An empirical analysis of the NZX's price query system

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Abstract

We examine the price query system used by the NZX to monitor compliance with its continuous disclosure regime. We focus on the proposition that "unexplained" price movements detected by the NZX's surveillance systems reflect speculative trading. Examining a sample of price queries where the companies responded with a "no news" announcement, we find evidence of significant abnormal returns immediately prior to the price query and smaller but significant partial reversal of abnormal returns immediately following the "no news" response. We interpret the absence of a full reversal to indicate that prices are based on information-based trading rather than speculative trading.

***JEL Classification*:** D82, G14, K22

***Keywords*:** Efficient markets, disclosure regulation, informed trading, event study

1. Introduction

One of the central aims of securities market regulation is to mitigate the information asymmetry that exists between different classes of investors, and in particular, the associated transfer of wealth from uninformed to informed investors (Kim 1993). Although insider trading is prohibited in many jurisdictions, insider trading laws can be difficult to police effectively. Requiring companies to immediately disclose price-sensitive information (i.e. continuous disclosure) can help create a more level playing field by eliminating to the opportunity for corporate insiders and other informed investors to trade at the expense of uninformed investors (Gething, 1998). This paper examines the price query system employed by the New Zealand Exchange ("NZX") to ensure that listed companies comply with its continuous disclosure requirements. Currently, the NZX will query a listed company when NZX surveillance staff detects a movement in the price and/or trading volume of a stock that cannot be explained by recent company announcements. The company is required to respond to the NZX within a specified period which then releases the response to the market.

Our study of the price query system is motivated by several considerations. First, little research is available on the effectiveness of the price query system in remedying an uninformed market. This is an important issue in New Zealand as securities market reform has continued despite only limited empirical evidence on the effectiveness of the current regime.[1] Continuous disclosure regimes have been adopted in other jurisdictions, including Australia, Canada, Hong Kong and the UK. Thus our research should be of interest to market officials in jurisdictions that have adopted, or chosen not

[1] The Securities Legislation Bill introduced into Parliament in November 2004 includes new insider trading and market manipulation laws and provisions permitting the Securities Commission to take enforcement action seeking civil penalties for breaches of securities laws (Securities Commission, 2005).

to adopt, continuous disclosure regimes since exchanges operating in a continuous disclosure environment are faced with the problem of monitoring compliance.[2]

Second, in an analysis of price queries issued by the Australian Stock Exchange (ASX), the ASX has observed that many small stocks are infrequently traded and this illiquidity contributes to the high number of alerts for these stocks (ASX, 2003). The ASX has also claimed that 85% of the "unexplained" price and volume movements detected by its market surveillance systems reflect speculative trading rather than information-based trading (ASX, 2002, 2003). We seek to test if this "speculative trading" explanation of price movements that trigger price queries also applies in the New Zealand market.

We examine the operation of the NZX's price query system using a sample of 102 price queries over the nine-year period from January 1996 to December 2004. Similar to studies by the ASX in the Australian market we find that the companies in our sample are predominantly small companies, with relatively low market capitalisation, trading at low prices and with low turnover. We then focus our attention on the price behaviour of stocks of companies in receipt of a price query in the 98 cases where the companies responded to the query with a "no news" announcement. Using the event study methodology, we find evidence of significant abnormal returns immediately prior to the date of the price query, followed by a partial but significant reversal in the period immediately following the "no news" response. We find this pattern holds for queries generated by "unexplained" price increases and price decreases. The absence of a full reversal in prices suggests that informed investors acting on private information rather than speculative traders are primarily responsible for the "unexplained" price

[2] See Golding and Kalfus (2004) for a brief description of the continuous disclosure regimes and enforcement records in these jurisdictions. While the chairman of the US Securities and Exchange Commission (SEC) suggested in 2001 the possibility that continuous disclosure receive legislative

movements prior to the query. Further cross-sectional regression analysis provides additional insights into a number of factors associated with abnormal returns around price queries. For example, we find evidence that pre-query price changes are larger for small companies and companies that have been previously issued price queries. On the other hand we find no significant difference in the price reaction to a NZX price query following amendments to the Securities Market Amendment Act 2002. These amendments, effective from 1 December 2002, gave statutory backing to the NZX disclosure rules under its listing requirements and also required large shareholders, directors and executives of companies to disclose details of their on-market trading in the company within 5 days of any sale or purchase of the company stock.

Our results cast some doubt on the speculation hypothesis of unexplained price changes. Rather we conclude that the price query system is only partially effective as a mechanism for remedying an uninformed market. In particular, "no news" announcements made by companies in response to price queries appear to lack credibility in the market. We surmise that the substantial transfers in wealth that occur in the pre-query period arise from informed investors acting on private information produced from publicly-available data rather than from breaches of either the insider trading regulations or the selective disclosure provisions of the continuous disclosure regime. However the size of the wealth transfers involved suggests that insiders may have earned abnormal gains from trading on inside information.[3]

The remainder of this paper is structured as follows. Section 2 discusses the monitoring and enforcement of the NZX's continuous disclosure system. Section 3 discusses two

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backing, the SEC instead chose to increase substantially the Form 8-K disclosure obligations of listed companies.

alternative interpretations of the price behaviour that triggers a price query. The methodology is presented in Section 4. Section 5 discusses the price query sample and data. Section 6 presents and discusses the empirical results. Further discussion is presented in Section 7. Section 8 concludes.

2. Institutional background

The price query system of the NZX is employed to monitor the compliance of listed companies with the NZX's continuous disclosure regime. The operation of the NZX's price query system has spanned two disclosure regimes. Prior to December 2002, the NZX's listing rules required listed companies to disclose "relevant information", defined as information in the possession of the company which would be likely to have a material impact on the company's stock price should it be disclosed (McLaughlin and Wallis, 2002). "Relevant information" was to be treated by the company as an asset, to be used for its overall benefit, and only to be released to the NZX immediately that it ceased to have greater value to the company (as distinct from its shareholders) than for the information to remain confidential.

