The information content of Canadian open market repurchase announcements

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Abstract
Purpose - This study seeks to examine the role of firm characteristics and insider private information in affecting Canadian firms' repurchase decision and the associated announcement period stock return.
Design/methodology/approach - Past studies of announcement returns employ a standard event-study methodology, which produces biased parameter estimates when the corporate event is voluntary. This study employs the conditional event study methodology, which is free of self-selection bias. The conditional model also provides a direct test of whether private information is conveyed through the announcement.
Findings - It is found that firms are more likely to buy back shares if they have greater free cash flows, lower market-to-book ratios, poor prior stock performance, and their insiders have large shareholdings. It is shown that the announcement period returns are strongly and positively related to the private information possessed by company insiders. The market reacts to the reason given for the repurchase and reacts less positively to repeat repurchases. Overall, the evidence is consistent with Isagawa's model which argues that repurchases signal that the insiders are not the type to waste their free cash flow.
Research limitations/implications - This methodology should also be applied to US open market repurchases.
Originality/value - This is the first study to explicitly test whether the abnormal return is attributable to private information; employ the conditional event study methodology in examining the announcement return; and study the returns to Canadian repurchase announcements.
Keywords Repurchase agreements, Information, Stock returns, Canada
Paper type Research paper

Repurchase program announcements have been shown to generate abnormal returns in the USA and Canada, and past studies have explored a variety of explanatory hypotheses[1]. Some of the hypotheses are based on public information and others are based on private information. An example of the former is the optimal capital structure hypothesis, which argues that the change in leverage - a publicly observable variable - explains the announcement return[2]. An example of the latter is the signaling hypothesis which argues that the market infers insiders' private estimates of future

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The usual disclaimer applies.
earnings from the announcement. This paper uses a conditional event study methodology to explicitly model the public and private information which guide a repurchase decision and then tests whether the abnormal announcement return is related to the private information.

This is the first study to explicitly test whether the abnormal return is attributable to private information learned through the announcement. It is the first study to employ the conditional event study methodology in examining the announcement return, and so it is not affected by the self-selection bias that plagues the standard event-study methodology. It is more comprehensive than past studies in its consideration of explanatory hypotheses. This is the first study of the returns to Canadian repurchase announcements. Ikenberry et al. (2000) study long-run returns following Canadian repurchases but do not explain variation in the announcement returns.

Past studies of announcement returns employ a standard event-study methodology. When corporate events are voluntary, like repurchase announcements, such studies produce biased parameter estimates (Li and Prabhala, 2005). This study employs a conditional event study methodology, which is free of self-selection bias[3]. The conditional event study models both the market’s expectation of the likelihood of a repurchase, and the determinants of the announcement return. This is a logical approach, since we cannot understand how the market reacts to repurchase announcements if we do not understand why the market thinks that firms repurchase. The market’s expectation of a repurchase is modeled as a function of publicly observable proxies suggested by theory and of unobservable private determinants known only to corporate insiders. The conditional event study provides an estimate of the correlation between the private information and the abnormal announcement return. The parameter estimates from the repurchase decision and announcement return models provide evidence as to the nature of the private information.

Studies of US announcement returns have tended to test individual hypotheses in isolation. They do not comprehensively test all of the theories that have been proposed to explain repurchase announcement returns. For example, Comment and Jarrell (1991) test signaling and find that the announcement returns are positively related to the proportion sought in the repurchase and negatively related to pre-announcement stock returns. McNally (1999) examines a more rigorous signaling model and finds that the returns are positively related to the quantity of shares targeted, the stock’s volatility, and the size of insider holdings. Grullon and Michaely (2004) examine a free cash flow hypothesis, and find that announcement returns are positively related to the proportion sought and cash (for low market-to-book firms) and negatively related to the market-to-book ratio and size. Dittmar (2000) examines a variety of motives for repurchasing, but does not explain variation in the announcement return. This study examines five hypotheses which explain repurchases and the announcement returns: earnings signaling, undervaluation, optimal capital structure, dividend substitution, and agency costs.

This paper examines Canadian repurchase announcements for three reasons:

1. Canada has a long history of open market repurchase activity;
2. the institutional framework governing Canadian repurchases is different from the USA in a way that makes them a good application for the conditional event-study methodology (Canadian repurchases are discrete information events); and
3. analysis of another jurisdiction (Canada) with different institutions provides a robustness check for results obtained in US studies.
This study provides a number of interesting results. We confirm that Canadian repurchase announcements generate significant abnormal stock returns, and we find that the announcements do convey private information to the market. In a sample as large as ours, there are bound to be a variety of motives for repurchasing, and we do find limited support for a number of the hypotheses. However, our results are most consistent with Isagawa’s (2000) agency hypothesis. We conclude that repurchase announcements convey private information to the market relating to the extent of agency costs in the firm.

The paper is organized as follows. The first section compares the institutional framework governing Canadian and US open market repurchases. The second section outlines the various hypotheses and their testable implications. The third section summarizes repurchase activity in Canada during the sample period, and compares the characteristics of the repurchase firms with those of a group of non-repurchase firms. The fourth section presents the conditional event study model and reports our results. The fifth section concludes.

