INSIDER TRADING DISCLOSURES: AN EFFECT ON THE WARSAW STOCK EXCHANGE

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Gastvortrag Saarbruecken, Juli 2013
Content:

1. Motivation
2. Literature
3. Methodology
4. Data
5. Results
6. Conclusions
7. Future Research
1) **Insider trading notion**
   - Superior information of insiders
   - Possible imitation of insider’s behaviour by investors
   - Public confidence versus insider trading
   - Government regulations against illegal insider trading activities
   - Market transparency: the insider trades are required to be disclosed

2) **Categories of insider trading**
   - The event of insider trading
   - Insider trading behaviour in conjunction with other corporate event

3) **No agreement in the literature about the profitability of insiders and the informative content of insider trading**

4) **Informational content of insider trading disclosures**
   - Effect on returns
   - Effect on volume

5) **The role of circumstances of the purchase of shares**
1) Support for EMH in its strong form


2) A significant positive effect on the stock prices

- Jaffe Special Information and Insider Trading, Journal of Business 47, 1974, 410–428
More recently:


Event study

Steps

• Determination of the event, and its announcement date
• Determination of event window and estimation window,
• Specification of the return generating model ,
• Estimation of the model parameters,
• Computation of the abnormal return of $i$th firm for day $t$ ($AR_{i,t}$) (as well as the cumulative abnormal return): $AR_{i,t} = r_{i,t} - E[r_{i,t} | I_{t1-1}]$,
Market model:

\[ r_{i,t} = \alpha_i + \beta_i r_{m,t} + \varepsilon_{i,t} \]

\[ \varepsilon_{i,t} \sim N(0, \sigma_i) \]  

were \( r_{m,t} \) market portfolio returns and \( \varepsilon \) represents the error term.

- Construction of a statistical test of event effect significance.

Standardized abnormal return of \( i \)th firm for day \( t \) (\( SAR_{i,t} \)):

\[
SAR_{i,t} = \frac{AR_{i,t}}{\tilde{\sigma}_i} \left[ 1 + \frac{1}{t_1 - t_0} + \frac{1}{t_1 - t_0} \left( \frac{r_{m,t} - \frac{1}{t_1 - t_0} \sum_{k=t_0}^{t_1-1} r_{m,k}}{\sum_{k=t_0}^{t_1-1} r_{m,k}^2 - \frac{1}{t_1 - t_0} \left( \sum_{k=t_0}^{t_1-1} r_{m,k} \right)^2} \right) \right]^{2}
\]

Test statistic

\[
Z_t = \frac{1}{N} \sum_{i=1}^{N} SAR_{i,t} - \frac{1}{N} \sum_{k=1}^{N} SAR_{k,t} \left( N(N-1) \right)^{\frac{1}{2}} \sum_{i=1}^{N} \left( SAR_{i,t} - \frac{1}{N} \sum_{k=1}^{N} SAR_{k,t} \right)^2
\]
For any sub-period within the event window restricted by $t_L$ and $t_U (t_L < t_U)$:

$$Z_{(t_L,t_U)} = \frac{\sum_{k=t_L}^{t_U} Z_k}{\sqrt{t_U - t_L + 1}} \quad (4)$$

Misspecification by confusing event (Aktas et al)

The Markov Switching Regression approach:

- **Two-regime process**: one regime with normal level of variance and one regime with high variance.

- The model parameters are assumed to be the same in both regimes
  \begin{align*}
  r_{i,t} &= \alpha_i + \beta_i r_{m,t} + \varepsilon_{i,1,t} & \varepsilon_{i,1,t} &\sim N(0, \sigma_{i,1}) & \text{if } S_{i,t} = 1 \\
  r_{i,t} &= \alpha_i + \beta_i r_{m,t} + \varepsilon_{i,2,t} & \varepsilon_{i,2,t} &\sim N(0, \sigma_{i,2}) & \text{if } S_{i,t} = 2 \\
  \text{and} & \sigma_{i,2} > \sigma_{i,1}
  \end{align*} \quad (5)

$S_{i,t}$ stands for not directly observable indicator variable (a first-order Markov process).
With the model (5) used to generate abnormal returns, the standardized abnormal return form (2) is modified by replacing $W$ with $\theta$.

