VOLUNTARY COMPLIANCE AND IMPLIED COST OF EQUITY CAPITAL: EVIDENCE FROM CANADIAN SHARE REPURCHASE PROGRAMS

A Thesis Submitted to the College of

Graduate Studies and Research

In Partial Fulfillment of the Requirements

For the Degree of Master of Science in Finance

In the Department of Finance and Management Science

Edwards School of Business

University of Saskatchewan

Saskatoon

By

JOANNE LEUNG

Keywords: share repurchases, implied cost of capital, voluntary compliance

PERMISSION TO USE

In presenting this thesis in partial fulfilment of the requirements for a Postgraduate degree from the University of Saskatchewan, I agree that the Libraries of this University may make it freely available for inspection. I further agree that permission for copying of this thesis in any manner, in whole or in part, for scholarly purposes may be granted by the professor or professors who supervised my thesis work or, in their absence, by the Head of the Department or the Dean of the College in which my thesis work was done. It is understood that any copying or publication or use of this thesis or parts thereof for financial gain shall not be allowed without my written permission. It is also understood that due recognition shall be given to me and to the University of Saskatchewan in any scholarly use which may be made of any material in my thesis.

Requests for permission to copy or to make other use of material in this thesis in whole or part should be addressed to:

Head of the Department of Finance and Management Science

Edwards School of Business

University of Saskatchewan

25 Campus Drive

Saskatoon, Saskatchewan S7N 5A7

ABSTRACT

Securities legislation in Canada and around the world does not mandate firms to fulfill announced share repurchase programs. As such, a firm's repurchase program completion rate can be interpreted as a measure of the firm's voluntary compliance, which communicates to investors the degree to which the firm is responsible, reliable and makes good faith efforts to fulfill its announced programs. We therefore expect that the voluntary compliance may reduce the riskiness of a firm and thus its cost of capital. In a sample of Canadian repurchase programs announced between 1995 and 2004, surprisingly, we find little evidence to suggest that a significant relationship exists between the firm's repurchase program completion rate and the cost of equity. We present a number of explanations for this result.

ACKNOWLEDGMENTS

I thank my thesis supervisors Dr. Dev Mishra and Dr. Marie Racine for their patience and invaluable guidance and members of my committee, Dr. Abdullah Mamun and Dr. Suresh Kalagnanam, for their helpful suggestions. I thank Luke Schmidt for providing share repurchase data. I am also grateful to my family and friends for their encouragement and support.

TABLE OF CONTENTS

page

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1
INTRODUCTION

This study examines the role of voluntary compliance, as measured by the firm's repurchase program completion rate, in affecting the firm's cost of equity capital. Canadian securities legislation limits firms announcing open-market share repurchase programs to a 12-month period within which to make their repurchases. As noted by Stephens and Weisbach (1998) and Grullon and Ikenberry (2000), open-market share repurchase programs are flexible particularly with respect to the degree of program completion. Firms may choose to purchase some, all or none of its targeted shares. Banyi, Dyl and Kahle (2005) state that even if firms fail to fulfill their announced actions, they face no legal penalty. Because of this flexibility, any shares repurchased reflect a voluntary decision by the firm to comply with their announcement to repurchase. This voluntary compliance can be considered as being equivalent to a voluntary disclosure, discussed in extant literature as being negatively associated with the cost of capital [Welker (1995); Healy, Hutton and Palepu (1999); Bloomfield and Wilks (2000)].

Our study is motivated by research which examines market perceptions of the firm's repurchase activity. Moore (2005) discusses the possibility that the degree of fulfillment of a firm's repurchase program in the past is a credibility indicator of subsequent repurchase fulfillment. Mishra, Racine and Schmidt (2007) find support for a positive association between a firm's completion credibility and the market reaction to subsequent repurchase announcements. These studies suggest that investors take into consideration a firm's repurchase activity history, particularly its degree of fulfillment, when forming perceptions of the firm, affecting their reactions to subsequent corporate actions.

We contribute to the literature by directly testing whether the cost of capital is affected by the firm's share repurchase completion rate. Our measure of cost of capital allows us to directly test the perceived impact of share repurchases in the firm's cost of capital (denominator term of the discounted cash flow equation), while simultaneously controlling for its impact in expected cash flows (numerator term). Our methodology allows us to examine whether the cost of equity is a significant channel through which the share repurchase completion rate affects post-completion firm value. In addition, we shed light on whether the market perceives the share repurchase completion rate as voluntary compliance affecting the firm's perceived risk. To our knowledge, this is the first study to do so. Further, researchers have recently focused on the repurchase completion rate in efforts to understand its information content [e.g., Stephens and Weisbach (1998); Ikenberry, Lakonishok and Vermaelen (2000); Chan, Ikenberry, Lee and Wang (2005)]. We add to these studies by examining the effect of the repurchase completion rate (as a measure of the firm's voluntary repurchase program compliance) on investor perceptions about the riskiness of firms' announcement and disclosure and its apparent impact on cost of equity capital.