An overview of share repurchases in Canada

There are some important institutional differences between US open market share repurchases and Canadian Normal Course Issuer Bids (a specific term coined for Canadian open market share repurchases, henceforth, NCIBs). The first difference is that NCIB announcements almost always indicate the maximum proportion of shares that the firm is legally allowed to repurchase (i.e. 5 per cent) rather than the proportion of shares the firm intends to repurchase. Thus, NCIB announcements are discrete information events. Second, Canadian securities laws prohibit firms from issuing new shares while NCIBs are in force[4]. This restriction imposes an opportunity cost to share repurchase announcements that enhances their credibility. Third, unlike in the USA, public announcements of NCIBs are mandatory, which increases their visibility to investors[5]. Finally, Canadian NCIBs must be completed within a 12-month period, whereas US repurchases often take place over several years (Stephens and Weisbach, 1998).

In Canada, the majority of repurchases are carried out through the facilities of an exchange, and so are subject to the exchange’s general by-laws which supersede the provincial securities acts[6]. According to the Toronto Stock Exchange (TSX) by-laws, an “issuer bid” is an offer to acquire listed equity securities made by the issuer firm. A “normal course issuer bid” is an issuer bid made at the market price, and may not exceed the greater of 5 per cent of shares outstanding or 10 per cent of public float (shares outstanding less insider shareholdings) over a 12-month period. In contrast, US companies target to repurchase 7 per cent of their shares outstanding, but actually succeed in buying between 74 per cent and 82 per cent of the targeted amount[7].

Issuer firms are required to file a notice of intention that contains material information about the bid. Once the notice of intention is finalized the firm is required to issue a press release. Concurrently, the TSX also announces the repurchase in its Daily Bulletin. The Daily Bulletin announcement is less informative than the press release (it omits the reason and the number of tendering insiders) and is distributed less widely – only to members of the exchange.

Hypotheses and testable implications

We focus on five hypotheses: earnings signaling, agency costs, undervaluation, optimal capital structure, and dividend substitution. All provide an explanation for why firms repurchase, but only a few predict an abnormal announcement period return.
We describe each in turn and outline their implications. The description of each hypothesis is quite succinct, since these hypotheses have been discussed in other papers (see, for example, Grullon and Ikenberry, 2000; Dittmar, 2000). The testable implications are summarized in Table I.

**Signaling**

A number of US studies model the target repurchase proportion as a signal of the insiders’ private information regarding the firm’s future earnings (e.g. Vermaelen, 1981; Comment and Jarrell, 1991; McNally, 1999). Canadian firms do not reveal their target repurchase proportion (they generally announce the legal maximum), and so if the announcement is a signal, then it is a discrete signal rather than a continuous signal[8]. According to the signaling hypothesis, there should be positive abnormal returns following the announcement as the market infers the insiders’ private information about future earnings.

McNally (1999) argues that repurchases are costly signals because non-tendering insiders are exposed to more firm-specific risk following the repurchase. McNally's model predicts that the announcement return should be increasing in volatility and insider shareholdings, since the marginal cost of signaling rises with both.

**Agency**

Insiders have the opportunity to deploy corporate resources in ways that benefit themselves but may not benefit outside shareholders (e.g. empire building, perquisite

<table>
<thead>
<tr>
<th>Earnings signaling</th>
<th>Hypotheses under valuation</th>
<th>Optimal leverage</th>
<th>Dividend substitution</th>
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</thead>
<tbody>
<tr>
<td>Panel A: Likelihood of repurchase and firm characteristics</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insider holdings</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Free cash flow</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Market-to-book</td>
<td>(-)</td>
<td>(-)</td>
<td></td>
</tr>
<tr>
<td>Prior XS Rets</td>
<td>(-)</td>
<td>(-)</td>
<td></td>
</tr>
<tr>
<td>Excess debt</td>
<td></td>
<td>(-)</td>
<td></td>
</tr>
<tr>
<td>Dividend yield</td>
<td></td>
<td></td>
<td>(-)</td>
</tr>
</tbody>
</table>

| Panel B: Announcement period return and firm characteristics |
| Insider holdings | + | | |
| Free cash flow | + | | |
| Market-to-book | | (-) | |
| Volatility | | | + |
| Prior XS Rets | | (-) | |
| Excess debt | + | | |
| Correlation $\rho$ | | | + |

**Notes:** Insider holdings is proportion of shares held by officers, directors, and large blockholders. Free cash flow is operating cash flow over total assets. Market-to-book uses book value from the most recent fiscal year-end. Volatility is the annualized standard deviation of daily returns for one year preceding. Prior XS Rets is the 60-day compound excess return ending seven days before the announcement. Excess debt is the difference between the firm’s debt-to-total assets ratio and the industry average debt ratio. Correlation, $\rho$ refers to the correlation between insiders’ private information and the abnormal announcement return.

**Table I.** Summary of hypothesized relationships
consumption). Repurchases may cause an abnormal announcement return because they reduce free cash flow and so reduce the opportunities for insiders to squander corporate resources (e.g. Easterbrook, 1984; Jensen, 1986). Under the agency hypothesis, the announcement return may be explained entirely by public information, or, following Isagawa (2000), it may also be due to a private information component.