Following amendments to the listing rules that took effect in December 2002, listed companies are now required to immediately disclose material information that is available on the presumption that the information belongs to all shareholders.[4] The

[3] Etebari et al. (2004) report that over the period 1995 to 2001, prior to the introduction of Securities Market Amendment Act 2002, insiders earned cumulative abnormal returns from purchases and sales over the calendar year following the transaction of 6.5% and -6.0% respectively.

[4] Non-disclosure is only permitted when all of the following criteria are satisfied: a reasonable person would not expect the information to be disclosed; the confidentiality of the information is maintained; release of the information would be a breach of law, or the information relates to an incomplete proposal or negotiation, is a matter of supposition or is insufficiently definite to warrant disclosure, is generated for internal management purposes, or is a trade secret (NZX, 2003)

definition of material information is also wider than under the previous “relevant information” rule.[5]

Monitoring compliance with the disclosure regime is one of the responsibilities of the Market Surveillance Panel (“Panel”). The Panel was established as an independent body by the NZX in 1989 and charged with the administration and enforcement of the NZX’s listing rules. One of the goals of the Panel is to ensure that trading takes place on an “efficient and fairly informed basis” (Market Surveillance Panel, 2001).

The responsibilities of the Panel in respect of the price query system have been largely unaffected by the reforms to the regulatory regime. Currently the staff of the Panel’s Special Division monitors trading activity in NZX-listed stocks for any unusual price or volume movements, a potential signal that the market is not fully informed. When staff of the Special Division believes this to be the case, they will query the company concerned by letter.

The standard price query asks four questions:

1. Is your company in possession of information which, if generally available to the public might reasonably be regarded as an explanation of the price variation?

2. Does your company have any reason to believe or suspect that any person has bought or sold securities on the basis of such information?

[5] At the same time legislation was enacted providing statutory backing to the NZX’s listing rules and introduced significant penalties for breach of these rules. As a result of these changes to both the listing rules and securities market law the post-December 2002 continuous disclosure regulatory framework closely resembles the regime introduced in Australia in September 1994.

3. Are there any matters of importance, concerning the company that the company is about to announce to the Exchange, and can any such announcement be made immediately?

4. Has any officer or other representative of the company made any statement which has become public or generally known which may account for the price fluctuation?

Companies are normally expected to reply to a price query within one trading day.

A positive response (i.e. "yes") to either Question 1 or Question 4 indicates that the company may not have fulfilled its obligations to either disclose immediately all material information or to refrain from making selective disclosures. Such a response, accompanied by a release of the material information should remove the informational disadvantage faced by uninformed investors. This type of response would suggest that price movements that triggered the query have been the result of trading by informed traders in possession of private information. These informed traders may include corporate insiders or investment professionals privy to selective disclosures. Since failure to disclose material information or breach of the prohibition on selective disclosure constitutes a breach of the continuous disclosure regime, one would expect company officers to be reluctant to respond to either Question 1 or Question 4 in the affirmative.

In contrast, a negative or "no news" response to the questions in the price query would suggest that the price movement that triggered the query may have been generated by the trading activity of speculators. In practice, however, many companies when providing a "no news" response also offer one or more "explanations" for the price movement. These explanations are varied and can include references to media speculation, changes in market sentiment towards the company and recent company announcements.

3. Theoretical development

Our primary focus is on the price behaviour of stocks during the period immediately before and after the price query. We are not aware of any NZX analysis of stocks that have been subject to price queries. However the ASX's analysis of price queries emphasises that stocks in "high risk" sectors are infrequently traded and are prone to speculation, features which promote stock price volatility and increase the likelihood of the stock coming to the attention of its surveillance staff (ASX, 2002).[6] This analysis blames speculative trading activity in infrequently traded stocks for the majority of "unexplained" price changes that generate price queries. This "speculation" argument is similar to the view expressed by critics of fraud-on the-market-theory that the market for small and infrequently traded stocks is inefficient (Robinson, 1990; Bernard et al., 1994; Brav and Heaton, 2003; Ferrillo et al., 2004).[7]

An alternative explanation for the price change that triggers a price query is that the price change is attributable to the trading activities of informed investors, those in possession of valuable private information. For example, the price increase might relate to as yet unannounced upward revision in an earnings forecast or the impending signing

[6] ASX analysis of surveillance referrals for the 2001 calendar year show that referral rates exceeded 30% in Diversified Resources, Chemicals, Healthcare and Biotechnology. Neagle and Tsykin (2001) examined 911 price queries issued by the ASX during the 1999 and 2000 calendar years and found that 80.8% had a market capital capitalisation of under $100 million and that many were in the resources and technology sectors.

[7] Critics of the application of the market model to fraud-on-the-market cases have identified a number of factors that distinguish between an efficient market and an inefficient market, including average trading volume, number of analysts following a stock, presence of market makers and arbitrageurs, shareholding of institutional investors, proof that stock prices react to unexpected company-specific information, market capitalisation, bid/ask spreads and free float (Robinson, 1990; Ferrillo et al., 2004). Empirical research finds evidence of inefficiencies in the pricing of stocks with low trading volume and smaller analyst following (Bernard et al., 1994; Barber et al., 1994).

of a major new sales contract. The informed trading argument also explains why smaller companies figure prominently in price query samples: informed trading is higher in these stocks because, when infrequently traded stocks are traded, it is usually because the investor has private information. The predisposition of small companies to be subject to greater trading by informed investors has been documented empirically (see Easley et al., 1996; Brockman and Chung, 2000).

The speculation and private information explanations have mutually exclusive implications. If the speculation hypothesis is true then we should observe a reversal in the price changes in the period following a "no news" announcement by the company. Alternatively, if the informed trading hypothesis is true, we should expect to observe very limited reversion in the stock price in the period following a "no news" response.

4. Methodology

We use the event study methodology to assess the merits of the alternative explanations. In respect of information disclosure, the event-study methodology has been used to examine the impact of stock suspensions invoked to improve the informational efficiency of stock prices (Kryzanowski, 1978; Kryzanowski, 1979; Howe and Schlarbaum, 1986) and to examine fraud-on-the-market litigation cases (Steen, 1994).

We define the event date, day [0], as the date the price query is issued by the NZX. We use the period [-210, -31] trading days prior to the event date to estimate the market model parameters. However the traditional single-factor market model is unsuitable for estimating expected returns and the measurement of abnormal returns when stocks do not trade each day. This is likely to be a problem in this study where many of the stocks ain the price query sample are small company stocks and suffer from thin trading.