**Basic definitions:**

1. Event day (the day when the disclosure took place).
2. The symmetrical event window covering ten days prior to the event day (the day when the disclosure took place) and ten days after it.
3. The pre–event window contains two hundred days prior to the event window.
4. Abnormal returns generated by (5).
5. Market portfolio returns approximated by returns of the market–capitalization weighted stock index WIG.
6. For six different sub–periods of the event window, we check the null hypothesis about no significant event effect by means of test statistic (4).
7. A combination firm–specific/market adjusted is the best way to generate the measure of firm–specific normal (non–event related) trading activity.

**Abnormal trading volume**

ATV analysed by the model (5) (applied the first differences in natural logarithm of firm trading volume (market trading volume)).
164 disclosures of insiders transactions in shares of their own companies (71 purchases and 91 sales) over period from July 1998 to June 2004.

**Table 1. Insider transaction disclosures on the WSE**

<table>
<thead>
<tr>
<th></th>
<th>Years</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1998</td>
<td>1999</td>
</tr>
<tr>
<td><strong>Purchases</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Member of the board</td>
<td>0</td>
<td>17</td>
</tr>
<tr>
<td>Member of the supervisory directors</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>Others</td>
<td>0</td>
<td>11</td>
</tr>
<tr>
<td><strong>Total Purchases</strong></td>
<td>0</td>
<td>35</td>
</tr>
<tr>
<td><strong>Sales</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Member of the board</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Member of the supervisory directors</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>Others</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td><strong>Total Sales</strong></td>
<td>3</td>
<td>28</td>
</tr>
<tr>
<td><strong>Total Purchases and Sales</strong></td>
<td>3</td>
<td>63</td>
</tr>
</tbody>
</table>
Selection requirements

1. Reliable and large enough firms to be quoted on the primary market of the WSE.

2. The information of insider trade in shares of a given firm should be close enough to identify the day in which this transaction indeed took place.

3. Exclusion from the sample all cases where insider transactions are related to (granted) options and warrants.

4. These requirements are fulfilled by one hundred sixty four disclosures (see Appendix A for more details).

5. Daily closing prices as well as the number of shares traded over a day for firms from PARKIET data base.
## Results

### A. Prices

#### Table 2. Test results for return series

<table>
<thead>
<tr>
<th>Sub-period ${t_L, t_U}$</th>
<th>Purchases</th>
<th></th>
<th></th>
<th>Sales</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average SAR</td>
<td>$\bar{Z}_{{t_L,t_U}}$</td>
<td>p-value</td>
<td>Average SAR</td>
<td>$\bar{Z}_{{t_L,t_U}}$</td>
</tr>
<tr>
<td>{-5,-1}</td>
<td>0.125</td>
<td>0.901</td>
<td>0.184</td>
<td>0.038</td>
<td>0.135</td>
</tr>
<tr>
<td>{-3,-1}</td>
<td>0.530</td>
<td>2.111</td>
<td>0.017</td>
<td>-0.120</td>
<td>-0.135</td>
</tr>
<tr>
<td>{-3,+3}</td>
<td>0.322</td>
<td>1.815</td>
<td>0.035</td>
<td>-0.465</td>
<td>-0.437</td>
</tr>
<tr>
<td>{+1,+3}</td>
<td>0.099</td>
<td>0.311</td>
<td>0.378</td>
<td>-1.062</td>
<td>-1.075</td>
</tr>
<tr>
<td>{+1,+5}</td>
<td>0.238</td>
<td>1.236</td>
<td>0.108</td>
<td>-0.269</td>
<td>-0.367</td>
</tr>
<tr>
<td>{-5,+5}</td>
<td>0.198</td>
<td>1.624</td>
<td>0.052</td>
<td>-0.078</td>
<td>0.127</td>
</tr>
</tbody>
</table>
1. The disclosures about insider purchases induce, on average, significant increase in stock prices in the period (-3; 3).