Firms with large amounts of free cash flow, which is a publicly observable value, are more likely to have agency costs and so should be more likely to make a repurchase to reduce them. In addition, the reduction in agency costs and the corresponding announcement return are likely to be higher the higher is free cash flow (e.g. Howe et al., 1992; Nohel and Tarhan, 1998).

Under the agency hypothesis, insiders with large shareholdings are more likely to initiate a repurchase. Rational insiders will only repurchase if the benefit exceeds the cost. Repurchases benefit insiders by generating an abnormal announcement return, but they cost insiders because they reduce perquisite consumption. The gain is more likely to outweigh the cost when the insiders have large shareholdings[9].

Isagawa (2000) models repurchase announcements as signals that the insiders are not the type to waste their free cash flow on negative NPV projects. Isagawa assumes that the insiders’ objective function is dependent on their firm’s stock price (because of stockholdings or options) and a personal benefit from empire building. Isagawa argues that firms with excess free cash and poor investment opportunities are more likely to repurchase. Because they have poor investment opportunities, initiating a new project will not grow the firm by much and it will depress the stock price. But not all firms with poor investment opportunities automatically repurchase. Insiders who derive more utility from a high stock price and relatively little private benefit from empire building prefer to repurchase stock:

In summary, repurchase announcements are more likely from firms with greater cash, poor recent stock price performance (due to their poor investment opportunities), and from firms whose insiders have greater proportionate shareholdings (because they derive greater utility from a high stock price[10]. Isagawa also shows that the announcement return should be increasing in the amount of free cash[11]. Under Isagawa’s model, there is private information conveyed through a repurchase announcement about management’s preferences for empire building and perquisite consumption.

Undervaluation
Barclay and Smith (1988) and Ikenberry et al. (1995, 2000) argue that asymmetrically informed inside shareholders use open market repurchases as disguised insider trading. Firms initiate repurchases when their shares are undervalued, and so the repurchase transfers wealth from the selling shareholders to the insiders (and other non-selling shareholders). Under this hypothesis, the announcement signals that the firm’s shares are undervalued, but the signal is incomplete. The market does not learn all of the insiders’ private information from the announcement and so it continues to undervalue the firm’s shares afterwards.

Ikenberry et al. (1995, 2000) find that stock prices of “value” firms (firms with low market-to-book ratios) rise by more than the stock prices of other firms. They conclude that this is consistent with the undervaluation hypothesis, because value firms are more likely to repurchase because their shares are undervalued. By the same reasoning, the market should expect that value firms are more likely to make NCIB announcements, and, when they do, their short-run announcement returns should be higher (Gruillon and Michaely, 2004). We measure undervaluation with the
market-to-book ratio and with the pre-announcement abnormal stock returns. Firms that have negative abnormal stock returns are more likely to be undervalued.

**Optimal capital structure**
Masulis (1980) and Vermaelen (1981) propose an optimal leverage hypothesis to explain the abnormal returns around repurchase announcements. If firms are below their optimal capital structure, then share repurchases increase leverage, increase the interest tax shield, and increase firm value. We proxy the optimal capital structure by the industry average debt ratio (i.e. debt to total asset ratio for firms with the same one-digit SIC code). Each firm’s capital structure relative to the optimum is calculated as the difference between its debt ratio and the industry average. The optimal capital structure hypothesis predicts that firms that are below their optimum should be more likely to repurchase, and the announcement period return should be inversely related to the firm’s relative debt level.

**Dividend substitution**
Gruillon and Michaely (2002) find that the dividend payout rate in the USA has been declining since the mid-1980s but that the total payout rate remains constant: firms are substituting repurchases for dividends. In Canada, gains are taxed at a lower rate than dividends, so there is a clear preference for repurchases over cash dividends amongst tax-paying investors, but not all investors pay tax. There are tax clienteles, and, following Miller (1977), we would expect firms to adjust their distribution policy according to the clientele they serve. Thus, we would expect cash-dividend-paying firms to be less likely to announce a repurchase. If the capital markets are in equilibrium, it is not clear that the announcement of a repurchase would induce an abnormal return.

**Public vs private information**
The signaling and agency hypotheses predict that the firm’s announcement will convey private information to the market. The undervaluation hypothesis also predicts that some private information is revealed, but on a more limited scale. Therefore, in addition to other comparative static implications, all three hypotheses predict that the abnormal announcement return should be correlated with the private information conveyed in the announcement. The conditional event study provides a direct test of market learning through the correlation, \( \rho \), between the residuals in the two equations (see section “A conditional event study of NCIIs”). The optimal capital structure and dividend substitution hypotheses provide explanations for why firms repurchase, but do not imply (as they are currently conceived in the literature) that there is private information conveyed through the announcement.

**Data**
*The NCIB sample*
We identify a total of 2,673 repurchase announcements from the TSX Daily Record over the period from January 1987 to December 2000. This represents the population of TSX repurchases, since all announcements are printed in the Daily Record[12]. We obtain price and return data from the Canadian Financial Markets Research Centre database. Accounting data is obtained from Standard & Poors’ Compustat. The Canadian coverage on Compustat is not complete and the lack of availability of that data significantly reduces our sample. After removing observations with missing data,
there are 901 repurchase announcements in the Estimation Sample (so named because it is used for estimating the conditional event-study model).