To control for thin trading bias a "trade-to-trade" approach using multi-period event returns is applied. Under the trade-to-trade returns approach the observed multi-period return ending on day *t* is (see Maynes and Rumsey, 1993):[8]

$$R_{j,n_t} = \ln\left[\frac{P_{j,t}}{P_{j,t-n_t}}\right] = \ln\left[\frac{P_{j,t}}{\hat{P}_{j,t-1}}\frac{\hat{P}_{j,t-1}}{\hat{P}_{j,t-2}}\cdots\frac{\hat{P}_{j,t-n_{t+1}}}{P_{j,t-n_t}}\right] \tag{1}$$

where R_{j,n_t} is return to security *j* over n_t days, $P_{j,t}$ is the observed price for security *j* on day *t*, $\hat{P}_{j,t-s}$ is the unobserved price for security *j* on day *t* - s (i.e., on a day the stock does not trade), n_t is the length of the return interval ending on day *t*. This represents the number of days between observed or traded prices. ln indicates that natural logarithms are used.

The single factor market model becomes:

$$R_{j,n_t} = \alpha_j n_t + \beta_j R_{m,n_t} + \sum_{s=0}^{n_{t-1}} \varepsilon_{j,t-s} \tag{2}$$

where R_{m,n_t} is the return on the market index over n_t days (where n_t days matches the number of days between the observed or traded prices for security *j*), β_j is the parameter estimate for security *j* taken from ordinary least squares estimates, α_j is the intercept term for security *j* taken from ordinary least squares estimates and ε_{jt} is the error term.

The error term in equation (2) will by heteroscedastic with variance equal to $n_t\sigma_j^2$ (assuming the variance of residuals is proportional to the length of the period between

[8] Under an event simulation study Maynes and Rumsey (1993) report that using a methodology based on trade-to-trade returns is much better specified for all trading frequencies than returns forecast using a 'lumped' or 'uniform' treatment of missing trades. The lumped returns procedure assumes the stock return over non-trading days to be zero and assigns all the multi-period return to the day the stock

trades). To estimate the α and β parameters in equation (2), a weighting scheme must be introduced whereby the return data are divided by the square root of n_t. The parameters α and β are estimated by equation (3) below:

$$\frac{R_{j,n_t}}{\sqrt{n_t}} = \alpha_j \sqrt{n_t} + \frac{\beta_j R_{m,n_t}}{\sqrt{n_t}} + \mu_{j,t} \qquad (3)$$

This correction (equation (3)) ensures that var(μ_{jt}) is independent of n_t.

The abnormal return for security j over the event period is calculated as:

$$AR_{j,n_t} = R_{j,n_t} - E\left[R_{j,n_t}\right] \qquad (4)$$

where AR_{j,n_t} is the abnormal return for security j over the period n_t days and $E\left[R_{j,n_t}\right]$ is the expected return for security j over the period n_t days

Standard event study parametric statistical tests are used to detect evidence of abnormal returns (see Patell, 1976).

actually trades. The uniform procedure allocates the return equally over all days in a multi-period interval where the stock does not trade.

5. Sample and Data

5.1 Sample

The sample comprises all price queries issued by the NZX between 1st January 1996 and 31st March 2004. An initial sample of 117 price queries was compiled from information provided directly by the NZX, a search of the NZX's i-Search online database and searches of the Newzindex and Newztext Plus databases. The 117 queries were generated by 60 stocks.

Starting with the 117 queries in the initial sample, we eliminated queries from the sample where (i) closer inspection revealed that the queries either did not relate specifically to price movements (2 cases) or were sent shortly after the NZX received notification of an announcement by the company concerned (2 cases); (ii) the underlying security was a bond and not a stock (3 cases); (iii) the stock was not listed 210 days prior to the query date (4 cases); (iv) the stock traded on the New Capital Market (2 cases), or (v) the primary listing of the stock was offshore (2 cases). These screens reduced the initial sample to 102 queries.

We can partition this sample of 102 queries on the basis of either the price movement that triggered the query or the response of the company in receipt of the query. Of the 102 queries, 62 were issued in response to an unexplained price increase (our "price increase" sample) and the remaining 40 in response to an unexplained price decrease (our "price decrease" sample).

Of the 102 responses, we find that in 98 cases, the company responded to the query with the claim that it had no new information to release to the market (our "no news" sample). In the remaining four cases the company concerned responded with an announcement containing new information (our "news" sample).[9]

5.2 Data

We require daily closing stock prices adjusted for dividends and capital changes for each stock in the sample and the market index, the NZSX40 Gross Index. This data is obtained from Investment Research Group (IRG). We are also interested in the microstructural characteristics of stocks of companies that received price queries. We obtain this data from various issues of the NZX Fact Book. Specifically, we record the end-of-year market capitalisation, end-of-year market price, annual turnover and trading frequency over the period [-210,+30] surrounding the price query.

[insert Table 1 here]

Table 1 reports summary statistics of share price, market capitalisation, trading frequency and turnover of each stock in the sample. Where a company receives multiple price queries over the sample period, we only record the stock's characteristics for the year of the first price query. The data in Table 1 show that, except for trading frequency, medians are well below means, indicating that the distributions of the underlying variables have long right tails. For example, market capitalisation ranges from $1.5 million (Pure NZ) to $13,643 million (Telecom). The Jarque Bera statistics also confirm that the distributions are highly non-normal. In light of this, we pay more attention to medians than means.

The data in Table 1 show that the median market capitalisation of stocks in the sample is $68.6 million, the median stock price is $1.05, the median annual turnover is $16.9

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[9] Of the 4 announcements, three related to queries of a price decrease (hence are classified as "bad

million and the median liquidity ratio is 27.1%. That our sample of price queries is generated from predominantly small companies should be clear when we compare these figures with comparative data for the 15 constituent stocks of the NZSX15 Gross Index for the 2003 calendar year. These 15 stocks had a median market capitalisation of $1,835.6 million, a median stock price of $5.12, a median turnover of $477.3 million and a median trading frequency of 87.8%. Compared to the stocks in the NZSX15 Gross Index, the stocks in our sample have dramatically lower market capitalisation, trade at lower prices, have much lower turnover and trade less frequently. To a large extent, these comparisons should not be surprising since the majority of NZX-listed companies are small companies.

