School of Economics and Management

Insider Trading & their chamber of secrets

Examining the information contained within insider trading before buyback announcements

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Abstract

This study investigates the relationship between insider trading activities and share repurchase announcements in the Swedish market. While buybacks and insider trading have been individually studied, their interaction remains underexplored. This research fills the gap by analysing insider trading patterns before buyback announcements and examining the impact on post-announcement market returns. The sample comprises 87 buyback announcements from 42 companies listed on the Stockholm Stock Exchange between 2016 and 2022, matched with peers using propensity score matching.

The findings reveal that insider trading increases significantly within the 1 month preceding the event compared to matched peers. Additionally, the results show that insiders are the most active within the month of the event, suggesting that insiders are taking advantage of the market conditions created by the event itself. Moreover, two event studies are conducted to explore the relationship between insider trading and repurchase announcements on abnormal returns. The first event study measuring the abnormal returns within a 3-day event window of the event finds a significant positive announcement effect for event firms compared to matched peers. Furthermore, the findings conclude that the announcement effect is significantly reduced when a buyback announcement is expected. However, there is no significant short-term relationship between insider trading and abnormal returns, thus disproving the joint theory on the Swedish market. The second event study conducted over a longer 250-day window, finds a significant positive correlation between insider trading and abnormal returns, suggesting that insiders possess superior knowledge about a firm's valuation. However, the combined effect of insider trading and buyback announcements within this window is insignificant. Further, the study finds no long-term effect on returns from repurchase announcements, suggesting the market efficiently revalues a company within the 3-day event window. The study concludes that while insider trading and buyback announcements individually convey valuable information to the market, their combined predictive power on abnormal returns is limited.

Keywords: Share repurchase announcements, Buyback announcements, Insider trading, Abnormal returns, Event-study

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1.0 Introduction

While buybacks and insider trading have been extensively researched individually (see, e.g., Dann, 1981; Vermaelen, 1981; Graham & Harvey, 2001; Brav, Graham, Harvey & Michaely, 2005; Dittmar & Field, 2015), the interaction between these two events remains underexplored (see, e.g., John & Mishra, 1990; Lee, Mikkelson & Partch, 1992; Babenko, Tserlukevich & Vedrashko, 2012; Bonaimé & Ryngaert, 2013). Moreover, even fewer studies have focused on the type of information insiders may possess and how this information is utilized in conjunction with corporate buyback announcements (Cziraki, Lyandres & Michaely, 2021). Furthermore, Cziraki, Lyandres, and Michaely (2021) studied the interaction between corporate events and insider trading, specifically, share repurchase announcements and seasoned equity offers. Additionally, they explored what types of information insiders might have.

Building on their findings, this study aims to test part of their hypothesis in the context of the Swedish market, specifically focusing on misvaluation and abnormal returns which has yet to be done to the best of our knowledge. This paper addresses this gap by investigating insider trading patterns before buyback announcements and examining their post-announcement effects on the market. Specifically, this study aims to determine whether insider trading activities can predict abnormal returns following buyback announcements and if these returns are enhanced by the joint signalling effect. Such an investigation provides insights into the informational content of insider trading and its perception by the market, thus contributing to the understanding of market efficiency and the strategic actions of insiders.

To examine the hypothesis, the study collects a sample of 87 share repurchase announcements made by 42 individual companies listed on the Stockholm Stock Exchange between 2016 and 2022. Further, the study assembles a subset of matched peers between 69 unique companies through propensity score matching. Propensity score matching is used to create a control group that is statistically similar to the treatment group, thereby minimizing selection bias and ensuring a more accurate comparison. Similarly to Cziraki, Lyandres, and Michaely (2021), the matching criteria include market capitalization (size), book value per share (BV/S), 12-month insider trading preceding the event, and 12-month stock returns preceding the event (Capital IQ, 2024). Furthermore, the study gathers insider trading data from

FinansInspektionen (2024). Altogether, a sample of 10,817 observations of insider trading was collected between the event firms and matched peers.

To measure whether insider trading tends to increase before a buyback announcement, the study begins by visually analysing the insider trading around buyback announcements. Thereafter, the study employs two event studies to test if increased insider trading before buyback events is correlated to higher abnormal returns (see, e.g., Cziraki, Lyandres & Michaely, 2021). First, the buy-and-hold abnormal returns (BHAR) of a 3-day event window are estimated. Specifically, the event window is set to the day before, the day of the event, and the day after [-1, +1] to account for potential data leakage and late responses from investors. Additionally, an event window of 250 trading days [2,252] is measured to analyse the longer-term effect on returns of a buyback announcement and insider trading.

By visually analysing the trading patterns before a buyback announcement we find that insider trading net buys peaks 1 month before the repurchase dates. On top of that, the percentage of active firms increases substantially in the months preceding the buyback announcements compared to the matched firms. These findings imply that insider trading conveys significant information to the market, although the precise use of this information remains yet to be investigated.

Moreover, the event study concludes that there is no significant relationship between insider trading and abnormal returns for event firms in the short-term BHAR [-1,1], thus disproving the joint signal theory for Swedish firms. However, consistent with previous literature (see e.g., Dann, 1981; Vermaelen, 1981), the study finds a significant positive announcement effect of 1.63 % between event firms and matched peers within the 3-day event window. Additionally, the study finds that the announcement effect is significantly reduced when an announcement is expected, which is in line with the findings of Dittmar and Field (2015). On top of that, the study finds a significant positive long-term relationship between insider trading and abnormal returns (BHAR [2,252]) across the total sample, which is in line with previous literature (see e.g., Lakonishok & Lee, 2001; Cohen, Malloy, & Pomorski, 2012). Specifically, a one standard deviation increase in the Net Buy Volume of insider trades leads to a 9.36 % increase in abnormal returns over the 250-day event window. However, this relationship is inconclusive for event firms, as the effect is less pronounced and insignificant in comparison to matched firms.

In summary, the study provides robust evidence that insider trading does contain information about a firm's value but only individually and not jointly with buyback announcements. Similarly, buyback announcements contain valuable information about a firm's value individually.

The remainder of the study consists of 4 sections. The next chapter, chapter 2 goes through the theoretical framework as well as previous literature on the subject. Chapter 3 presents the data and methodology and is divided into three sections. The first section describes the data collection and cleaning processes, along with the descriptive analysis of the sample. The second section explains the methodology used to analyse the dynamics of insider trading. The final section outlines the methodology of the event study. Furthermore, Chapter 4 presents and discusses the results obtained from the insider trading data around events, along with the event study results. Finally, in chapter 5 the conclusion and future research are presented.