Canadian companies are required to issue announcement press releases stating, amongst other things, the reason for their repurchase. In section "A conditional event study of NCIBs" we explore whether the declared reason has an impact on the market’s reaction. We gather announcement press releases for repurchases during the period from July 1995 to December 2000 from CANSTOCK, an electronic database of all public newswire releases. CANSTOCK data are only available over that period. This sub-sample, the Post-1995 Sample, includes 664 repurchase programs.

Insider holdings data is collected from Proxy statements. Because the cost of collecting this data is high, it was only collected for a sub-set of the full sample: January 1989 to December 1992. This sub-sample, dubbed the Insider Holdings Sample, includes 109 repurchase announcements.

Table II provides a temporal breakdown of the population of TSX repurchase announcements, the Estimation Sample and its matching non-NCIB control sample over the period of 1987-2000. We see that there is obvious cyclicality in share repurchase activities in Canada. The number of repurchasing announcements peaked at the beginning of the sample following the market crash of 1987, and peaked again after the burst of the high-tech bubble in 2000.

*The non-NCIB sample*

Prabhala (1997) argues that the non-event sample in a conditional event study should include firms that were anticipated to announce the event but did not. We define firms that were “anticipated to announce but did not” as those firms that were in the same circumstance (industry and size) as the repurchase firm but chose not to repurchase. We selected the non-event sample by matching with the repurchasing sample. For each

<table>
<thead>
<tr>
<th>Year</th>
<th>All repurchase announcements on TSX</th>
<th>Repurchases in Estimation Sample</th>
<th>Control sample events</th>
</tr>
</thead>
<tbody>
<tr>
<td>1987</td>
<td>224</td>
<td>43</td>
<td>24</td>
</tr>
<tr>
<td>1988</td>
<td>154</td>
<td>33</td>
<td>27</td>
</tr>
<tr>
<td>1989</td>
<td>143</td>
<td>34</td>
<td>26</td>
</tr>
<tr>
<td>1990</td>
<td>187</td>
<td>45</td>
<td>30</td>
</tr>
<tr>
<td>1991</td>
<td>106</td>
<td>24</td>
<td>23</td>
</tr>
<tr>
<td>1992</td>
<td>93</td>
<td>17</td>
<td>11</td>
</tr>
<tr>
<td>1993</td>
<td>80</td>
<td>15</td>
<td>16</td>
</tr>
<tr>
<td>1994</td>
<td>134</td>
<td>26</td>
<td>23</td>
</tr>
<tr>
<td>1995</td>
<td>188</td>
<td>66</td>
<td>50</td>
</tr>
<tr>
<td>1996</td>
<td>180</td>
<td>69</td>
<td>55</td>
</tr>
<tr>
<td>1997</td>
<td>214</td>
<td>79</td>
<td>70</td>
</tr>
<tr>
<td>1998</td>
<td>298</td>
<td>124</td>
<td>104</td>
</tr>
<tr>
<td>1999</td>
<td>327</td>
<td>162</td>
<td>112</td>
</tr>
<tr>
<td>2000</td>
<td>345</td>
<td>164</td>
<td>122</td>
</tr>
<tr>
<td>Total</td>
<td>2,673</td>
<td>901</td>
<td>693</td>
</tr>
</tbody>
</table>

*Notes:* The first column shows the population of all repurchase announcements by TSX listed companies excluding funds and income trusts. The second and third columns show the number of repurchase announcements and non-NCIB events in the Estimation Sample, respectively.

Table II.

Canadian repurchase announcements 1987-2000
repurchase announcement we selected all of the TSX-listed firms that did not have a repurchase in the year of, year prior to or year following the announcement. From that set, the matching firm was selected as the one closest in size to the repurchasing firm and in the same two-digit SIC code. The announcement date for the matching firm is the same as for the repurchasing firm.

Summary statistics
Panel A of Table III presents summary statistics for the population of repurchases. The average proportion sought is 5.7 per cent, and the median is 5 per cent. In most of the announcements the proportion of shares targeted is equal to the maximum allowed under TSX by-laws[13]. The small variation in the announced target repurchase proportion makes the repurchase announcement a discrete information event – it happens or it does not.

Are repurchases trustworthy? Market commentators argue no because some firms do not repurchase, but our results show that almost 80 per cent of the TSX firms do repurchase something over the course of the bid[14]. By the end of the bid only half

<table>
<thead>
<tr>
<th></th>
<th>NCB Sample Mean</th>
<th>NCB Sample Median</th>
<th>Non-NCB Sample Mean</th>
<th>Non-NCB Sample Median</th>
<th>Test of difference</th>
<th>Wilcoxon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Announcement return (%)</td>
<td>0.73</td>
<td>0.24</td>
<td>0.27</td>
<td>0.01</td>
<td>0.0007</td>
<td>0.0005</td>
</tr>
<tr>
<td>Repeat announcement</td>
<td>0.53</td>
<td>0.09</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New announcements</td>
<td>0.93</td>
<td>0.42</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prior XS Ret (%)</td>
<td>-4.56</td>
<td>-4.27</td>
<td>-1.72</td>
<td>-2.98</td>
<td>&lt;0.0001</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Proportion sought</td>
<td>5.70</td>
<td>5.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>%Δ shares out</td>
<td>4.73</td>
<td>-0.04</td>
<td>10.02</td>
<td>0.47</td>
<td>&lt;0.0001</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