6. Empirical results

6.1 Price reactions to "no news" announcements

Table 2 presents the results on the behaviour of the average CAR[10] for the 98 price queries where the company responded to the NZX query with a "no news" response. We distinguish between price queries issued in response to unexplained stock price increases and price queries issued in response to unexplained price decreases.

Price reaction to "no news" responses to a NZX query of a price increase.

The results reported in the second column show that the stocks in the price increase sample experienced positive and significant average CARs (based on the Z-statistics)

news") and one related to a query of a price increase (hence is classified as "good news").

[10] The CARs in column 2 and 3 of Table 2 are calculated by first cumulating abnormal returns for each individual stock / price query over the event window period under consideration and then averaging across the number of stocks / queries. If not all stocks in the sample trade on a daily basis, then the CARs obtained by this method will be slightly different to CARs obtained by first determining the average AR for each day in the event window period and then cumulating these daily average ARs. However, the results in Table 2 are qualitatively similar under both approaches given most stocks in the price query sample trade each day.

during various event window periods between day [-30] and day [0], the event date (the day of the price query by the NZX). The average CAR for the event window period [-30,0] was 27.7% with a Z-statistic of 10.84. Price movements close to the date of the price query were responsible for most of this CAR: over the event window period [-5,0] the average CAR was 23.5%, significant at the 0.001 level (with a Z-statistic of 19.12). On these days [-1] and [0] the average AR was 5.8% and 9.5% respectively (with Z statistics of 11.6 and 18.6). On days [-1] and [0] the number of companies with a positive AR was 47 and 52 respectively out of the total sample size of 61 (significant in both cases at the 0.01 level under the binomial sign test). Over the event window period [+1,+4], however, the average CAR was -3.4%, negative and significant (Z-statistics of -4.50). This is evidence of a significant but not complete stock price reversal during the immediate post-announcement period. Over the longer event period [+5,+30] the average CAR is 3.0%, but with an insignificant Z statistic of 0.12. This suggests that on average the price reversal in the immediate post-announcement period is not followed by a significant recovery.

[insert Table 2 here]

Figure 1 plots the average CAR over the event window period [-30,+30] for this sample of price queries. The figure illustrates the significant positive price run-up prior to and including the event date, followed by a price reversal in the immediate post-announcement period. As illustrated in Table 2, the price reversal over the period [+1,+30] is only partial and the average stock price or abnormal return does not revert to its level in the pre-query price period.

[insert Figure 1 here]

We also observe that the frequency of non-trading days declines in the period immediately before the event day and reaches zero on event day. The frequency of non-trading days rises in the period immediately following the event day but remains marginally below the levels attained in the prior to the event day. For example, the frequency of non-trading days is 17.5% over the period [-30,-21], declines to 11.9% over the period [-10,-1], is 0.0% on the event day, rises to 10.0% over the period [+1,+10] and to 12.4% over the period [+21,+30].

Price reaction to "no news" responses to a NZX query of a price decrease.

The results reported in the third column of Table 2 shows that these companies who responded to the NZX query of a price decrease with no news experienced significant negative average CARs over the event window periods between day [-30] and day [0]. Over the period [-30,0] the CAR was -28.4% (significantly negative with the Z-statistic of -12.44). The average CAR over the event window period [-5,0] was -18.8% (Z-statistic of -16.73). On days [-1] and [0] (the day of the price query by the NZX) the average AR was -4.6% and -7.7% respectively (with Z statistics of -12.0 and -12.1). On days [-1] and [0] the number of companies with a negative AR was 28 and 31 respectively out of the total sample size of 37 (significant in both cases at the 0.01 level under the binomial sign test). The price decline is followed by a price reversal over the immediate post-announcement event window period [+1,+4], with the average CAR equal to 2.9% (Z-statistic of 3.35), which is significant at the 0.01 level.

Over the longer event period [+5,+30] the average CAR is -0.9%, with a Z statistic of -0.13 which is not significant at the 0.05 level.

[insert Figure 2 here]

Figure 2 plots the average CAR over the event window period [-30,+30] for this sample of price queries. This figure shows the significant price declines experienced by the 37 stocks in this sample during the pre-query period, followed by a price reversal in the immediate post-announcement period. Similar to our results for our price increase sample, the price reversal for the price decrease sample is only partial over the period [+1,+30] and the average stock price or abnormal return does not revert to its level in the pre-query price period.

The frequency of non-trading days displays the same behaviour as noted in the price increase sample. For example, the frequency of non-trading days is 14.6% over the period [-30,-21], declines to 9.5% over the period [-10,-1], is 0.0% on the event day, then rises to 7.1% over the period [+1,+10] and to 11.2% over the period [+21,+30].

The results for both “no news” samples have important similarities. In both cases we document significant and substantial CARs in the period [-30,0]: 27.7% in the price increase sample and -28.4% in the price decrease sample. Furthermore, in both cases we observe an upwards or downwards price movement that gathers momentum and is then followed by a partial price reversal. The results are consistent with trading activity of informed investors acting on private information. This trading by informed investors generates a price change and attracts the attention of uninformed speculators following naïve trading strategies. Trading by these uninformed speculators then exaggerates the initial price change, triggering a price query by the NZX. However, our evidence suggests the price query is too late to prevent the price from overshooting its new equilibrium or full-information level. Thus, the “no news” response leads to uninformed speculators reversing their trades and the stock price undergoes a small partial correction.

Perhaps more importantly, the results show that the price reversal that occurs in the post-announcement window is relatively small compared to the price run-up that occurred prior to the query being issued. The absence of a full reversal in the CAR in the post-announcement period suggests that trading activity is not being wholly driven by speculators but instead by informed investors who believe that the price that has emerged by day[+5] fully reflects the private information they possess. Speculators do play a role in this explanation, but only in exacerbating the initial change in the stock price and causing the stock price to temporarily overshoot its full-information level.