2.0 Theoretical Framework & Previous Literature

Akerlof (1970) proposed the concept of information asymmetry in his paper "The Market for Lemons". He centred his ideas on the imbalance of information between sellers and buyers in the used car market. He explained that the sellers know what cars are of low quality (lemons) and what cars are of great quality (peaches), whilst the buyers cannot distinguish a lemon from a peach. His example explains the concept of information asymmetry. In financial markets, this theory is applicable in the same way. Insiders, such as executives or board members, often have more knowledge about a firm's prospects, health or strategies. In the context of this study, insider trading and buybacks serve as an illustration of information asymmetry to investors. An insider might use their superior knowledge to make decisions and thus signal information to the market.

Building on the foundations of information asymmetry, Spence (1973) introduced the signalling theory. He suggested that obtaining a degree in school serves primarily as a signal. Similarly, in financial markets, corporate actions such as share repurchases and insider trades can signal the firm's prospects to the market. When a company announces a repurchase or engages in insider trading, it signals to the market that the stock could potentially be undervalued.

Further expanding on this concept, Myers and Majluf (1984), along with Korajczyk, Lucas, and McDonald (1991), explain how information asymmetry between insiders and investors influences investment decisions. Myers and Majluf (1984) introduced the Pecking Order Theory, which shed light on why equity offerings are often perceived negatively by the market due to the signalling of potential overvaluation or financial distress. Conversely, this framework can also be used to understand why buyback announcements are often interpreted as signals of undervaluation or managerial confidence in the firm's prospects.

Supporting this perspective, empirical evidence from surveys conducted among CEOs indicates that misvaluation is a pivotal consideration in deciding whether to pursue equity offerings and repurchases (Graham & Harvey, 2001; Brav, Graham, Harvey & Michaely, 2005). These findings suggest that managerial actions, whether in the form of corporate decisions like buybacks or personal investments as in insider trading, are influenced by their assessments of firm valuation relative to market prices.

Additionally, Seyhun, 1992, Jenter (2005), Piotroski, and Roulstone (2005) propose that this asymmetry does not solely stem from insiders acting on material non-public information. Instead, they suggest that insiders have a superior ability to interpret and assess publicly available information about their firms. This enhanced ability enables them to make more informed trading decisions compared to the average investor. Expanding on the value of insider trading as a market signal, Seyhun (1992), along with Lakonishok and Lee (2001) and Cohen, Malloy, and Pomorski (2012), provide empirical evidence that insider purchases are predictive of future returns.

Similarly, corporate share repurchases can also serve as significant signals. Studies have shown that repurchase announcements lead to value increases (see, e.g., Dann, 1981; Vermaelen, 1981; Dittmar & Field, 2015). Dann (1981) finds that the value of a firm increases significantly within one day of the repurchase announcement, attributing this to the information contained in the repurchase signal. Vermaelen (1981) draws similar conclusions, indicating that repurchase announcements serve as a positive signal to the market. He finds abnormal returns from repurchase announcements and notes that repurchase offers via a tender offer yield the highest abnormal returns. Grullon and Michaely (2004) and Peyer and Vermaelen (2009) further find that repurchase announcements result in significantly higher returns in the long term. Furthermore, Recent studies suggest that the event effect from buybacks have not disappeared (see, e.g., Ben-Rephael, Oded & Wohl, 2014; Dittmar & Field, 2015). Manconi, Peyer, and Vermaelen (2018) show that these findings are true outside of the US as well.

Several explanations for the event effect of the buyback announcement have been offered. Mispricing is a common explanation (see e.g., Dann, 1981; Vermaelen, 1981; Kahle, 2002; Dittmar & Field, 2015). Another is that buybacks are associated with lower future risk. Grullon and Michaely (2004) argue that buybacks lead to a lower future cost of capital, with investors initially underestimating this decline, thus generating long-term abnormal returns as the market adjusts. For example, a lowered cost of capital would lead to a higher valuation due to the reduced expense of financing. If this reduction is underestimated, the company's value will deviate from its true value. Over the long run, this under-pricing would be corrected, leading to abnormal returns as the market adjusts. Jakob and Valta (2023) further explore this phenomenon, noting that firms perceived as under-priced experience the largest

decreases in cost of capital and the highest long-term returns following repurchase announcements, indicating that repurchases correct temporary overestimations of the firms' cost of capital.

Furthermore, Ben-Rephael, Oded and Wohl (2014) and Dittmar and Field (2015) explore whether firms buy back stock at a discount, finding that companies indeed purchase their stock significantly below the average market price over various horizons. On top of that, Dittmar and Field (2015) discover that companies engaging in infrequent buybacks yield the highest abnormal returns, indicating a strategic component to the timing and frequency of buybacks.

Considering this, the relationship between insider trading and share repurchase announcements has become a key area of interest in financial research, offering valuable perspectives on how insider activities can affect the market's response to buybacks. This concept, often referred to as the "joint signal theory" introduced by John and Mishra (1990), suggests that insider trading before corporate event announcements can significantly enhance the credibility and market impact of those buybacks. By aligning insider buying with corporate buyback announcements, firms send a compounded positive signal that often results in stronger market reactions compared to either event occurring independently.

Lee, Mikkelson, and Partch (1992) build upon this foundation by demonstrating that insider buying intensifies before fixed-price repurchase offers, reinforcing the market's perception of these buybacks as value-enhancing events. Babenko, Tserlukevich and Vedrashko (2012) and Bonaimé and Ryngaert (2013) further illustrate that the timing and structure of insider trades around repurchases can predict subsequent long-term stock performance, indicating that insiders effectively use private information to time their transactions around repurchase strategically. Cziraki, Lyandres, and Michaely (2021) delve deeper into this phenomenon, investigating how the interaction between insider trades and equity offerings, including repurchases, informs the market about underlying firm value, suggesting that these combined actions serve as a joint signal to investors.

Moreover, BenRephael, Oded and Wohl (2014) find a positive relationship between insider trading and buyback offers, indicating that when insiders purchase shares, it often precedes or coincides with corporate buyback announcements. This pattern suggests that insiders, aware

of the firm's undervaluation or forthcoming positive developments, exploit this timing for both personal and shareholder gain.

In summary, the empirical evidence strongly supports the notion that both buyback announcements and insider trading individually serve as significant market signals. The evidence also suggests that when combined, these signals have a prominent impact. This study aims to address the joint effect by first analysing the relationship between insider trading and repurchase announcements. It will then examine whether their combined effect can predict abnormal returns.