In order to empirically test the relationship between the firm's voluntary repurchase compliance and the cost of equity, we estimate the firm's implied cost of equity capital along the lines of Hail and Leuz (2006) and Dhaliwal, Heitzman and Li (2006). The implied cost of capital estimation approach has been recently suggested by researchers [Claus and Thomas (2001); Gebhardt, Lee, and Swaminathan (2001); Gode and Mohanram (2003)] as an alternative to the CAPM and various models that necessitate the use of realized returns as a proxy for expected returns because cost of equity estimates from these types of models have been found to be imprecise [e.g. see Fama and French (1997)]. We run a cross-sectional regression of RP

(implied cost of equity in excess of the risk free rate) on the firm's repurchase program completion rate. Our results indicate little evidence of a relationship between the firm's repurchase program completion rate and the cost of equity. Section 4.3 includes several explanations for this finding.

CHAPTER 2
LITERATURE REVIEW

This chapter contains a review of the relevant literature. Section 1 provides an overview of share repurchases. Section 2 details the rationale for repurchase program completion rates as a form of voluntary compliance. Section 3 addresses the information disclosure aspect of voluntary compliance. Section 4 discusses the information disclosure literature as it relates to the cost of equity. Section 5 discusses the motivation behind the use of the implied cost of equity estimation approach as an alternative to more traditional approaches.

2.1 An Overview of Open-Market Repurchases

There has been a substantial increase in open market share repurchases in recent years. Mauboussin (2006) reports that the value of repurchases as a percentage of total payout has increased from 5% in 1977 to 53% in 2004. Jagannathan, Stephens and Weisbach (2000) document a 650% increase in the number of open market share repurchase program announcements made by U.S. industrial firms between 1985 and 1996. They also document a 750% increase in the value of these announced programs. Grullon and Michaely (2002a) state that expenditures on repurchase programs as a percentage of total earnings increased from 4.8% in 1980 to 41.8% in 2000. Furthermore, as an indication of the recent prevalence of repurchase programs, Grullon and Ikenberry (2000) report that as of January 2000, 70% of firms included in the S&P500 initiated open-market repurchase programs within the past five years. Grullon and Michaely (2002a) suggest that the increase in open market share repurchases is attributable to the use of repurchases as an alternative to dividends as a method of payout.

Firms repurchase shares to signal positive earnings prospects and address undervaluation [Comment and Jarrell (1991); Ikenberry, Lakonishok and Vermaelen (1995); Stephens and Weisbach (1998); and Baker, Powell and Veit (2003)], mitigate agency problems associated with free cash flow [Grullon and Michaely (2002b)], serve as a substitute for dividend increases [Grullon and Michaely (2002a)], counter dilutive effects of employee stock options [Bens, Nagar, Skinner and Wong (2003)], and deter takeovers [Billett and Xue (2006)]. While the open-market share repurchase approach is not the only repurchase approach available to companies in Canada and the U.S., it is undoubtedly the most prevalent method used [Grullon and Ikenberry (2000) and Mauboussin (2006)]. Preference for the open-market repurchase method is frequently attributed to the flexibility that open-market share repurchases afford to firms initiating these programs, particularly in terms of commitment. If firms fail to fully complete their announced programs, no legal disciplinary action is taken against them [Banyi, Dyl and Kahle (2005)]. This is the case in both Canada and the U.S. Previous literature, however, suggests that repurchase programs in the two countries differ in terms of regulation. Disclosure requirements for repurchase programs in Canada appear to be more stringent compared to those in the U.S. Canadian repurchasing firms must disclose their repurchase activity to the Toronto Stock Exchange each month and repurchase programs are subject to a 12 month time frame for completion.[1] Firms in the U.S. previously were not obligated to disclose, register or otherwise report any information to the stock market or exchange regarding their repurchase activities aside from the initial program announcement [Grullon and Ikenberry

[1] According to Grullon and Ikenberry (2000, p. 45), "In Canada, disclosure of actual repurchase activity is far more extensive and meaningful. There the exchanges gather and publish each month the previous month's trading activity for all authorized programs. Thus, it is easy to find the exact level of repurchase activity at any point in time, the number of shares still authorized for repurchase, and the program's termination date."