This interpretation suggests that any claim that the vast majority of "unexplained" price movements are due to speculative trading is not warranted. While it is true that speculators lead to the stock price overshooting, the new full-information stock price reflects the trading decisions of informed investors acting on private information. Thus although many of the stocks in the price query sample may well have the attributes of stocks that are said to trade in "inefficient" markets, any "inefficiency" in pricing is only transitory.

At first glance the results above also suggest that many companies in receipt of a price query may not be giving a truthful response in issuing a "no news" response. However companies may be making use of their right not to disclose material information, by either employing the "value test" under the old regime or the exemption under then new regime. We examine media reports over the six weeks following the price query for evidence that the company may have legitimately utilised an exemption where, at the time of the price query, the information related "to an incomplete proposal or negotiation", was "a matter of supposition" or was "insufficiently definite to warrant disclosure". We identified 17 cases where an exemption was potentially applied, 15 from the price increase sample and 2 from the price decrease sample. The total of 17 cases represents only 17.4% of the total "no news" sample and suggests that the potential for exemption cannot explain the large and persistent CARs around the issuance of price queries.

We also partition the price increase sample into two sub-samples: a sub-sample of 15 cases where an exemption could have applied and a sub-sample of the remaining 46 cases. Over the event window period [-30,+30] the mean (median) CAR for the potential exemption sub-sample is 27.4% (51.2%) while the mean (median) CAR for the remaining sub-sample is 52.3% (26.5%). We test the null hypothesis of no difference between the average CARs of the two sub-samples using the *t*-test and the non-parametric Wilcoxon test. The *t* and Wilcoxon test statistics of 0.61 and 0.75 show that we cannot reject the null hypothesis that the average CARs of the two sub-samples are equal. This result casts further doubt on the ability of exemptions to explain the large and persistent CARs around price queries.

6.2 Cross-sectional regression analysis

In this section we use cross-sectional regression analysis to address a number of issues raised in the previous section. We use weighted least squares (WLS) - with the weights proportional to the reciprocals of the error variances – to estimate the regression models.

Our explanatory variables include ASSETS, QUERY, REASON and EXEMPT. ASSETS represents the total assets of the company and is used as a measure of firm size. QUERY represents the number of previous price queries received by a company. REASON is a dummy variable and takes the value 1 if the company offers a reason for the "unexplained" price change and 0 otherwise. EXEMPT is a dummy variable and takes the value 1 if the query falls into the potential exemption category and 0 otherwise.

Are pre-announcement price changes stronger for small companies?

For the pre-announcement period event window [-30,0], the regression model is:

$$CAR[-30,0] = \alpha_0 + \alpha_1 \log(ASSETS) + \alpha_2 QUERY + u \qquad (5)$$

Small companies that are not followed closely by analysts or where there is greater information asymmetry between managers and investors may offer more profitable trading opportunities for informed investors. If the small company hypothesis is true, we should expect CAR[-30,0] to be negatively related to ASSETS for the price increase sample and positively related to assets for the price decrease sample. We also expect the initial price change to be stronger if the firm has received an earlier price query. In summary, we expect $\alpha_1 < 0$ and $\alpha_2 > 0$ for the price increase sample. We expect $\alpha_1 > 0$ and $\alpha_2 < 0$ for the price decrease sample.

[insert Table 3 here]

The WLS estimation results are reported in Table 3. The results for the price increase sample reported in column 2 show that the estimates of α_1 and α_2 have the expected signs and both are significant, the former at the 0.001 level and the latter at the 0.01 level. The negative sign on of α_1 is consistent with the argument that smaller firms are more susceptible to large price changes. The positive sign on of α_2 is consistent with the argument that price run-ups are stronger when the company has a prior history of price queries. For the price decrease sample, the coefficient estimates of α_1 and α_2 have the expected sign but only the former is significant at the 0.15 level. Again, this shows that the pre-query price changes are larger for smaller companies. In summary, these results provide clear support for the small company hypothesis.

What factors influence the immediate post-announcement price response?

For the immediate post-announcement event window period [+1,+4], the regression model is:

$$CAR[+1,+4] = \beta_0 + \beta_1 CAR[-5,0] + \beta_2 \log(ASSETS) + \beta_3 QUERY + \beta_4 REASON + u \quad (6)$$

The original speculation hypothesis suggests a negative relationship between the immediate pre-query price change, measured by CAR[-5,0], and the immediate post-query price change for both the price increase and price decrease samples. We also expect that a "no news" response by a company in receipt of a price query will be viewed with greater credibility if (i) the company is larger, (ii) the company has no history of price queries, and (iii) the company offers a reason for the "unexplained" price change. A credible "no news" response is expected to lead to a larger price reversal in the immediate post-announcement period. In summary, we expect $\beta_1 < 0$, $\beta_2 < 0$, $\beta_3 > 0$ and $\beta_4 < 0$ for the price increase sample. For the price decrease sample, we expect $\beta_1 < 0$, $\beta_2 > 0$, $\beta_3 < 0$ and $\beta_4 > 0$.

[insert Table 4 here]

The WLS estimation results are reported in Table 4. The results for the price increase sample reported in column 2 show that all the coefficient estimates have the correct sign but only those of for β_3 and β_4 are significantly different from zero. The results for the price decrease sample reported in column 3 show that all the coefficient estimates have the correct sign but none of the estimates are significantly different from zero.

These results suggest that the immediate post-query price reversal is stronger for the price increase sample where the company has a previous history of price queries and where the company offers an explanation for the price increase that triggered the price query.

Does the December 2002 reform affect the immediate post-announcement price response?

To answer this question we add the REGIME dummy variable to the previous model specification. The regression model is:

$$CAR[+1,+4] = \beta_0 + \beta_1 CAR[-5,0] + \beta_2 \log(ASSETS) + \beta_3 QUERY + \beta_4 REASON + \beta_5 REGIME + u \qquad (7)$$

The variable REGIME is a dummy variable which takes the value 1 if the price query was issued on or after 2nd December 2002 and 0 otherwise. We expect that the more stringent continuous disclosure regime that was introduced in December 2002 would encourage greater efforts at compliance with the NZX's continuous disclosure listing rules, thus causing investors to attach greater credibility to any "no news" response by company to a price query. Ceteris paribus, "no news" responses should be associated with greater price reversals in the post-December 2002 period. Hence we expect $\beta_5 < 0$ for the price increase sample and $\beta_5 > 0$ for the price decrease sample.