3.0 Methodology

The methodology section is divided into three parts. Part 1 explains the data collection approach, including the descriptive analysis. Part 2 presents the methodology used to visually explore the dynamics of insider trading patterns before and after buyback repurchases of event firms in comparison to non-event firms. Finally, part 3 outlines the methodology of the two event studies conducted on different time horizons to investigate whether the joint relationship between insider trading and buyback announcements is predictive of future returns.

3.1 Data & Descriptive Analysis

The study started with collecting buyback announcements made in the Swedish market between 2017 and the end of 2022. This period was chosen due to the availability of insider trading data. The corporate actions and transactions were available at Nasdaq (2024), which provided the transactions made during the period. However, it did not provide the buyback's initial announcement dates, only the actual transactions. Moreover, by first acknowledging the transactions of repurchases, we made sure the sample included only firms that were involved in buybacks as some firms may announce buybacks but never execute any transactions (Dittmar & Field, 2015). This is important as it could affect the trading decision of an insider. Additionally, in line with Bonaimé and Ryngaert (2013), the study made sure to collect only non-trivial buyback announcements. Specifically, all buybacks where a company issues equity to immediately repurchase the same shares were excluded from the sample. To map the initial announcement dates, the data had to be manually extracted from the corporation's websites. With this approach, a sample of 87 repurchase announcements between 42 corporations was collected.

Moreover, the distribution of the buyback announcements increased with each year, quadrupling from 2017 to 2022 (Table 1). All companies are or have been traded on the Nasdaq Stockholm exchange. In line with Cziraki, Lyandres, and Michaely (2021), financial firms were excluded due to potential regulatory restraints affecting corporate events and insider trading.

Table 1. Repurchase Announcements

The table presents the distribution of share repurchase announcements from 2017 to 2022. It shows the number of repurchase announcements each year and their corresponding share as a percentage of the total announcements over the period.

Event		
	Observations	*Share (%)*
2017	6	*7%*
2018	10	*11%*
2019	11	*13%*
2020	16	*18%*
2021	20	*23%*
2022	24	*28%*
Total	87	*100%*

Next, the data on insider trades was extracted from FinansInspektionen (FI). The insider data provided by FI stretches from July 3, 2016, when the European Parliament and Council Regulation (596/2014/EU) on market abuse (MAR) came into force and became directly applicable in Swedish law (FinansInspektionen, 2024). In line with the buyback announcements, the sample stretches between 2016 and the end of 2022. Furthermore, the assembled data was cleaned and standardized. Firstly only "active" trades were kept from the sample, in contrast to "revised" and "obliterated" to save only the trades which took place. Additionally, buying and selling assets or instruments have many synonyms, thus the buy and sell side had to be regulated. Acquisition, allocation, subscription, redemption increase, and conversion increase were all set to the types of buy forms. In contrast, divestment, redemption decrease, and conversation decrease were set to the types of sell forms. This approach allowed the buy and sell sides to be standardized without losing any viable information.

In addition, in line with Cohen, Malloy, and Pomorski (2012) the insider trades were divided into two groups: routine trades and opportunistic trades. As Cohen, Malloy, and Pomorski (2012) suggested, a routine trade is defined as insider trading in the same calendar month for at least 3 consecutive years. All other trades are defined as opportunistic. This study found 368 trades to be routine only around 7.3 % of the total sample. In contrast, 92.4 % of the trades were noted as first-time trades, and 0.3 % as neither of the categories. In line with their theory acquisitions and divestments made within a share repurchase program were additionally removed from the sample. In total, the study obtained a clean sample of 4519 observations of opportunistic insider trades.

Equation 1. Net Buy Volume

$$Net\ Buy\ Volume = \frac{(Total\ shares\ purchased - Total\ shares\ sold)}{(Total\ shares\ purchased + Total\ shares\ sold)} \quad (1)$$

To further analyse the insider data, the study aggregated the daily insider trading data at the monthly level, following the methodology of Cziraki, Lyandres, and Michaely (2021). Subsequently, net insider trading was calculated using the method provided by Lakonishok and Lee (2001), specifically focusing on the net buy volume as defined in Equation 1. The net buy volume ranges between -1 if all trades are sales and +1 if all trades are buys. This approach is used to standardize the data, thus effectively increasing the interpretability of the data. A drawback of this measure is the loss of precision as it does not account for the momentum when all trades are made in the same direction (Cziraki, Lyandres, & Michaely, 2021).

Furthermore, in line with previous literature (see e.g., Dittmar & Field, 2015), it has been proven that frequent announcers of buyback announcements yield lower returns. To test this theory, the study assigns a dummy variable to all serial repurchases. A repurchase event is classified as serial (1) if it recurs within the same year or the following year.

To increase the robustness of the findings, a propensity score matching process was conducted to find a control group with similar attributes. Similarly to Cziraki, Lyandres, and Michaely (2021), the matching was performed along four dimensions: size (market capitalization), book value per share (BV/S), past 12-month returns before the event, and 12-month insider trading preceding the event. All four metrics were gathered from the fiscal year preceding the event. Matching firms could not be an event firm within three years of an event, the year before, the year of the event, or the year after. The data was gathered from the screening tool in Capital IQ (2024).

The propensity score matching was executed through logistic regression and carefully assessed by the propensity score distribution after matching to ensure balanced covariates across treated and control groups. In line with the event firms, financial firms were excluded from the sample, and all matching firms are traded on the Stockholm Stock Exchange. Since the matching firms do not have a buyback announcement, a random date ± 15 days from the actual event firms' date was assigned to match the distribution of the event firms, while

keeping the sample random. Moreover, the same pre-process of collecting insider trading data for matched firms was identical to the one applied to the event firms.

This comprehensive matching process resulted in a sample of 69 firms, spread over 87 observations and 6,298 insider trades during the period from July 3, 2016, to the end of 2022. This robust methodology ensures that the control group closely mirrors the characteristics of the event firms, thereby providing a reliable basis for comparative analysis and reinforcing the validity of the study's findings.

Table 2. Descriptive Metrics

This table reports descriptive statistics for the sample of repurchase announcements (left panel) and matching firms without such announcements (right panel) collected for the period from July 3, 2016, to the end of 2022. The analysis includes events in which we have at least 12 months of stock return data available before the event. Book value per share (BV/S) represents the BV/S from the fiscal year preceding an event. Similarly, Market Cap (MC) represents the fiscal years MC preceding an event. Historical Returns: Ret6 and Ret12 are the cumulative stock returns of the firm measured over periods starting 6 and 12 months before the event and ending 20 days before an event, respectively. Insider Trading: Net-Buy-Volume is defined as (number of shares purchased – number of shares sold) / (number of shares purchased + number of shares sold) over the 6 months ending 1 month before the event. Trading Frequency is the proportion of active firms over the same period. Serial Repurchasing Events indicate the percentage of firms that announced share repurchases more than once within the same year or the following year. The number of unique firms and observations included in the analysis are also reported.

