long after insider report dates, but it increased the number of observations and thus improved our

Table 1. Yearly Insider Trades, 1987–2002

	Purchases			Sales			
Year	No. of Trades	No. of Shares (millions)	Value of Trades (millions)	No. of Trades	No. of Shares (millions)	Value of Trades (millions)	No. of Companies
1987	9,435	43.2	$ 406.3	13,320	129.8	$ 2,655.8	3,745
1988	6,189	35.8	234.2	12,038	115.8	2,181.5	3,261
1989	6,040	29.8	308.2	12,589	126.8	2,313.9	3,351
1990	9,844	47.0	326.1	10,478	115.8	2,184.2	3,454
1991	5,827	32.9	197.8	19,048	262.2	5,848.1	3,636
1992	6,454	46.0	417.7	19,959	305.4	7,366.7	3,972
1993	6,791	55.7	582.1	19,209	309.2	7,016.6	4,266
1994	10,136	79.7	734.8	16,069	244.9	5,640.8	4,765
1995	9,513	73.2	658.9	22,825	354.3	9,468.0	5,170
1996	10,025	89.7	1,222.0	22,299	461.9	14,411.1	5,633
1997	11,977	121.5	1,332.1	30,000	541.4	17,759.8	6,195
1998	18,687	178.2	1,542.4	27,817	602.3	22,627.1	6,323
1999	17,310	196.2	2,407.9	25,399	727.7	33,160.0	5,890
2000	14,223	212.7	1,527.6	29,063	821.5	36,944.4	5,602
2001	12,300	412.2	819.2	36,976	1,199.3	30,756.1	5,236
2002	11,450	583.2	3,200.2	28,843	844.0	18,418.4	4,773

Note: Trades executed before the end of 2002 but reported after February 2003 are not included.

interpretation of the statistical significance of abnormal returns. To avoid skewed returns resulting from transactions in the shares of very small companies, we narrowed our universe to include only stocks that were among the largest 3,000 stocks at the time of portfolio formation.

For every quarter, starting from June 1987, we calculated the *net* total shares purchased or sold for each company over the prior six months. We included trades that were reported before and up to the last day of the quarter for two reasons. First, the processing delay is usually short.[1] Second, no previous study has found meaningful abnormal price movements during short windows around insider trade dates.

For our sample, the average gap between transaction and report date was 31.8 days and the median was 24 days. This gap will shorten dramatically in the future. Until August 2002, insiders had up to the 10th day of the next month to report their trades, but a few high-visibility insider trading and corporate accounting scandals amid the burst of the 1990s stock market bubble caused the SEC to tighten reporting rules. Now, insiders are required to report their trades within 48 hours of the transaction.

To calculate shares traded as a percentage of shares owned, we added up for each company the last reported number of shares owned over the six months for all insiders and added (subtracted) the net total shares sold (purchased). In the case of multiple reports by the same insider, reported holdings plus (minus) shares sold (purchased) are often different from holdings reported on the previous filing. The probable cause is that insiders receive new shares between filings—through either option exercise or stock compensation. Although our choice of inferred beginning-of-period holdings (rather than actual reported holdings from the last filings before the formation period) may seem arbitrary, it has several advantages. First, it does not require that an insider file a prior report before the current formation period. Second, even if an insider filed a report before the current formation period, that report may be outdated. Finally, any new shares received through option exercise or stock compensation during the formation period are likely to have been anticipated and, hence, be a part of the insider's consideration when trading.

Of all reported transactions, about 12 percent did not include holdings data. Some insiders may have used a blank to denote zero shares owned after a sale, but we found that a significant number of purchases also had missing holdings information. For calculating the percentage, we used trades by an insider only if that person reported holdings on his or her last filing during the formation period. But for net total shares purchased or sold, we included all transactions. The example in **Table 2** illustrates our method.

Table 2 reflects five insider trades by three insiders during the six months ending June 1995. The net total number of shares sold is 14,000, simply

Table 2. Illustration of Calculation of Net Total Shares Traded and Percentage of Shares Owned

Trader	Trade	Shares	Date	Report Date	Holdings
Insider A	Bought	1,000	04/06/95	05/08/95	1,000
Insider B	Sold	5,000	01/15/95	01/23/95	5,000
Insider B	Sold	2,000	04/15/95	05/02/95	
Insider B	Sold	3,000	04/16/95	05/02/95	2,000
Insider C	Sold	5,000	05/02/95	05/10/95	NA

Notes: The net total shares sold by insiders for whom we have holdings information is 9,000. The derived beginning shares owned by insiders with holdings information is 12,000. The figure for shares sold as a percentage of shares owned is 75 percent.