[insert Table 5 here]

The WLS estimation results are reported in Table 5. The results for the price increase sample reported in column 2 show that the estimates of β_1, β_2, β_3 and β_4 have the same signs and statistical significance as reported earlier but that the estimate of β_5 is positive but not significantly different from zero. A similar result holds for the price decrease sample. These results suggest that the new regime introduced in December 2002 has not had any discernible impact on how investors perceive, and react to, “no news” responses by companies that have received a price query.

What impact does the potential for exemption have on abnormal returns?

Earlier we employed simple parametric and non-parametric tests to determine whether the potential for an exemption from disclosure made any difference to abnormal returns. We now address this issue using a cross-sectional regression model. The full model is:

$$CAR[-30,+30] = \lambda_0 + \lambda_1 \log(ASSETS) + \lambda_2 QUERY + \lambda_3 EXEMPT + u \qquad (8)$$

In this regression model, the coefficient of interest is λ_3. We introduce ASSETS and QUERY to control for differences in firm size and previous price query history that may impact on price reaction over the event window period.

[insert Table 6 here]

The WLS estimation results are reported in Table 6. For the price increase sample, the results reported in column 2 show that the estimates of λ_1 and λ_2 are consistent with those reported earlier. The variable of primary interest, however, is EXEMPT. The estimate of λ_3 is positive but not significantly different from zero. For the price decrease sample, the results reported in column 3 show that the estimate of λ_1 is consistent with earlier results while that of λ_2 has changed sign (but is not significantly different from zero). More importantly, the estimate of λ_3 is negative and significant. To summarise, we find mixed results for the impact of potential exemptions. They make no difference to abnormal returns in the price increase sample but have been shown to be associated with greater negative abnormal returns in the price decrease sample.

7. Discussion of results

Our principal aims have been to examine the effectiveness of the price query system in remedying an uninformed or false market and to test the speculation hypothesis. Empirical results for companies that make a “no news” response to a price query leads us to largely reject the speculation hypothesis of unexplained price changes. The long-run or true price of a stock, which emerges in the post-announcement period, is being set principally by informed investors. Speculative activity appears to play a role in setting the price but only in the short window immediately surrounding the price query. We believe that initial price movements caused by the trading activity of informed investors attracts uninformed investors following naïve trading strategies. This pushes stock prices past their full-information level and the subsequent price change attracts the attention of the NZX. The subsequent “no news” response by the company leads these uninformed investors to reassess their positions and a price reversal occurs.

Our results suggest the price query helps to remedy an uninformed market but not in the way the NZX envisages. The absence of a full reversal of the pre-query price movement to a “no news” announcement over the window [+1,+30] suggests that the information in the announcement is not viewed as credible. However it does appear to warn uninformed investors that the current stock price is not at its fair level and that a correction is warranted. The full-information stock price then emerges after the price reversal in the immediate (one to four day) period following the query. This suggests that the interests of uninformed investors would be better served by the more timely release of the price query. On the other hand lowering the threshold at which a price query is triggered would likely generate an increase in the number of price queries, some of which may relate to transitory rather than permanent price movements. Although some of these price queries may lead to the release of genuine new information, the large number of “false” queries suggests that the potential benefits to investors from successful identification of under-valued and over-valued stocks would not be without cost.

One of the striking results to emerge from this study is the evidence of substantial transfers of wealth from uninformed investors to informed investors in the pre-query period [-30,0]. Over this period [-30,0] the CARS are 27.7% and -28.4% respectively for the “price increase” and “price decrease” samples. The presence of such large transfers of wealth is not consistent with the overall thrust of continuous disclosure regulation of encouraging participation in financial markets by (uninformed) investors with possible adverse implications for market liquidity and the function of the smooth function of the price mechanism.

The underlying cause of these large price changes in the pre-query period is open to interpretation. One plausible explanation is that they reflect the activities of insiders trading on private information. If this interpretation is correct, it requires acceptance of the joint propositions that the NZX is unable to detect both breaches of the continuous disclosure regulations and insider trading in NZX-listed stocks.[11] A related explanation is that the price changes reflect the activities of investors who have benefited from the selective disclosure of non-public information by company officers. However, this interpretation requires acceptance that the NZX is unable to detect both breaches of its selective and continuous disclosure provisions and trading in NZX-listed stocks is on

[11] Of course this would be mitigated if an exemption from disclosure applied.

the basis of privileged or inside information. The absence of a significant number of prosecutions for breach of either the continuous disclosure or insider trading regulations suggests to us that these two explanations are not wholly convincing. On the other hand Etebari et al. (2004) find evidence over the period January 1995 to December 2001 insiders actively traded in company shares and were able to earn significant abnormal profits following sale and purchase transactions.

An alternative explanation is that we are witnessing the “natural limitations” of a continuous disclosure regime. While such a regime, incorporating a ban on selective disclosure to analysts and other investment professionals, and backed by insider trading regulations and a sophisticated market surveillance system, may well be able to eliminate many of the opportunities for gains by corporate insiders and other informed traders at the expense of uninformed investors, it will not eliminate all informed trading. Continuous disclosure regulation largely ignores the role of private information production from publicly-available sources by analysts and other skilled investment professionals. These agents have the time and expertise to convert publicly-available information – and much of it from non-company sources – into valuable private information. Thus it is possible for a company to have made full disclosure of all price-sensitive information but for uninformed investors to still be at a disadvantage vis-à-vis informed investors due to their inability to distil the true value of the company’s stock from this mass of publicly-available information.

If this is the case there would seem to be little that can be done to prevent these transfers of wealth. The insider trading regime permits investors to trade immediately on the basis of this private research provided it is based exclusively on deductions from generally available information. Furthermore, investors will also incur costs in producing this private information and mandating public disclosure of this information or otherwise preventing investors from trading profitably on this privately produced information would have adverse consequences on the informational role of stock prices.