Panel B: Estimation Sample
|                          |                  |                   |                     |                       |                    |          |
| Free cash flow (%)       | 10.99            | 11.06             | 7.53                | 9.99                  | <0.0001            | <0.0001  |
| Excess debt (%)          | -0.14            | -0.09             | 1.02                | 1.09                  | 0.2415             | 0.1245   |
| Dividend yield (%)       | 2.66             | 0.45              | 1.20                | 0.00                  | 0.0352             | <0.0001  |
| Market-to-book           | 3.14             | 1.58              | 3.63                | 1.65                  | 0.0756             | 0.1532   |
| Announcement return      | 0.59             | 0.29              | 0.02                | -0.10                 | 0.0225             | 0.0100   |
| Prior XS Ret (%)         | -4.91            | -3.72             | -1.22               | -2.18                 | <0.0001            | <0.0005  |
| Insider holdings (%)     | 27.71            | 21.91             | 11.49               | 2.56                  | <0.0001            | <0.0001  |

Notes: The population includes 2,673 repurchase announcements and the reported statistics include as many observations for each variable as have valid data. Observations are removed if they lie outside of the 1st and 99th percentiles. The Estimation Sample includes 961 NCB and 663 non-NCB observations over the 1987-2000 period. Announcement return is the abnormal buy-and-hold return from one day before to two days after the announcement. Repeat announcements are those by firms that also announced a repurchase program in the preceding year. Prior XS Ret is the 60-day compound abnormal return ending seven days before the announcement. Proportion sought is the proportion of shares sought in the official announcement of the repurchase. %Δ shares out is the percentage change in shares outstanding over the year of the repurchase program. Free cash flow is operating cash flow over total assets. Excess debt is the difference between the firm's debt ratio and the industry average debt ratio (based on one-digit SIC codes). Dividend yield is the amount of dividends per share from preceding fiscal year over price preceding announcement. Market-to-book uses book value from the most recent fiscal year-end. Insider holdings is the proportion of shares held by officers, directors, and large blockholders based on sample of 109 NCBs and 110 non-NCIBs from 1989-1992. Test of difference gives the p-values from T-test and Wilcoxon rank test.

Table III.
Summary statistics for NCB and non-NCIB firms.
of the firms reduce their outstanding shares, and if you look at the whole sample, the average number of shares actually rises by 4.73 per cent (median = -0.04 per cent). The number of shares outstanding rises because of the exercise of stock options and convertible securities. In contrast, the non-NCIB firms increase their shares outstanding by 10.02 per cent (median = 0.47 per cent), which is statistically significantly greater than for the NCIB firms. Thus, the main impact of repurchases is not that they reduce shares outstanding, but that they slow the rate of dilution that is common in firms today.

In the population of TSX repurchases 48.5 per cent of repurchases were announced by firms that had announced a repurchase in the previous year. Thus, almost half of all repurchases are repeats. Given the high frequency of repeated programs, one might expect the market to react differently to new program initiations vs renewals or repeats of repurchase programs. The data shows that the market learns more positive information from new announcements than it does from repeat announcements. In Panel A of Table III, the average abnormal announcement return for new announcements is 0.93 per cent, which is significantly greater (at the 5 per cent level) than the return to repeat announcements, 0.53 per cent. This result is consistent with results from the USA, documented by Grullon and Michaely (2002), who also find that first time announcements have higher average announcement returns.

In their press releases, companies are required to announce the reason for the repurchase, which is different from the USA where firms are not so required. The majority, 76 per cent, of NCIBs in the Post-1995 Sample are motivated by the insiders' belief that the firm's shares "represent a good investment" or "are currently undervalued by the market." Such wording is generally consistent with both of the signaling and undervaluation hypotheses. Some firms explicitly favor undervaluation by using wording such as "... the acquisition of shares at prices less than what the Corporation believes is fair value is in the best interests of the Corporation and its remaining shareholders." Only 3.3 per cent of the issuer bids are motivated to offset the dilution caused by share ownership plans, and the remaining announcements do not offer a clear motive.

Figure 1 shows the cumulative average abnormal returns (CARs) around the NCIB announcements[15]. On average, there is a significant increase in price following the announcement of repurchases. The average abnormal return (over the concurrent market return) from the close of trading on eventday -1 to the close of trading on eventday +2 is 0.73 per cent (the announcement is on eventday 0). This is consistent with Ikenberry et al. (2000), who find average abnormal returns of 0.93 per cent over the announcement month for Canadian repurchases. US studies (e.g. Comment and Jarrell, 1991) document average returns of 2.3 per cent around open market repurchase announcements. We also find (Panel A of Table III) a significant abnormal negative return of 4.56 per cent over the 60 trading days preceding the announcement. This is consistent with results reported by Comment and Jarrell (1991) showing significant price declines prior to US open market repurchase announcements.