NA = not available.

the sum of all sold trades minus the bought trades. Insider B reported twice and received 2,000 new shares between the two filings. Her second and more recent filing indicates that she has 2,000 shares left after selling 5,000 shares in April. Insider C did not report his holdings; thus, his trade is excluded from the calculation of percentage of holdings.

Our methodology of using aggregate insider trades and holdings to calculate percentage of shares owned gives more weight to those insiders who trade and own larger shares of the company. This approach is reasonable if these significant insiders are more influential and better informed than insiders who own few shares.

Insider Trading and Future Returns

At the end of each quarter from June 1987 through September 2002, we calculated net total shares traded in each stock in the prior six months. **Table 3** reports summary statistics for, separately, stocks with net insider purchases and stocks with net insider sales over the six-month formation period. Note the much greater number of net total shares sold than of net total shares purchased.

Table 3. Characteristics of Stocks Based on Net Total Shares Traded, 1987–2002

Characteristic	Net Purchases	Net Sales
Average net total shares traded	28,894	133,608
Average prior six-month return (%)	4.94	16.23
Average book-to-price ratio	0.62	0.41
Average market capitalization ($ millions)	1,348.9	4,680.5
Average next three-month return (%)	4.05	2.36
Average next three-month excess return (%)	0.83	0.16
No. of observations (company-quarters)	20,740	60,002

Based on average book-to-price ratios (B/Ps), the two groups also exhibit a significant difference in valuation. In addition, the stocks with net purchases were the stocks of smaller companies than were the stocks with net sales.

To calculate returns, we formed 62 quarterly portfolios (one of net purchases and one of net sales) in the June 1987–September 2002 period, for a total of 80,742 company-quarters with insider trading. Consistent with previous research, Table 3 shows that insiders appear to be contrarian investors: They sell when prices seem high and buy when they seem low. Insiders seem better informed than the market. The stocks with net purchases earned, for raw sales in subsequent three-month periods, an average 1.69 percentage points more than the stocks with net sales. This difference in average absolute returns is partly a result, however, of insiders' ability to time the overall market (see Lakonishok and Lee). To measure insiders' pure stock-selection ability, therefore, we calculated excess returns, which we defined as raw returns minus the average return of all stocks in the universe in each quarter. As Table 3 shows, the difference in average excess returns between the portfolios of net sales and net purchases is considerably smaller than the difference in raw returns.

What may be surprising is that stocks with net insider sales produced positive (although not statistically significant) average excess returns in the subsequent three months. This finding differs from the findings of earlier studies, which reported negative relative performance of stocks after insider sales (see Seyhun 1986; Lin and Howe). We believe our results reflect the fact that a small volume of sales simply to raise money for the executive is a positive statement about the company's future: The executive likes the prospects of her company and so sells as little as possible to raise the money she needs. The results are perhaps clearer in our study than in previous studies because our sample

includes the more recent period, when stock and option compensation became common and more central to an executive's compensation package than in the past. The work of Lakonishok and Lee perhaps supports this reasoning. They used data as recent as 1995 and found that stocks with more sales than purchases produced the same subsequent six-month returns as stocks with no insider trading at all.

The suggestion that insider sales of different volumes have different informational implications brings up the major point of this article: Not all insider sales are the same. To explore the idea that large sales may be driven by perceived overvaluation (and thus provide a negative signal) but many small sales are carried out to raise money or to reduce risk, we used shares traded as a percentage of shares owned to separate trades that may signal negative information from those that signal positive information. For stocks with net sales, we report the results for two groups—transactions of more than 100,000 net total shares sold and those of fewer shares sold.

Table 4 shows the results. For the most part, the larger the percentage of shares owned, the larger the magnitude of excess returns. The group of stocks with net total sales exceeding 100,000 shares had an average excess return of –0.55 percent, but of that group, those stocks for which shares sold accounted for more than half of shares owned had average excess return of –1.17 percent. Excess returns on stocks with the same level of shares sold but a lower percentage of holdings were negative but statistically insignificant. Among stocks with net total sales of fewer than 100,000 shares, those that accounted for at least half of shares owned had small and insignificant excess returns but those that accounted for less than half of the holdings had statistically significant positive excess returns.