2. Insiders sell their shares from the many different motives, but they buy shares from only one motive – to gain profit.

3. Significance from day –3 to day –1 - possible leakage of information about insider transactions prior to the official disclosure.

4. No support for positive relationship between the information leakage and time which elapses between insider transaction and official announcement.

5. Also, none of other factors employed by Carter et al. seems to have explanatory power for the information leakage.
B. Abnormal volume

**Table 3.** Test results for trading volume series

<table>
<thead>
<tr>
<th>Sub-period ( {t_L, t_U} )</th>
<th>Purchases</th>
<th>Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average SAV</td>
<td>( \bar{Z}_{{t_L, t_U}} )</td>
</tr>
<tr>
<td>{-5,-1}</td>
<td>0.133</td>
<td>1.384</td>
</tr>
<tr>
<td>{-3,-1}</td>
<td>0.216</td>
<td>1.726</td>
</tr>
<tr>
<td>{-3,+3}</td>
<td>-0.002</td>
<td>0.165</td>
</tr>
<tr>
<td>{+1,+3}</td>
<td>-0.213</td>
<td>-1.420</td>
</tr>
<tr>
<td>{+1,+5}</td>
<td>-0.132</td>
<td>-1.326</td>
</tr>
<tr>
<td>{-5,+5}</td>
<td>-0.002</td>
<td>0.012</td>
</tr>
</tbody>
</table>

1. First cluster: An abnormal trading activity on three days prior to the official disclosure of insider buying activity.

2. Leakage of information possible.
Is imitation of insider behaviour profitable?

- Investment principle of copying insider behaviour
- May outsiders profit from signals which are transferred to the stock market by insiders who buy or sell shares in their own companies?
- The insiders such as executives and directors have superior information concerning their company prospects.
- Irrespective of its theoretical basis, all over the world, investors carefully observe insider activity.
- It is still believed that thanks to an imitation of insider investment decisions they are able to profit from information accessed only by insiders.

Gastvortrag Saarbruecken, Juli 2013
Examination of the profitability of investment strategies based on insider disclosures: the reference return portfolio approach which is similar to that of Gervais et al. (2001).

The test period for each stock position in the portfolio covers 130 trading days (approximately six months) and starts the day after the insider trading announcement is released.

The formulation of the reference return portfolio by taking a long (short) position in all stocks which were previously bought (sold) by insiders. One zloty is invested in every stock included in the portfolio.

At the same time, every long (short) position is offset by a short (long) position in a reference portfolio (here the market portfolio).

All positions are held without rebalancing until the end of the test period.

Offsetting each position by the reference portfolio, we are able to test the hypothesis that the average portfolio return is equal to zero, separately, for all the positions in stocks which were previously bought by insiders (Purchases) and all the positions in stocks which were previously sold by insiders (Sales).
Figure 1 contains the average returns of the reference return portfolio formulation strategies over the entire test period in two clusters separately, as well as the net return for these clusters taken together.

Because some of the firms previously included in our sample had incomplete stock price series over the test period, we reduced the number of events to one hundred and fifty four (66 purchases and 88 sales).

**Figure 1.** Average returns of the reference return portfolio formulation strategies

![Average returns of the reference return portfolio formulation strategies](image-url)
Outsiders who copy insider behaviour, resulting in stock purchases, would receive negative returns.

Taking into account the above-mentioned fact that in the case where an insider buys shares in his own company, the signal is more transparent for outsiders, this finding seems to be a bit surprising.

However, at least two other researchers (Brick et al., 1989 and more recently Jeng et al., 1999) found the same return pattern.