Panel B of Table III provides a summary of firm characteristics for the NCIB and non-NCIB firms in the Estimation Sample. Repurchasing firms generate significantly greater cash flow than do the non-NCIB firms. Free cash flow is 10.99 per cent of total assets compared to the non-NCIB firms' average of 7.5 per cent. Repurchasing firms have higher dividend yields than non-repurchasing companies, which suggests that, in Canada, repurchases are not a substitute for dividends. Repurchasing companies have lower market-to-book ratios than non-repurchasing companies, but only the means are
Figure 1.
CARs around Canadian repurchase announcements

Notes: Daily excess returns are daily returns less the TSX 300 total returns index return. Daily average excess returns are accumulated over a period from five days before the announcement to five days after. Sample includes 1,702 program announcements between 1 January 1987 and 31 December 2000. Firms included in this graph only if there is returns data available on the announcement day.

statistically significantly different. Repurchasing firms have less leverage, but the difference is not statistically significant. Insiders have a significantly larger ownership share (27.7 per cent vs 11.5 per cent) in firms that repurchase than in firms that do not.

A conditional event study of NCIBs

The model

The conditional event study models the insiders' decision to repurchase and the market's response in separate equations[16]. The repurchase decision is discrete and is modeled using a probit regression. The endogeneity of the repurchase decision and the abnormal announcement return is reflected in the model by the explicit inclusion of a correlation between the error of the probit equation, which is interpreted as the insiders' private information, and the error of the return equation, which is the abnormal return. If the correlation is positive, then we infer that the market learns the insiders' private information from their choice.

The firms' insiders decide to repurchase if their marginal utility from doing so is positive. Let \( y^* \) be the insiders' marginal utility associated with making the announcement, and assume that \( y^* = y + u \) is normally distributed. Its mean, \( E(y^*) = y \), represents the market's expectations of the insiders' marginal utility, which we assume to be a linear function, \( y = Z\theta \), \( \theta \) is a vector of \( k \) parameters. \( Z \) is an \( n \times k \) matrix of variables (the empirical proxies listed in the previous section) used by the market to predict the likelihood of the firm announcing a repurchase. The insiders' private assessment of their marginal utility, \( u \), can be characterized as \( u = y^* - E(y^*) = y^* - y \). \( u \) is not observable to the market and known only to the insiders. The market forms its inference of \( u \) based on its observation of the repurchase announcement. In sum, the likelihood of a firm announcing a NCIB is
\[ y^* = Z\theta + u \quad (1) \]
\[ \text{NCIB} = 1 \iff y^* \geq 0 \iff u \geq -y \quad (2) \]
\[ \text{NCIB} = 0 \iff y^* < 0 \iff u < -y \quad (3) \]

That is, the normal course issuer bid is announced (NCIB = 1) if the insiders’ marginal utility, \( y^* \), is “large enough” or, alternatively, if their private assessment of their utility, \( u \), is favorable enough.

Our conditional event study models the abnormal announcement period return for the repurchasing firms as

\[ R = X\beta + E(e|u \geq -Z\theta) \quad (4) \]

where \( X \) is an \((m \times j)\) matrix of announcement period return-related variables in the market’s information set and \( \beta \) is a vector of \( j \) parameters. (Where \( m \) is the number of observations in the event sample and \( j \) is the number of explanatory variables including the intercept.) The correlation of \( u \) and \( e \) is denoted \( \rho \), and it represents the correlation between the private information of insiders and the abnormal announcement period returns unexplained by \( X\beta \). We estimate the parameters of the both equations and the correlation simultaneously using the maximum likelihood estimation method.

Results

The results from estimating the conditional event model are presented in Table IV. Panel A presents estimates of the probit regression, which explains the market’s estimate of the insiders’ marginal benefit from announcing a repurchase. Panel B shows the coefficients of the regression explaining variation in the announcement return. The first column of Table IV presents results for the Estimation Sample, the second column shows results for the Post-1995 Sample and the third column shows results for the Insider Holdings Sample. The sub-periods are determined by data availability but also provide robustness checks for the results from the Estimation Sample.

The results from the Estimation Sample show that firms are more likely to repurchase if they have high free cash flow, a low market-to-book ratio, and a sell-off in their stock price. The dividend yield variable is insignificant, which suggests that firms are not substituting dividends for repurchases. The sign and significance of the market-to-book and prior returns variables are consistent with the hypothesis that firms repurchase when their shares are undervalued. However, the two results are also consistent with Isagawa’s agency-signaling, which predicts that firms with poor investment opportunities are more likely to repurchase. The result that high free cash flow firms are more likely to repurchase is also consistent with the agency hypothesis.

The second column of Panel A presents the probit-regression estimation results for the Post-1995 Sample. The results are qualitatively equivalent to the Estimation Sample results.