In summary, we believe that both total number of shares sold and percentage of shares owned are proxies for the motivation of insider sales. When insiders sell a large number of shares and a large portion of what they own, they are likely to be motivated by perceived overpricing of their stocks. When insiders sell a small number of shares and also a small portion of their holdings, they are likely to be simply raising money to spend or to be modestly diversifying their holdings.

As Table 4 shows, percentage of shares owned is also useful for differentiating insider purchases. As net insider purchases increase as a percentage of shares already owned, positive excess returns increase. For stocks with only initial purchases, we could not, of course, calculate a percentage value of holdings. Initial insider purchases, however, do not seem to earn excess returns. For net new purchases, we found an insignificant excess return of 0.05 percent from 2,625 observations.

Size- and B/P-Adjusted Returns

Prior studies have found that market cap and book-to-price ratio are significant factors for explaining cross-sectional variation in stock returns (Fama and French 1992). Thus, to refine the information provided by insider trades, we added adjustments for size and B/P. These findings may be especially interesting because, as Table 3 shows, stocks with net sales and stocks with net purchases differ substantially in average market cap and B/P.

We ranked the stocks in our universe each quarter independently by size and by B/P and separated them into three groups containing an equal number of stocks for each attribute. The result was

Table 4. Excess Returns Based on Shares Traded as Percentage of Shares Owned, 1987–2002

	Percentage of Shares Originally Owned		
Group	Less than 10%	10–50%	More than 50%
Net shares sold			
Over 100,000 shares	–0.48	–0.24	–1.17**
No. of observations	3,932	7,776	4,397
0–100,000 shares	0.65**	0.44**	0.04
No. of observations	14,191	20,295	9,411
Net shares purchased	0.44*	1.24**	1.56**
No. of observations	8,468	5,175	4,472

Note: Excess returns are in percentages.

*Significantly different from zero at the 5 percent level.
**Significantly different from zero at the 1 percent level.

nine portfolios. We then subtracted from the three-month return on each stock with insider trading the average return of all stocks in the same group in which that particular stock fell. We call these returns the "size- and B/P-adjusted excess return."

The average quarterly (three-month) returns on the size- and B/P portfolios are shown in **Table 5**. As in numerous other studies, the high-B/P stocks outperformed the low-B/P stocks. Over the 1987–2002 period, large-cap stocks had higher average returns than small-cap stocks, but the difference is small. Also, note that the number of observations in the cells along the diagonal is greater than the number across any row or down any column, which indicates that size and B/P are correlated; the smaller-cap stocks tend to have the higher B/Ps.

Table 6 reports size- and B/P-adjusted excess returns for the stocks subject to insider trading. Because stocks with net sales had lower B/Ps and stocks with net purchases had higher B/Ps than the average stock, the size- and B/P-adjusted returns are smaller than the simple excess returns shown in Table 4. Nevertheless, the results are qualitatively similar.[2]

Finally, we ran a cross-sectional regression of size- and B/P-adjusted returns on insider trading measures. We defined three dummy variables—*LrgSale*, *SmlSale*, and *Buy*—which equaled 1 if the net total shares traded fell into the corresponding level defined in Tables 4 and 6 and equaled 0 otherwise. To measure the effect of percentage holding, we added interaction terms consisting of each of the three dummy variables multiplied by *PcntOwn*. The term *PcntOwn* was assigned a value of 0, 1, or 2 for each respective level of percentage holding defined in Tables 4 and 6.[3] Because we defined dummy variables for all levels of net total shares traded, we used no intercept for the regression. We chose this specification of the regression equation because it would allow us to clearly interpret the parameter estimates.

Table 7 reports the regression results. The coefficients on the dummy variables are average excess returns for small-percentage trades in each level of net total shares traded. For example, the coefficient on *LrgSale* is 0.20, suggesting that the small-percentage large insider sales earned an average abnormal return of 0.20 percent. These

Table 5. Average Quarterly Returns on Portfolios Based on Size and B/P, 1987–2002

Size	Low B/P	Medium B/P	High B/P	All B/P Groups
Large (%)	2.54	2.42	3.09	2.64
No. of observations	22,947	22,317	16,736	62,000
Medium (%)	1.52	2.36	3.42	2.44
No. of observations	20,417	21,159	20,424	62,000
Small (%)	1.65	1.97	3.26	2.39
No. of observations	18,636	18,524	24,840	62,000
All size groups (%)	1.94	2.26	3.27	2.49
No. of observations	62,000	62,000	62,000	186,000

Note: Stocks with missing returns were not included in calculating the means.