	Event Firms (1)			**Matching Firms (2)**		
	Mean	Median	Standard deviation	Mean	Median	Standard deviation
Valuation						
Book value per share (BV/S)	6.3	4.5	6.1	5.5	3.6	6.4
Market Cap (USD mn)	8151	2302	15193	6657	1505	14083
Historical Returns preceding the event						
6-Months	11.2%	7.0%	32.1%	7.0%	1.2%	28.1%
12-Months	20.8%	11.3%	46.1%	20.3%	10.6%	47.6%
Insider trading 6-month prior to the event						
Net-Buy-Volume	0.18	0.17	0.31	0.13	0.03	0.26
Trading Frequency	35.8%	33.3%	25.7%	32.4%	33.3%	25.7%
percentage of serial repurchasing firms		62%			26%	
Unique Firms		42			69	
Observations		87			87	

From Table 2, column (1) provides insights into event firms, where the average (median) book value per share was 6.3 (4.5) with a standard deviation of 6.1. This is comparable to the

matched firms in column (2), which had an average (median) book value per share of 5.5 (3.6) and a standard deviation of 6.4. The market capitalization for event firms averaged 8151 with a median of 2302 and a standard deviation of 15193, whereas matched firms had an average market cap of 6657, a median of 1505, and a standard deviation of 14083.

Historical returns preceding the event for event firms showed a 6-month average (median) return of 11.2% (7.0%) with a standard deviation of 32.1%, and a 12-month average (median) return of 20.8% (11.3%) with a standard deviation of 46.1%. Comparatively, matched firms exhibited a 6-month average (median) return of 7.0% (1.2%) with a standard deviation of 28.1%, and a 12-month average (median) return of 20.3% (10.6%) with a standard deviation of 47.6%.

In terms of insider trading, event firms had a net-buy-volume average over the 6 months preceding the event until 1 month before the event (median) of 0.18 (0.17) with a standard deviation of 0.31, while matched firms had an average (median) of 0.13 (0.03) with a standard deviation of 0.26. Trading frequency was similar between the two groups, with event firms at 35.8% (33.3%) and matched firms at 32.4% (33.3%). Furthermore, 62% of event firms engaged in serial repurchasing, whilst matched firms cannot effectively be serial announcers, they were assigned this property to create a comparable sample later for the event study. 26% of the matched firms were identified as serial announcers when run through the algorithm. In total, the sample for included 42 unique event firms and 69 unique matched firms, with 87 observations in each group.

3.2 Insider Trading around Repurchase Announcements

Earlier studies have found insider trading to increase before corporate events (see e.g., Lee, Mikkelson & Partch, 1992; Babenko, Tserlukevich & Vedrashko, 2012; Bonaimé & Ryngaert, 2013). To build on their findings this study collected a sample of purely Swedish corporations with repurchase announcements between 2017 and 2022. To compare insider trading in the months around the event, the insider data were clustered at the monthly level and standardized for comparison. Also, to investigate the dynamics of insider trading within the event firms compared to the matched firms, a portfolio of equal weights was constructed, calculating the average insider trading across all event firms and matched firms respectively. This procedure was repeated for each month of trading. Specifically, the study analyses the

trading behaviour from 12 months before the repurchase announcement until 5 months afterwards.

Furthermore, the study provides three measures to analyse, the average net buy volume across firms, the percentage of net buying firms and the percentage of active firms. More specifically the net buy volume is defined by equation 1. The percentage of net buying firms is defined as all firms with a positive net buy volume for a single month, and lastly, the percentage of active firms is defined as all firms with any activity during a month.

3.3 The Event Study

This part describes and presents the methodology of the event study introduced to measure the buy-and-hold abnormal returns around the announcement dates, using two different event windows: 3 days and 250 days.

3.3.1 The Event Study

Previous studies have shown that insider trading around share repurchase announcements can lead to higher future returns (see e.g., Babenko, Tserlukevich & Vedrashko, 2012; Bonaimé & Ryngaert, 2013). This part of the study aims to test whether insider trading around repurchase announcements yields higher returns in the Swedish market. To investigate this, we employ an event study, a well-established method explained by MacKinlay (1997). An event study tests whether the observed returns during the event window are significantly different from the expected returns in the estimation window, with the expected returns calculated on a specified model.

In this study, the estimation window is set to 250 days, starting 270 days before the event, and ending 20 days before the event. This choice of estimation window is consistent with e.g., Cziraki, Lyandres, and Michaely (2021). Also, it aligns with MacKinlay (1997), who states that the estimation window shall preferably be at least the length of the estimation window. The gap between the estimation window and the event window is intended to avoid potential data leakage effects. Moreover, the abnormal returns will be estimated using the market model as outlined by MacKinlay (1997) (Equation 2).

Equation 2. The Market Model

$$R_{it} = \alpha_i + \beta_i * R_{mt} + \varepsilon_{it} \qquad \varepsilon_{it} \sim N(0, \sigma^2_{\varepsilon it}) \qquad t \in estimation\ window \tag{2}$$

Where: R_{it} = Observed asset return, R_{mt} = Observed market return (OMXSPI)

(MacKinlay, 1997)

From equation 2, $\boldsymbol{R_{it}}$ is the assets returns calculated as the difference between dividends-adjusted daily closing prices. $\boldsymbol{R_{mt}}$ representing the market returns calculated from the OMXSPI, which is often used as the market portfolio of Sweden, reflecting the general movement of the Swedish market. To estimate the abnormal returns for each asset, an ordinary least squares (OLS) regression is conducted for each asset within the estimation window.

Equations 3 & 4. The Market Model (estimated) & Abnormal Return

$$\hat{R}_{it} = \hat{\alpha}_i + \hat{\beta}_i * R_{mt} \qquad t \in event\ window \tag{3}$$

$$AR_{it} = R_{it} - \hat{R}_{it} \tag{4}$$

Using the estimates of alpha and beta, the predicted returns during the event window are calculated. The abnormal returns are then obtained by subtracting the predicted returns from the observed returns.

Equation 5. Buy and Hold Abnormal Return (BHAR)

$$BHAR_{it}(t1, t2) = \prod_{t=t1}^{t2}(1 + AR_{it}) - 1 \tag{5}$$

Where: AR_{it} = Abnormal returns for firm i at time t.