8. Summary and conclusions

This paper examines the price query system employed by the NZX. We focus on two inter-related issues: the effectiveness of the price query system in remedying an uninformed market and the speculation hypothesis of “unexplained” stock price changes.

Although we find that stocks in our price query sample do share the attributes of stocks traded in “inefficient” markets – low market capitalisation, low prices, frequent non-trading days and low turnover – we find no strong evidence consistent with the speculation hypothesis. The stocks in our “no news” exhibit price reversals on the day of a “no news” response to a price query but the price reversals is limited and the CAR does not mean revert to zero over the medium term. This suggests that the market does not believe the “no news” response and that informed investors acting on the basis of private information have correctly ascertained the full-information value of the stock.

We also find that the price query system is only partially effective as a mechanism for remedying an uninformed market, and then only in a way not envisaged by the NZX. Although “no news” announcements made by companies in response to price queries appear to have little credibility in the market, they do serve to warn uninformed investors following naïve trading strategies that they have most likely overreacted to the initial price movements in the stock. Further research is warranted to determine if the NZX would serve the interests of these investors by reacting to the initial price movements in a more timely fashion.

We also document that substantial transfers in wealth occur in the pre-query period. These wealth transfers can arise from either insiders trading on non-public information, private information production from non-public data or private information production from publicly-available data. In the absence of any evidence of widespread breaches or prosecutions under either the insider trading regulations or the selective disclosure provisions of the continuous disclosure regime, we surmise that the source of these wealth transfers lies in the private information production from publicly-available data. Nonetheless, the size of the wealth transfers involved suggests that more research is warranted to determine which of these three explanations is the more valid.

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Table 1: Microstructural characteristics of 60 stocks in sample

Table 1 reports summary statistics on the microstructural characteristics of the 60 stocks subject to a price query. Market capitalisation and price are measured at the end of the calendar year of the stock's first price query. Turnover is the annual dollar value of trading in the stock in the calendar year of the stock's first price query. Trading frequency is measured as the percentage of trading days that the stock trades on-market over the event window period [-210,+30] where day 0 is the date of the stock's first price query. The JB (Jarque Bera) statistics reports the result of the test of the null hypothesis that the underlying variable is normally distributed.

	Market Capitalisation ($m)	Price ($)	Turnover ($m)	Trading Frequency (%)
Mean	475.9	2.02	144.7	81.8
Median	68.6	1.05	16.9	87.8
Maximum	13,642.9	10.50	3,090.0	100.0
Minimum	1.5	0.01	0.2	19.5
Std dev	1,807.4	2.49	446.4	20.0
Jarque Bera statistic	5,652.8***	38.78***	2,576.9***	24.86

* significant at the 10% level   ** significant at the 5% level   *** significant at the 1% level

Table 2: Cumulative abnormal returns

Table 2 reports average cumulative abnormal returns (CARs), Z statistics (in parentheses) and the number of queries where the CARs were positive for companies that announced "no news" in response to a NZX query of (i) a price increase (column 2) and (ii) a price decrease (column 3). Day 0 of the event window period is the date the price query was issued.

Event window period	No news/price increase n = 61 Mean CAR (Z Statistic)	No news/price decrease n = 37 Mean CAR (Z Statistic)
[-30,-1]	0.1826 (7.02)**** n=30	-0.2071 (-10.27)**** n=2
[-30,0]	0.2774 (10.84)**** n=34	-0.2839 (-12.44)**** n=1
[-5,0]	0.2352 (19.12)**** n=36	-0.1882 (-16.73)**** n=1
[-1]	0.0584 (11.63)**** n=47	-0.0461 (-11.97)**** n=8
[0]	0.0948 (18.68)**** n=52	-0.0767 (-12.14)**** n=6
[+1]	-0.0049 (-2.23)*** n=21	-0.0300 (5.61)**** n=25
[-1,0]	0.1474 (21.90)**** n=33	-0.1216 (-17.02)**** n=3
[0,+1]	0.0902 (12.19)**** n=27	-0.0475 (-4.59)**** n=15
[-1,+1]	0.1429 (16.53)**** n=34	-0.0923 (-10.88)**** n=5
[+1,+2]	-0.0193 (-3.77)**** n=16	0.0340 (5.18)**** n=24
[+1,+4]	-0.0336 (-4.50)**** n=14	0.0291 (3.35)**** n=24
[0,+30]	0.0908 (2.18)** n=18	-0.0563 (-1.22) n=17
[+1,+30]	-0.0040 (-1.45) n=14	0.0204 (1.12) n=23
[+5,+30]	0.0296 (0.12) n=18	-0.0087 (-0.13) n=14

* significant at 0.10 level ** significant at 0.05 level *** significant at 0.01 level **** significant at 0.001 level

Table 3: WLS estimation results for equation (5)

Table 3 presents estimation results for the cross-sectional regression model represented by equation (5). The dependent variable is CAR [-30,0] which measures the cumulative abnormal return over the 30 trading days prior to the price query. The explanatory variables are ASSETS and QUERY. ASSETS represent the total assets of the company as at the latest financial year end prior to the query. QUERY measures the number of price queries received by the company since the beginning of the sample period. We estimate the model separately for the no news/price increase and no news/price decrease samples using weighted least squares (WLS).

	No news/price increase	No news/price decrease
Constant	0.7193	-0.6017
	(7.34)****	(-2.35)**
Log(ASSETS)	-0.0308	0.0207
	(-6.61)****	(1.68)$^{+}$
QUERY	0.0779	-0.0315
	(3.31)***	(-0.48)
Adjusted R^2	0.577	0.224
F statistic	41.98****	6.20***

+ significant at 0.15 level * significant at 0.10 level ** significant at 0.05 level *** significant at 0.01 level **** significant at 0.001 level

Table 4: WLS estimation results for equation (6)

Table 4 presents estimation results for the cross-sectional regression model represented by equation (6). The dependent variable is CAR[+1,+4] which measures the cumulative abnormal return immediately following the price query. The explanatory variables are CAR[-5,0], ASSETS, QUERY and REASON. CAR[-5,0] measures the cumulative abnormal return immediately prior to the price query. ASSETS represent the total assets of the company as at the latest financial year end prior to the query. QUERY measures the number of price queries received by the company since the beginning of the sample period. REASON is a dummy variable taking the value 1 if the company offered a reason for the pre-query price change and 0 otherwise. We estimate the model separately for the no news/price increase and no news/price decrease samples using weighted least squares (WLS).