Table 6. Size- and B/P-Adjusted Excess Returns on Shares Traded as Percentage of Shares Owned, 1987–2002

	Percentage of Shares Originally Owned		
Shares Traded	Less than 10%	10–50%	More than 50%
Net shares sold			
Over 100,000 shares	–0.06	0.08	–0.81*
0–100,000 shares	0.68**	0.44**	0.06
Net shares purchased	0.38	1.06**	1.42**

Notes: Excess returns are in percentages, and numbers of observations are the same as reported in Table 4. For net new purchases, excess return was an insignificant 0.10 percent from 2,625 observations.

*Significantly different from zero at the 5 percent level.
**Significantly different from zero at the 1 percent level.

Table 7. Regression of Size- and B/P-Adjusted Excess Returns on Insider Trading Measures

Statistic	*LrgSale*	*SmlSale*	*Buy*	*PcntOwn* × *LrgSale*	*PcntOwn* × *SmlSale*	*PcntOwn* × *Buy*
Coefficient	0.20	0.74	0.41	–0.39	–0.30	0.54
t-Statistic	0.64	4.08	1.75	–1.54	–2.01	2.58

Note: The dependent variable is excess return.

results show that, on the one hand, even large insider sales did not predict negative abnormal returns if they represented only a small fraction of insider holdings. On the other hand, if insiders sold a small number of shares that also represented a small fraction of their holdings, the average future abnormal return was positive and statistically significant (as shown by the positive and significant coefficient on *SmlSale*). The coefficients on the three interaction terms all have the predictable sign. Insider sales and purchases contain stronger signals when shares traded account for a larger percentage of insider holdings.

Conclusions and Future Research

We used shares traded as a percentage of insiders' holdings to separate information-driven sales from other (liquidity- or risk-motivated) sales. We hypothesized that not all insider trades are the same. When insiders have negative information about their companies' business prospects, their sales are likely to be large in volume and to account for a large portion of their holdings. A small volume of sales that represents a small portion of insiders' holdings may indicate that the owners need to raise money but think highly of their company and, therefore, limit the amount of the holdings they sell. If so, a small volume of sales provides a positive signal for future stock returns.

The empirical results support our hypothesis. Using insider transaction data from 1987 through 2002, we found that only large sales that also accounted for large percentages of insiders' holdings predicted significantly negative future abnormal returns. Small sales that represented small percentages of shares owned not only did not predict poor performance but were associated with significantly positive abnormal returns.

Although the association of positive future performance with small volume/small percentage of sales may have been specific to the time period we studied (because option and stock compensation became common in the period), we believe that comparing shares traded with shares held is useful for differentiating the motivation and likely signaling of insider sales. Moreover, our findings may not be time specific, because we found percentage of shares owned to be useful also for differentiating the expected future return from insider purchases, which would not have been affected by increasing option and stock compensations. We found that insider purchases that were small relative to shares already owned predicted lower positive future returns than purchases that were large relative to shares already owned.

We chose to investigate the size and relative importance (to the insider) of insider trades, but other aspects of insider trading may also prove fruitful. For example, the length of the holding period may matter. Sales of shares that the insider has just received may contain less information than sales of shares that have been held for a long time. Or sales of shares obtained through exercise of options that are far from the expiration dates may indicate a negative view on the stock. Finally, although we used only trades and holdings of insiders who traded during the months of portfolio formation to calculate percentage of holdings, an aggregate measure of all insiders, including those who did not trade, might be a better predictor for the information content of insider trades. In short, the field of insider trading analysis still holds untested hypotheses.

Notes

1. For the insider trades in 2001 and 2002 for which we had data, the average processing delay from the report date to when the information was electronically available to all investors, or the keypunch date, was 1.8 days. The median delay was 1 day.
2. We also adjusted the returns on the insider trading portfolios for size and earnings/price and, separately, used a three-factor risk model that encompassed size, B/P, and prior-six-month momentum. In both cases, we found results very similar to those reported here.
3. Because the variable *PcntOwn* could not be defined for initial purchases, they were not included in the regression.

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