In line with Cziraki, Lyandres, and Michaely (2021) this study uses the buy-and-hold abnormal returns (BHAR) metric presented in equation 5 to calculate the cumulative return over the event window. The buy-and-hold abnormal returns are calculated as the cumulative product of returns over a specified period, the event window. This measure is used as it is widely accepted as a proxy for reflecting the returns of an investor.

Furthermore, we will be applying a similar methodology as Cziraki, Lyandres, and Michaely (2021) to examine what explains the abnormal returns. First, we will examine the short-term effect on returns around the announcement date. The event window is set to [-1, +1] to account for potential data leakage and delayed responses from investors. In addition, to test

for longer-term effects on returns, we will conduct another analysis on the returns between days 2 and 252, with the event window set to [+2, +252].

3.3.2 Cross-sectional Regression Analysis

To examine the relationship between insider trading preceding buyback announcements, the study conducts a cross-sectional regression with the BHAR (buy-and-hold abnormal returns) as the dependent variable. As introduced in the previous section, the study includes matched firms to control the results against. This approach is crucial for several reasons: first, it allows us to analyse the event effect of the announcement; second, it enables us to measure if insider trading is only significant for firms that announce buybacks. In line with Cziraki, Lyandres, and Michaely (2021), we set up Equation 6 to measure the importance of each factor individually and jointly with event firms.

Equation 6. The Regression

$$BHAR_{it}(t_1\,,\,t_2) = \beta_0 + \beta_1 Event_{it} + \beta_2 NBV_{it} + \beta_3 Ret6_{it} + \beta_4 Serial\ BB_{it} + \beta_5(Event_{it}\ x\ NBV_{it}) + \beta_6(Event_{it}\ x\ ret6_{it}) + \beta_7(Event_{it}\ x\ Serial\ BB_{it}) + \varepsilon \quad (6)$$

The dependent variable of the regression is the BHAR [t1, t2] As mentioned earlier, matched firms are assigned a random event date ± 15 days around the actual event date since they do not have a specific event date. The first coefficient, Event-dummy(β_1), captures the event effect of event firms compared to matching firms. It indicates whether there are abnormal returns associated with the buyback announcements compared to if there had been no announcement. Based on previous literature, we expect this coefficient to be positive and significant in both the short and long term (see e.g., Dann, 1981; Peyer & Vermaelen, 2009).

Next, NBV or net-buy-volume (β_2) explains the effect of insider trading between 6 months preceding the event to the month before the event on the BHAR. For matched firms, we expect this term to be insignificant in the short term but significant in the long term, as previous research has found a positive relationship between insider trading and long-term returns (see e.g., Lakonishok & Lee, 2001; Cohen, Malloy, & Pomorski, 2012). However, to analyse insider trading before the event for event firms, we include the interaction term Event x Net-buy-volume (β_5), which aims to address the problem statement of this thesis. Cziraki, Lyandres, and Michaely (2021) found this coefficient to be significant and positive for both

the short and long term. Their findings were primarily based on the American market, and we aim to determine if this holds for the Swedish market.

In line with Lakonishok and Lee (2001) and Cziraki, Lyandres, and Michaely (2021), we include the cumulative return of the past 6 months preceding the event (β_3) and the interaction term for event firms (β_6). The 6-month returns are included to separate insider trading from contrarian trading (Lakonishok & Lee, 2001). Additionally, to test if the abnormal returns are reduced when a repurchase is expected, we add a dummy variable for serial buyback events (β_4) (Dittmar & Field, 2015). This term is 1 if the event belongs to a serial announcer. For matched firms, the coefficient is expected to be insignificant as they do not participate in a real event. However, we expect the interaction term Event x Serial BB (β_7) to be negative and significant, as previous studies suggest reduced returns when an event is anticipated (Dittmar & Field, 2015).

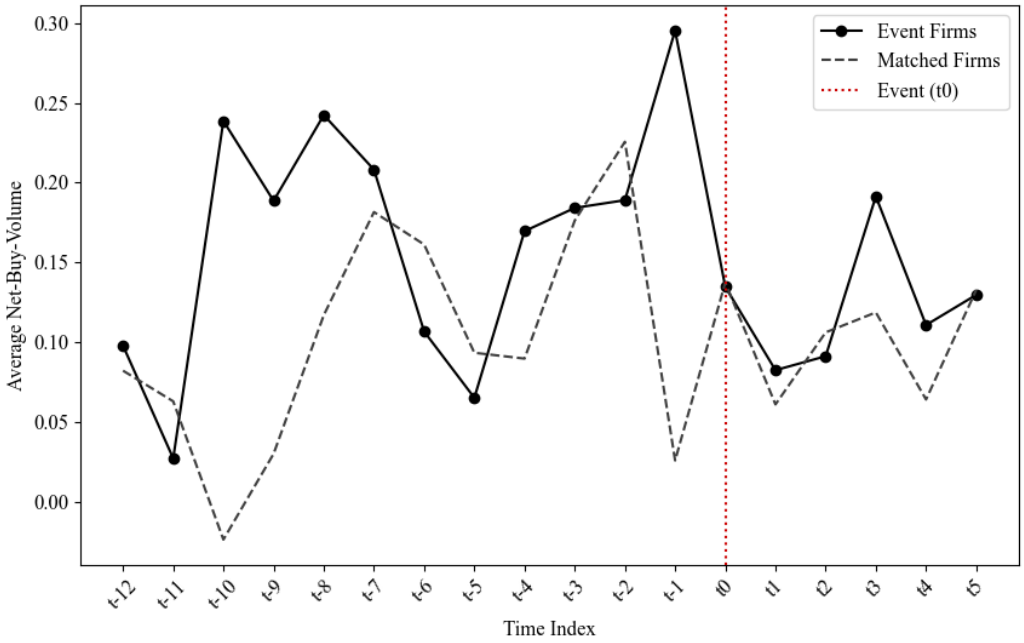
4.0 Results & Discussion

The Results & Discussion section is divided into 2 parts. Part 1 investigates the differences between insider trading in event firms compared to matched firms. Part 2 conducts two event studies analysing the relationship between insider trading and repurchase announcements.

4.1 Insider Trading around Repurchase Announcements

Figure 1. Net Buy Volume per month before and after the Repurchase Announcement

This figure illustrates the average Net Buy Volume per month before and after the repurchase announcement for event firms and matched non-event firms. Net Buy Volume is defined as (number of shares purchased – number of shares sold) / (number of shares purchased + number of shares sold). Event Firms are represented by solid lines and filled markers. Matched Firms are represented by dashed lines and empty markers. The x-axis (Time Index) denotes the months relative to the repurchase announcement: T-12 to T-1: 12 months to 1 month before the event, T0: The month of the event and T1 to T6: 1 month to 6 months after the event. The data for insider trading has been gathered from FinansInspektionen.se.