The third column of Panel A presents the results for the Insider Holdings Sample. The results for that sub-sample are similar to the results for the Estimation Sample, except for the following three results. The excess debt variable is significantly inversely related to the likelihood of repurchasing, which is consistent with the optimal capital structure hypothesis. The market-to-book variable is not significant. Finally,
Table IV. Conditional event-study model estimates

<table>
<thead>
<tr>
<th></th>
<th>Estimation Sample</th>
<th>Sample</th>
<th>Post 1995 Sample</th>
<th>Sample</th>
<th>Insider Holdings Sample</th>
<th>Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Estimate</td>
<td>p-value</td>
<td>Estimate</td>
<td>p-value</td>
<td>Estimate</td>
<td>p-value</td>
</tr>
<tr>
<td>Intercept</td>
<td>-0.053</td>
<td>0.2888</td>
<td>-0.014</td>
<td>0.8190</td>
<td>-0.806</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Free cash</td>
<td>0.023</td>
<td>&lt;0.0001</td>
<td>0.024</td>
<td>&lt;0.0001</td>
<td>0.007</td>
<td>0.0187</td>
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<tr>
<td>Excess debt</td>
<td>-0.002</td>
<td>0.1424</td>
<td>-0.002</td>
<td>0.2734</td>
<td>-0.010</td>
<td>0.0421</td>
</tr>
<tr>
<td>Dividend yield</td>
<td>0.722</td>
<td>0.1784</td>
<td>0.229</td>
<td>0.7837</td>
<td>0.016</td>
<td>0.1396</td>
</tr>
<tr>
<td>Market-to-book</td>
<td>-0.017</td>
<td>0.0047</td>
<td>-0.037</td>
<td>&lt;0.0001</td>
<td>0.026</td>
<td>0.4931</td>
</tr>
<tr>
<td>Insider</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.027</td>
<td>-0.0001</td>
</tr>
<tr>
<td>Prior XS Rets</td>
<td>-0.009</td>
<td>&lt;0.0001</td>
<td>-0.009</td>
<td>&lt;0.0001</td>
<td>-0.018</td>
<td>0.0010</td>
</tr>
<tr>
<td>Correlation $\rho$</td>
<td>0.809</td>
<td>&lt;0.0001</td>
<td>0.789</td>
<td>&lt;0.0001</td>
<td>0.99</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

Panel A: Probit regression

Panel B: Announcement return regression

Intercept | -2.267 | <0.0001 | -2.597 | 0.0002 | -11.286 | <0.0001
Free cash  | 0.045  | 0.0721  | 0.068  | 0.0269 | 0.22    | 0.0390
Excess debt| -0.012 | 0.2466  | -0.006 | 0.7219 | -0.084  | 0.0722
Market-to-book | -0.069 | 0.0779  | -0.125 | 0.0501 | -0.150  | 0.7566
Insider    |       |        |        |        | 0.017   | <0.0001
Prior XS Rets | -0.057 | <0.0001| -0.053 | 0.0001 | -0.044  | <0.0001
Undervaluation | 1.072  | 0.0095  | 1.072  | 0.0095 | 1.072   | <0.0001
Repeat     | -0.505 | 0.1258  | -0.772 | 0.0615 | 0.011   | 0.1370
Volatility | -0.017 | 0.0064  | -0.020 | 0.0097 | -0.153  | 0.3907

Notes: This table presents probit and return regression coefficient estimates. Column 1 presents the Estimation Sample: 901 NCIB and 693 non-NCIB over 1987-2000. Column 2 presents the Post-1995 Sample: 664 NCIB and 513 non-NCIB over 1995-2000. Column 3 presents the Insider Holdings Sample: 219 observations: 109 NCIB and 110 non-NCIB over 1989-1992. Dependent variable in probit regression equals to one if NCIB is announced, and zero otherwise. Free cash flow is operating cash flow over total assets. Excess debt is the difference between the firm's debt ratio and the industry average debt ratio (based on one-digit SIC codes). Dividend yield is common dividends per share from preceding fiscal year over price preceding announcement. Market-to-book uses book value from the most recent fiscal year-end, Insider holdings is proportion of shares held by officers, directors and large blockholders. Prior XS Rets is the 60-day compound abnormal return ending seven days before the announcement. Undervaluation is the annualized standard deviation of daily returns over the sixty days preceding the announcement. Volatility is the annualized standard deviation of daily returns over the sixty days preceding the announcement. Repeat is a dummy taking the value of one if the firm had a repurchase in the preceding year, and zero otherwise.

The insider holdings variable is positively and significantly related to the likelihood that a firm will repurchase. This result is consistent with the agency hypothesis. The last row in Panel A presents an estimate of the correlation between the private information affecting the insiders' decision to repurchase and the abnormal announcement period return. In all three samples the correlation is positive and statistically significant, which implies that some of the insiders' private information is revealed by the repurchase announcement. The nature of the private information can be deduced from the probit regression results. Those results are most consistent with the agency hypothesis – it predicts the sign and significance of the coefficients on the free cash flow, market-to-book, pre-announcement return, and insider holdings variables. Since the agency hypothesis best explains the likelihood of a repurchase, it follows that the private information relates to the insiders' private knowledge of the marginal benefit that they derive from perquisite consumption and empire building.
Since they choose to repurchase, the market deduces that the insiders derive a low
marginal benefit—they are not the type to waste free cash flow.