(2000)]. Disclosure requirements in the U.S. have since been modified. Amendments made by the U.S. Securities and Exchange Commission in November 2003 (effective December 2003) now require firms to disclose the number of shares repurchased and the average repurchase price each quarter.[2] Despite the recently increased disclosure requirements, repurchasing firms in the U.S. are still not required to complete their programs under any specific time limits.[3] Though firms in both countries are now required to disclose their repurchase activity, they face no penalties if they choose not to complete their programs. The Toronto Stock Exchange's rules governing open market share repurchases in Canada clearly stipulate that repurchasing firms must report their repurchase activity each month.[4] So while the disclosure of repurchases is mandatory, the degree of compliance (fulfillment) with their announced programs is voluntary.

2.1.1 Institutional Framework

In Canada, open market share repurchases for firms listed on the Toronto Stock Exchange (TSX) are called "normal course issuer bids." In order to repurchase its shares, a firm must file a notice with the TSX declaring its intention to repurchase shares and also specify the number of shares that the firm's board of directors has decided to repurchase. The normal course issuer bid (or repurchase program) is allowed a one year period for repurchases to be made. Prior to TSX

[2] The SEC amended Regulations S-K and S-B, and Forms 10Q, 10QSB, 10-K, 10-KSB, 20-F, and N-CSR to include periodic disclosure of share repurchases.

[3] Flexibility regarding the length of time a U.S. firm chooses to engage in its repurchase program is implied in section VI Disclosure of the Securities and Exchange Commission's release pertaining to 'Purchases of Certain Equity Securities by the Issuer and Others' (refer to references), which reads "The final rules also require footnote disclosure of the principal terms of publicly announced repurchase plans or programs, including: […] the expiration date (if any) of the plans or programs […]."

[4] See TSX Company Manual, Part VI Changes in Capital Structure of Listed Issuers, L. Normal Course Issuer Bids, Section 629 Special Rules Applicable to Normal Course Issuer Bids, section (k). Retrieved on May 30, 2008 from: http://tsx.complinet.com/en/display/display.html?rbid=2072&element_id=566

acceptance of the notice, the firm must issue a press release detailing the number of shares sought, the reason for repurchase and specifics for any repurchases made in the previous 12 months. The firm must outline its repurchase program in any upcoming documents (e.g. quarterly report) sent out to its security holders. Within the last 10 days of each month, the firm must report the number of shares it has repurchased in that month and the average repurchase price to the TSX. While Canadian firms are subject to a 12-month period for completion, firms are at liberty to complete their repurchases in any one month or spread over the 12 months. The Toronto Stock Exchange's rules governing open-market repurchases do not stipulate a repurchase schedule for the firm.[5]

2.1.2 Repurchase Motives

Researchers have suggested a variety of reasons why firms choose to repurchase their shares. These motives include: (*i*) signaling and addressing undervaluation, (*ii*) addressing agency problems, (*iii*) achieving optimal capital structure, (*iv*) serving as a substitute for dividends, (*v*) managing earnings per share, (*vi*) misaligned interests, and (*vii*) discouraging takeovers. Each of these will be discussed below.

Signaling and undervaluation. Underlying the signaling and undervaluation hypothesis is the concept of information asymmetry between firm insiders (managers) and the investing public (outsiders). Contemporary interpretations of informational asymmetry in financial markets have largely been based on Akerlof's (1970) "lemons" principle, which explores quality and uncertainty interactions in a market context. Insiders are expected to be more knowledgeable about their firm's workings and prospects than the general public which brings about the need

[5] For the Toronto Stock Exchange's rules governing open-market share repurchases, refer to TSX Company Manual, Part VI Changes in Capital Structure of Listed Issuers, L. Normal Course Issuer Bids, Section 629 Special Rules Applicable to Normal Course Issuer Bids http://tsx.complinet.com/en/display/display.html?rbid=2072&element_id=566

for insiders to effectively communicate their quality to the market in some way. As Grullon and Ikenberry (2000) describe, managers may seek to communicate new information, specifically their optimism for firm prospects (for instance, imminent increases in firm cash flow and earnings) through repurchases. This positive outlook may not be shared by the market. Therefore the discrepancy between the current price and the intrinsic value arises from the firm's inability, without repurchasing, to otherwise credibly inform investors of its prospects. Alternatively, managers may be at odds with the way that the market is valuing the firm's current performance, and repurchases are meant to convey their disagreement.