From Figure 1, it is evident that the monthly buy count varies significantly between months but peaks one month before the announcement for event firms. In comparison, the matched firms exhibit similar variance in the data but do not show a peak in trading one month before the event. This suggests that insiders tend to trade in anticipation of the event, as the buy count drops to lower levels at the time of the event and afterwards. Moreover, using an independent two-sample t-test, the study finds a significant difference at the 1% level between the net buy volumes of event firms and matched peers within the last month of trading, thus indicating that insiders of events trade in line with the announcements.

Figure 2. Percentage of Net-Buy firms before and after the Repurchase Announcement

This figure illustrates the average Net Buy firms per month before and after the repurchase announcement for event firms and matched non-event firms. Net buy firms are defined as all firms with a positive Net Buy Volume per month. Net Buy Volume is defined as (number of shares purchased – number of shares sold) / (number of shares purchased + number of shares sold). Event Firms are represented by solid lines and filled markers. Matched Firms are represented by dashed lines and empty markers. The x-axis (Time Index) denotes the months relative to the repurchase announcement: T-12 to T-1: 12 months to 1 month before the event, T0: The month of the event and T1 to T6: 1 month to 6 months after the event. The data for insider trading has been gathered from FinansInspektionen.se.

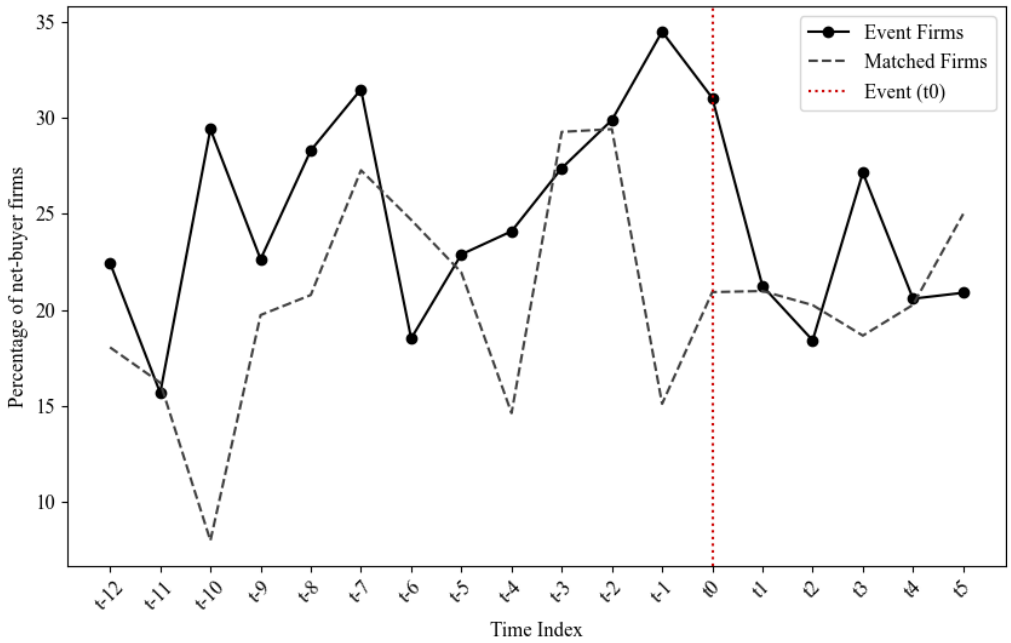


Figure 2 depicts the percentage of net buying firms, defined as all firms with a positive net buy volume per month. When comparing Figure 2 to Figure 1, the findings are similar, event firms tend to exhibit net buying behaviour before the repurchase announcements, with the highest buying activity occurring one month before the event. This trend suggests that insiders in event firms anticipate the positive impact of the repurchase announcement and increase their buying activity accordingly. Furthermore, the matched firms do not show the same pattern of consistency of net buying firms within 6 months of the event, adding to the argument that insiders are aware of the firm's undervaluation or forthcoming positive developments (BenRephael, Oded & Wohl, 2014). While there is some variation in the net buying for matched firms, there is no significant increase or trend in insider buying activity leading up to the corresponding dates.

Overall, these observations reinforce the hypothesis that insiders in event firms trade in anticipation of the repurchase event, as evidenced by the peak in net buying activity one month prior (Cziraki, Lyandres, & Michaely, 2021). The data for matched firms further supports this conclusion by showing the absence of a similar pattern, highlighting the unique insider trading behaviour associated with repurchase announcements. Nevertheless, considering the variation in the data, the findings should be viewed with a degree of caution.

Figure 3. Percentage of active Trading before and after the Repurchase Announcement

This figure illustrates the percentage of Active Firms per month before and after the repurchase announcement for event firms and matched non-event firms. The percentage of Active Firms is defined as all firms involved in any type of trading during a month. Event Firms are represented by solid lines and filled markers. Matched Firms are represented by dashed lines and empty markers. The x-axis (Time Index) denotes the months relative to the repurchase announcement: T-12 to T-1: 12 months to 1 month before the event, T0: The month of the event and T1 to T6: 1 month to 6 months after the event. The data for insider trading has been gathered from FinansInspektionen.se.