	No news/price increase	No news/price decrease
Constant	0.0054	-0.0653
	(0.08)	(-0.44)
CAR[-5,0]	-0.0106	-0.1897
	(-0.09)	(-0.99)
Log(ASSETS)	-0.0009	0.0032
	(-0.30)	(0.52)
QUERY	0.0280	-0.0353
	(2.43)**	(-1.27)
REASON	-0.0226	0.0108
	(-2.06)**	(0.31)
Adjusted R^2	0.562	0.100
F statistic	20.25****	2.00^{+}

+ significant at 0.15 level * significant at 0.10 level ** significant at 0.05 level *** significant at 0.01 level **** significant at 0.001 level

Table 5: WLS estimation results for equation (7)

Table 5 presents estimation results for the cross-sectional regression model represented by equation (7). The dependent variable is CAR[+1,+4] which measures the cumulative abnormal return immediately following the price query. The explanatory variables are CAR[-5,0], ASSETS, QUERY, REASON and REGIME. CAR[-5,0] measures the cumulative abnormal return immediately prior to the price query. ASSETS represent the total assets of the company as at the latest financial year end prior to the query. QUERY measures the number of price queries received by the company since the beginning of the sample period. REASON is a dummy variable taking the value 1 if the company offered a reason for the pre-query price change and 0 otherwise. REGIME is a dummy variable taking the value 1 if the query was issued on or after 2nd December 2002 and 0 otherwise We estimate the model separately for the no news/price increase and no news/price decrease samples using weighted least squares (WLS).

	Price increase sample	Price decrease sample
Constant	-0.0015	-0.1001
	(-0.02)	(-0.65)
CAR[-5,0]	-0.0036	-0.1758
	(-0.03)	(-0.91)
Log(ASSETS)	-0.0006	0.0050
	(-0.18)	(0.78)
QUERY	0.0272	-0.0349
	(2.27)**	(-1.25)
REASON	-0.0230	0.0149
	(-2.06)**	(0.43)
REGIME	0.0057	-0.0272
	(0.26)	(-0.99)
Adjusted R^2	0.555	0.100
F statistic	15.95****	1.80^{+}

+ significant at 0.15 level * significant at 0.10 level ** significant at 0.05 level *** significant at 0.01 level **** significant at 0.001 level

Table 6: WLS estimation results for equation (8)

Table 6 presents estimation results for the cross-sectional regression model represented by equation (8). The dependent variable is CAR[-30,+30]] which measures the cumulative abnormal return over the period from six weeks prior to the price query to six week following the query. The explanatory variables are ASSETS, QUERY and EXEMPT. ASSETS represent the total assets of the company as at the latest financial year end prior to the query. QUERY measures the number of price queries received by the company since the beginning of the sample period. EXEMPT is a dummy variable taking the value 1 if the query falls into the potential exemption category and 0 otherwise We estimate the model separately for the no news/price increase and no news/price decrease samples using weighted least squares (WLS).

	No news/price increase	No news/price decrease
Constant	0.6447	-0.7350
	(3.97)****	(-2.83)***
Log(ASSETS)	-0.0300	0.0271
	(-3.87)****	(2.16)**
QUERY	0.0605	0.0216
	(1.47)	(0.32)
EXEMPT	0.0340	-0.7832
	(0.81)	(-2.25)**
Adjusted R^2	0.090	0.381
F statistic	2.98**	8.38****

+ significant at 0.15 level * significant at 0.10 level ** significant at 0.05 level *** significant at 0.01 level **** significant at 0.001 level

Figure 1

Average cumulative abnormal returns (CARs) for companies that announced "no news" in response to a NZX query of a price increase. Day 0 of the event window period is the date the price query was issued.

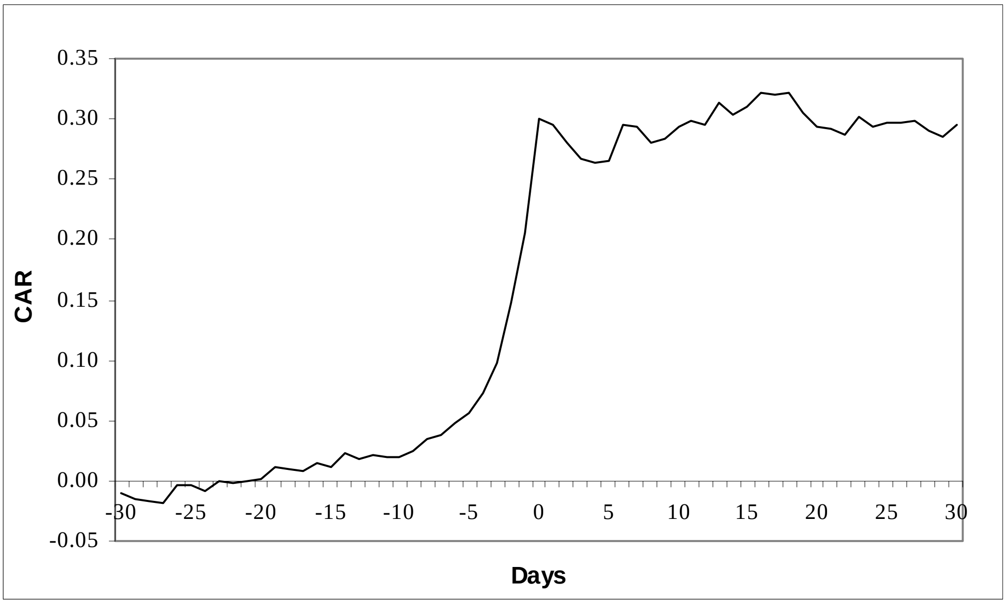

Figure 2

Average cumulative abnormal returns (CARs) for companies that announced "no news" in response to a NZX query of (i) a price increase (column 2) and (ii) a price decrease (column 3). Day 0 of the event window period is the date the price query was issued.