The authors based the investigations upon data from the U.S. stock market. In both cases it turned out that outsiders imitating insiders who bought stocks in their own companies experienced negative excess returns.
Two possible explanations for this phenomenon:

- **Firstly,** insiders are likely to sell shares immediately before negative information concerning their companies is issued. They may buy the shares in their own companies long before the good news becomes known to other investors. Hence, the observed negative return may be a consequence of the relatively narrow window over which profitableness of the respective portfolios is examined.
Two possible explanations for this phenomenon:

- **Secondly**, as demonstrated by Banz (1981) and Reinganum (1981), among others, there is an inverse relationship between stock returns and the market value of a given firm (the so-called size effect). Therefore, it is possible that the negative returns in the first cluster is a result of the overlapping of two opposing effects. The one associated with insider trades is positive, but the other, which is rooted in the high market value of firms included in the sample, forces returns down, so that the final effect is negative.

  On the other hand, outsiders who sell stocks which were previously sold by insiders, profit from it. Note that the average portfolio return in this cluster systematically increases over time.
In spite of the fact that insiders sell their shares for many different motives, the imitation of their investment decisions appears to be profitable.

Table 4 summarises test results for the significance of the average portfolio returns in the respective clusters at six different time-points.

<table>
<thead>
<tr>
<th>Test period (in trading days):</th>
<th>1</th>
<th>10</th>
<th>20</th>
<th>50</th>
<th>100</th>
<th>130</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchases (returns in %)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>0.443</td>
<td>-0.767</td>
<td>-0.312</td>
<td>-2.982</td>
<td>-3.960</td>
<td>-5.528</td>
</tr>
<tr>
<td>(returns in %)</td>
<td>(0.806)</td>
<td>(-0.735)</td>
<td>(-0.187)</td>
<td>(-1.243)</td>
<td>(-1.218)</td>
<td>(-1.341)</td>
</tr>
<tr>
<td>Sales (returns in %)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>0.331</td>
<td>2.266*</td>
<td>3.343*</td>
<td>6.200*</td>
<td>8.970**</td>
<td>8.569*</td>
</tr>
<tr>
<td>(returns in %)</td>
<td>(0.933)</td>
<td>(1.748)</td>
<td>(1.841)</td>
<td>(2.155)</td>
<td>(2.356)</td>
<td>(1.846)</td>
</tr>
<tr>
<td>Net (returns in %)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>0.379</td>
<td>0.966</td>
<td>1.777</td>
<td>2.265</td>
<td>3.429</td>
<td>2.528</td>
</tr>
<tr>
<td>(returns in %)</td>
<td>(1.224)</td>
<td>(1.109)</td>
<td>(1.405)</td>
<td>(1.151)</td>
<td>(1.305)</td>
<td>(0.783)</td>
</tr>
</tbody>
</table>

- The promising nature of the investment principle of copying the insider’s behaviour resulting in stock sales as a tool for gaining profit.
- In the cluster Sales the average portfolio return is a positive and statistically significant event at 1%
- The average portfolio return in the cluster Purchases is negative, though insignificant.
1. Importance of investigation not only of stock prices reaction but also trading volume reaction to the insider disclosures.

2. Significant impact of purchasing disclosure on prices and volume.

3. No informational content of insider sales.

4. Leakage of information about insider transactions prior to the official disclosure.

5. No evidence supporting positive relationship between the information leakage and time which elapses between insider transaction and official announcement.

6. Similar results as reported in the literature for developed stock markets.

7. The benefits to outsiders from public information about insider trading.

7.1 Outsiders, who copy the insider’s behaviour resulting in stock purchases, received negative returns.

7.2. Outsiders who sell stocks previously sold by insiders may profit from it, in spite of the fact that insiders might sell their shares for many different motives.

8. Low number of events included in the sample.
Future Research

1. Future research should reveal whether the inferences drawn here are true.

2. Examination of the profitability of insider trades by using Buy–and–hold strategy and other alternative techniques.