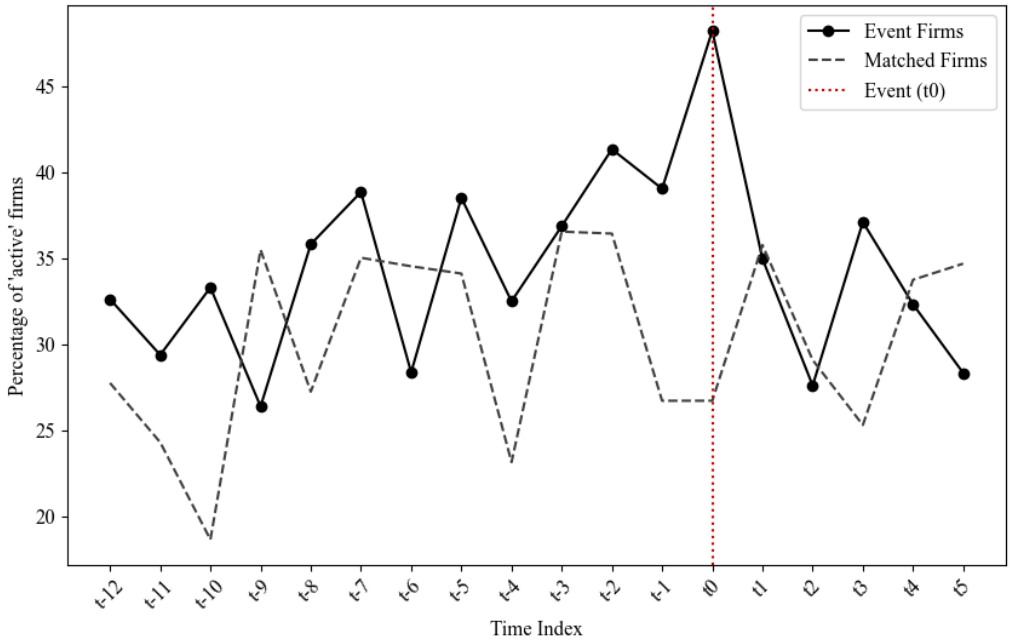


Figure 3 illustrates the percentage of firms involved in any transactions during the period measured, whether sales or buys. Compared to the net buy volume and net buyers, the trading activity in event firms seems to deviate from normal activity before events. Specifically, there is a noticeable increase in trading activity from 2 months before the event leading up to the repurchase announcements.

When compared to matched firms, event firms show a gradually increasing trend in trading activity that is not observed within their peers. This pattern suggests heightened insider

trading activity preceding repurchase events, which is not mirrored by matched firms. These findings indicate that insiders in event firms may be responding to the anticipated buyback announcement. Interestingly, unlike the previous metrics, the highest trading activity for insiders in event firms occurs during the event month. This peak in activity suggests that insiders may be reacting to the announcement itself or taking advantage of the market conditions created by the repurchase event. This could potentially suggest that insiders tend to buy 1 month before announcements and sell shortly after the event.

In summary, the study finds that the monthly net buy volume and the percentage of net buying firms peak one month before the announcement for event firms, a pattern not observed in matched firms. This suggests that insiders of event firms anticipate the positive impact of repurchase announcements and adjust their trading behaviour accordingly. Furthermore, the percentage of firms involved in any transactions leading up to the event increased every month and peaked at the month of the event, indicating that insiders were the most active around the actual event month itself.

4.2 The Event Study

Table 3. The Regression Results

This table provides the results of regressions of buy-and-hold abnormal returns (BHAR) around events and matched peers. The dependent variable in column (1) is the buy-and-hold abnormal return (BHAR) for the event window [-1,1] around the announcement of the event. The dependent variable in column (2) is the buy-and-hold abnormal return (BHAR) for the event window [2,252] days following the announcement of the event. Buy-and-hold abnormal returns are calculated using the Market model as the benchmark, with an estimation window beginning 270 days preceding the event and ending 20 days before the event. Event: A dummy variable that equals 1 if the observation is a repurchase event and 0 if the observation is a matched non-event.Net Buy Volume: Defined as (number of shares purchased – number of shares sold) / (number of shares purchased + number of shares sold) over the 6 months ending 1 month before the event. ret6: The cumulative return of the past 6 months preceding the event. Serial Buybacks: A dummy variable that equals 1 if the event is part of a series of buybacks within the same or following year. Event x Net Buy Volume: Interaction term between the event dummy and net buy volume. Event x ret6: Interaction term between the event dummy and ret6. Event x Serial Buybacks: Interaction term between the event dummy and the serial buybacks dummy. Heteroskedasticity-robust standard errors are reported below the coefficients. Also, the significance level is highlighted with *, **, and *** to address the level of significance at the 0.1, 0.05 and 0.01 levels. The data used in the regression was collected from FinansInspektionen.se & finance.yahoo.com.

Dependent variable: Buy & Hold Abnormal Returns		
	BHAR [-1,1]	BHAR [2,252]
	(1)	(2)
Intercept	-0.0057	-0.0756
	(0.004)	(0.048)
Event	0.0330***	0.0548
	(0.008)	(0.082)
Net Buy Volume	-0.0024	0.3274**
	(0.013)	(0.146)
ret6	-0.0050	-0.3663***
	(0.012)	(0.134)
Serial Buybacks	0.0093	0.00
	(0.008)	(0.084)
Event x Net Buy Volume	**-0.0002**	**-0.206**
	(0.018)	**(0.191)**
Event x ret6	0.0152	0.0984
	(0.017)	(0.18)
Event x Serial Buybacks	-0.0346***	0.0305
	(0.01)	(0.114)
Observations	174	174
Adjusted R-squared	0.103	0.079
Mean for Events	0.0124	-0.0104
Mean for Matched firms	-0.0039	-0.0571
t-stat difference	3.282***	0.855

Table 2 provides the results of the regression analysis. Column (1) presents the returns over the 3-day event window, and column (2) presents the returns over the 250-day event window.

Column 1: BHAR [-1,1]:

From column (1) in Table 2 the summary results from the regression are presented. The adjusted R-squared shows that the BHAR [-1, 1] could be explained by about 10 % of the included variables. This result is in line with Cziraki, Lyandres, and Michaely (2021), who presented an R-squared of 2.7 %. Furthermore, only 2 variables proved to be significant.

From column (1) we observe a significant difference in the mean returns between event firms and matched firms, thus indicating an announcement effect from repurchases. Specifically, we observe a difference of 1.63 percentage points if we count the difference between the mean returns (*mean for Events – mean for Matched firms*) of the event and matched firms, significant at the 1 % level. Support, from the Event dummy (β_1) the regression concludes a positive relationship significant at the 1 % level between announcing a buyback and not doing it. These results are in line with previous literature (see e.g., Dann, 1981; Vermaelen, 1981).

Moreover, we observe a significant reduction in the announcement effect when the buyback is expected (β_7). Specifically, the regression shows that when a buyback is expected the returns are expected to be around 3.5 percentage points lower compared to non-serial announcers. This finding is significant at the 1 % level and is in line with Dittmar and Field (2015) who state that the expected return is lower when an announcement is anticipated.

Nevertheless, the results conclude the interaction term Event x Net Buy Volume (β_5) to be insignificant and around zero. This suggests that insider trading before an announcement is insignificant to its announcement return or BHAR [-1, 1]. This finding is not in line with Cziraki, Lyandres, and Michaely (2021), who found a positive relationship between returns and insider trading in the US market. The difference in results could be explained by many factors, although it is evident that the Swedish market already priced in insider trading before the announcement, thus not affecting the announcement returns. Comparing the two different markets, the difference could be explained by different regulatory issues, such as different insider trading rules.