Panel B presents estimates of the coefficients of the announcement regression. In all
two samples, free cash flow is positively related to the abnormal announcement
return, which is consistent with the agency hypothesis. In all three samples, abnormal
announcement returns are higher for undervalued firms (low market-to-book ratio and
higher underperformance relative to the market return prior to the announcement).
This result is consistent with the predictions of the undervaluation hypothesis, and
with results documented in US studies (Comment and Jarrell, 1991). This result is not
consistent with the agency hypothesis—it makes no prediction as to the relationship
between public measures of undervaluation and the announcement return. The last
consistent result is that the announcement return is inversely related to volatility,
which is contrary to the implications of the signaling hypothesis. (The coefficient is not
significant in the Insider Holdings Sample.)

The Post-1995 Sample (the second column of Panel B) shows that the coefficients on
both the repeat and undervalued variables are significant. (The repeat variable is
not significant in the Estimation Sample.) The negative coefficient on the repeat variable
indicates that the market infers less positive information from firms that announce a new
repurchase program immediately after one has finished. The significant, positive
coefficient on the undervaluation dummy indicates that the market learns from
companies’ press releases. Despite the extensive use of boiler-plated wording in the
press-releases and despite the fact that three quarters of all firms claim it, the market
revalues firms more when they claim that their shares are undervalued. It is perhaps not
surprising that the market reacts to such claims despite their “cheap talk” nature.
Companies play a repeated game with capital markets, and so reputation is important.

The last column of Panel B shows results for the Insider Holdings Sample.
The announcement return is significantly inversely related to the firm’s relative debt.
This result is consistent with the optimal capital structure hypothesis—the increase in
firm value should be larger the further the firm is below its optimal leverage—but the
result is not robust. The coefficient on debt is not significant in either the Estimation or
Post-1995 Samples. The more interesting result from that time period is that insider
holdings are positively related to the announcement return. This result is consistent
with the signaling hypothesis and is also consistent with the agency hypothesis.

Conclusions
This paper examines the determinants of firms’ repurchase decision and the market
reaction to the decision using a conditional event study framework. We find that firms
are more likely to buy back shares if they have greater free cash flows, lower market-
to-book ratios, poor prior stock performance, and their insiders have large
shareholdings. We show that the market reacts more positively to repurchase
announcements when firms claim that there shares are undervalued and when firms
initiate new repurchase programs. Other than reacting to observable characteristics of
the repurchasing firm, our results also suggest that the market infers positive private
information from the repurchase announcement—we observe a significant positive
correlation between the unexplained abnormal announcement return and the private
information which insiders use to guide their decision to repurchase.

Canadian firms have many motives for repurchasing, and our results reflect this.
There is support for a number of the hypotheses, e.g. capital structure and
undervaluation. However, the hypothesis that best fits the data is the Isagawa/Agency
hypothesis. Firms that are prone to agency problems (high free cash flow and low growth firms) are more likely to repurchase and the market infers from the announcement that the insiders are not high agency costs types (do not derive a great deal of utility from empire building). This is good news, which explains the abnormal positive announcement return.

Notes

2. This is not meant to imply that a firm cannot have private information about its optimal capital structure which is conveyed by a repurchase, but the extent repurchase literature does not include a private component.
3. For a more complete treatment of self-selection issues in empirical corporate finance, see the review paper by Li and Prabhala (2005).
4. Ontario Securities Act, 1994, Section 94(8).
5. Rule changes adopted by the SEC in 2003 and 2004 make repurchase program announcements mandatory (changes to Rule 10b-18 and Regulation S-K and S-B). In the past, announcements were not mandatory, although most firms did announce their repurchase program by means of a press release.
6. Due to availability, our sample of Canadian open market repurchases includes only firms that are listed on the TSX; hence, our discussion throughout the paper focuses on the TSX by-laws.
8. NCIB announcements are viable signals in that they satisfy the Spence-Mirrless single crossing condition. Announcing firms are restricted from issuing shares over the duration of the bid, which is an opportunity cost. The opportunity cost is lower for high profit firms, because their greater internal cash flow gives them an alternative source of financing.
9. See Shleifer and Vishny (1986). The gain may also dominate if insiders own stock options (Fenn and Liang, 2001). We tested this by including shares reserved for conversion (Compustat item A40) in our probit model. Unfortunately, that variable is missing in much of the Canadian Compustat data, and, in the reduced sample, the option variable did not have any explanatory power, we do not report those results.
10. In Isagawa’s notation, if \( \alpha \) – the managers’ ownership share – is large, then it is more likely that their private benefit will be smaller than the loss of wealth due to adapting a negative NPV project.
11. Between Equations (7) and (8), Isagawa shows that the announcement return is increasing in the size of the repurchase. Since \( K = \) free cash, this can also be interpreted as implying that the return is increasing an the amount of free cash.
12. We did not include announcements by closed end mutual funds or income trusts.
13. Some offers target more than 5 per cent of shares outstanding because the alternative maximum is 10 per cent of the public float.
14. 79 per cent of the population of repurchases show a month-over-month decline in shares outstanding in at least one month during the program.
15. Figure 1 and the return estimates reported in this paragraph are based on the subset of the population of TSX repurchases with good price data. The statistics reported here are based on 2,318 programs. Figure 1 uses a smaller sample because it includes only programs for which there is non-missing data on the announcement day.
16. The model is essentially a self-selection model (see Maddala, 1983) and is also similar to Acharya (1988) and Eckbo et al. (1990).
References


Further reading

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