Furthermore, in line with our expectations, the additional variables ($\beta_2, \beta_3, \beta_4$ & β_6,) were found to be insignificant. The results are also in line with those presented by Cziraki, Lyandres, and Michaely (2021).

Column 2: BHAR [2,252]:

From column (2) in Table 2, the results from the regression on the BHAR [2,252] are presented. The adjusted R-squared is around 8 % a result very similar to Cziraki, Lyandres, and Michaely (2021) who presented an adjusted R-squared of 7 %. In similarity to the first regression, only 2 variables were found positive in the regression.

The mean abnormal return (BHAR [2, 252]) for the event firms was -1 %. In comparison, the mean for matched firms was -5.7 % (*mean for Events – mean for Matched firms*). However, this difference was not found to be statistically significant. Additionally, from the regression, we find the Event dummy to be insignificant (β_1). Again, this is a finding contradictory to previous research (see e.g., Grullon & Michaely, 2004; Peyer & Vermaelen, 2009; Cziraki, Lyandres, & Michaely, 2021), which found significantly higher long-term returns from event firms 4, 3 and 1 year after the event occurred. In contrast to previous research, our findings suggest that the market revalues a company efficiently within the BHAR [-1, 1]. In contrast, this finding is in line with the efficient market hypothesis, which states that all available information is reflected in the price, thus any information contained within insider trading shall already be reflected in the price.

In contrast to column (1), we find a positive significant relationship at the 5 % level between Net buy Volume and long-term abnormal returns (β_2). Specifically, a one standard deviation increase in Net Buy Volume results in a 9.36 % increase in BHAR [2,252]. This result suggests that increased insider trading is correlated to higher future returns, a finding in line with previous literature (see e.g., Lakonishok & Lee, 2001; Cohen, Malloy, & Pomorski, 2012; Cziraki, Lyandres, & Michaely, 2021). It supports their arguments that insiders have superior knowledge about theory firms' prospects. On the other hand, the interaction term between insider trading and the event firms (β_5) proved insignificant, indicating that this relationship was weaker for event firms compared to matched peers. This finding does not align with Cziraki, Lyandres, and Michaely (2021), who found a positive effect significant at the 10 % level.

Further, the cumulative returns of the 6 months before the event (β_3) are significant at the 1 % level, suggesting that companies that perform well before the event tend to experience losses in the 12 months following the event, a pattern akin to that observed by Cziraki, Lyandres, and Michaely (2021). The cause for this result could potentially be a reversion to the mean effect within the assets. Specifically, a 1 % increase in the 6-month return prior to the buyback announcement would result in a -0.36 % point reduction in the BHAR [2,252]. On the contrary, this relationship was not equally strong for the event firms. The interaction term for event firms and 6 months return (β_6) proved positive although insignificant. This indicates that the 6-month return preceding the event for event firms did not significantly affect the asset's future performance compared to the matched firms.

Lastly, the results show no significant returns from serial announcers for the sample nor the event firms indicating that the long-term returns are not affected by whether a buyback is expected within a year (β_4, β_7). This is in line with the expectations.

In conclusion, the results of this study reveal several key insights into the relationship between insider trading and buyback announcements in the Swedish market, and how these findings align with or diverge from the existing literature. The results confirm the positive announcement effect of event firms and the lowered returns from serial announcers in the short term. On the other hand, the study cannot conclude any significant relationship between insider trading before a buyback announcement on abnormal returns (BHAR [-1, 1]). Looking at the long-term abnormal returns, the study reaffirms the positive long-term effect of insider trading on abnormal returns. However, it cannot find any evidence of the positive relationship between insider trading and buyback announcements on abnormal returns, nor any positive long-term effects of a buyback announcement on abnormal returns.

5.0 Conclusion & Future Research

5.1 Conclusion

The study aimed to investigate whether insider trading before a buyback announcement can account for abnormal returns over two different time periods. To address this, the study first analysed the patterns of insider trading around repurchase announcements within event firms and their matched peers. Subsequently, a cross-sectional regression analysis was conducted with the buy-and-hold abnormal return as the dependent variable to identify the factors influencing the returns.

The study finds that repurchase announcements are associated with a positive and significant announcement effect within the 3-day event window around the announcement date. In addition, the study concludes that if an announcement is expected the returns are significantly reduced within the same window. Moreover, the study finds no significant short-term relationship between insider trading and abnormal returns within the 3-day event window around the announcement date. This finding suggests that while insiders may increase their trading activity before buyback announcements, this does not translate into abnormal returns.

By looking at the longer horizon (250 days) the study finds no significant relationship between buyback announcements and abnormal returns. This suggests that all information is priced within the 3-day event window around the announcement, indicating that the Swedish market is more efficient in comparison to the American market. Additionally, the study finds a significant relationship between insider trading and abnormal returns, thus suggesting insiders possess some superior knowledge about a firm's valuation and prospects. Lastly, the study concluded a negative significant relationship between 6 months' returns prior to the announcement and abnormal returns within the 250-day event window, suggesting that the stocks tended to mean revert.

In conclusion, the study provides robust evidence that insider trading does contain information about a firm's value but only individually and not jointly with buyback announcements. Similarly, buyback announcements contain valuable information about a firm's value individually.

5.2 Future Research

By only using the Swedish market, the sample size is reduced compared to other literature (see, e.g., Rephael, Oded & Wohl, 2014; Cziraki, Lyandres & Michaely, 2021). Also, due to the data limitations from FinansInspektionen, the insider data only stretches from the 3rd of July 2016 and onwards, further constraining the sample. A limited sample reduces the generalizability of the results; thus, redoing the analysis with a larger dataset and a broader time horizon would be of great interest. Additionally, the same type of analysis can be applied to a larger set of markets, e.g. the Nordic market to increase the sample size. This would provide more robust results, and thus increase the generalizability of the study.

Moreover, the question arises as to why the results of this study do not find any evidence of the joint theory. The answer could potentially lie in the sample or the time horizon, or simply that the market has become more efficient. Nevertheless, an interesting aspect to research would be to examine the differences between the Swedish and the American market such as the regulatory system against insider trading. By examining the differences between the markets, one might be able to explain this imbalance.

Lastly, in line with the most recent studies, (see e.g., Cziraki, Lyandres, & Michaely) the information contained within insider trading has been a topic of interest. They explore the effects of insider trading and the joint signal on operating performance, investor sentiment, and cost of capital. Their methodology would be interesting to apply to the Nordic markets and test their hypothesis as their results are the only ones within the field to the best of our knowledge.

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