Incentives obviously exist for managers to misrepresent or window-dress the firm's earnings prospects. As such, the investing public may be skeptical because they cannot discern an undervalued firm from an overvalued firm. Under these circumstances, "actions speak louder than words," a phrase aptly applied by Leland and Pyle (1977) to illustrate that if managers are willing to undertake certain actions, they can signal to the market the firm's true quality and the market will value the firm to reflect the information content of the signal. Grullon and Ikenberry (2000) rationalize that managers can convincingly signal their optimistic earnings prospects by participating in stock repurchases because they restrict the flexibility of managers. The signal is credible because managers are prepared to engage in immediate cash payouts due to their belief that the anticipated rise in earnings will cover upcoming capital requirements. The mimicking of such strategy by lower quality firms is deterred because they face more chance of loss than superior quality firms; in other words, firms that expect a drop in earnings are less willing to repurchase shares considering the substantial outflow of capital would make them unable to invest in profitable projects and more importantly, might make them prone to risks of financial distress.

In their study, Ikenberry, Lakonishok, and Vermaelen (1995) gather announcements for open-market share repurchases from the *Wall Street Journal* for a period beginning in 1980 and ending in 1990. They note that although the majority of firms do not disclose the reason behind the repurchase, for the ones that do, the leading reason provided involves issues of undervaluation.[6] A survey conducted by Baker, Powell, and Veit (2003) also finds that undervaluation is the most commonly cited reason by managers participating in open-market repurchases from January 1998 to September 1999. Studies such as Comment and Jarrell (1991) and Stephens and Weisbach (1998) find that repurchase announcements are often preceded by negative firm performance, which has been interpreted as support for signaling and undervaluation theories. Dittmar (2000)[7] finds some support that firms repurchase stock in order to address potential undervaluation; the variable used to measure undervaluation is significant in every year of her sample[8].

Although the undervaluation hypothesis has been supported by some studies, others find no empirical substantiation for it. Grullon and Michaely (2002b) and Jagannathan and Stephens

[6] In spite of this observation, Ikenberry, Lakonishok, and Vermaelen (1995) caution that reading these condensed press reports may not lead to a clear understanding of managers' motives concerning repurchases.

[7] Dittmar (2000) uses U.S. cross-sectional data and a Tobit model estimated for each year in her sample which spans from 1977 to 1996 to simultaneously examine multiple motives for stock repurchasing. Although her sample is not confined to open market share repurchases and includes all manners of repurchasing, including fixed-price tender offer as well as dutch auction tender offer methods, open market share repurchases comprise the majority of her sample.

[8] Although undervaluation appears to be a strong motive in her study, Dittmar (2000) suggests that the results do not point to a precise and single determining motive behind share repurchases; it could be that firms repurchase depending on various factors in conjunction with one another. For example, a firm's decisions to repurchase shares may be motivated by the desire to distribute excess capital, but the firm will opt to repurchase when there is more likelihood of stock price undervaluation.

(2003) find no evidence of improved operating performance subsequent to open-market repurchase announcements, despite the notion that managers use repurchases to signal positive earnings prospects.

Agency Costs and Free Cash Flow. Some believe that firms repurchase stock in order to lessen agency problems related to free cash flow. Agency costs are an inevitable result of the separation of ownership and control, and they arise because there is a divergence in the interests of managers and shareholders [Jensen and Meckling (1976)]. Managers may fail to act in the best interest of shareholders because they have incentives to further firm growth at the sacrifice of value. From a manager's perspective, control of a larger firm means increased power and prestige, and with it, higher compensation [Jensen (1986)]. These potent managerial incentives may prevail even if they mean causing the firm to grow to a size beyond what is optimal. Jensen (1986) refers to free cash flow as the capital exceeding what is needed to finance positive net present value projects. He explains that agency problems intensify when firms are faced with considerable free cash flow. To resolve this issue, managers must disgorge the excess cash instead of investing it in value-destroying projects. Jensen (1986) also suggests that as a way to cope with concerns relating to significant free cash flow, managers can increase dividend payments or buy back stock and in so doing, disburse cash that would otherwise be squandered on unprofitable projects. Not only do payouts diminish managerial power by shrinking resources under managerial control, but they also induce managers to behave in a way that conforms to shareholders' interests as a result of stringent capital market monitoring when it comes time for the firm to seek new capital [Easterbrook (1984); Jensen (1986)]. Grullon and Michaely (2002b) find empirical support for the free cash flow and agency costs motive in their analysis of repurchases.

Optimal Leverage and Capital Structure. An optimal ratio of debt to equity is an important issue for firms because it corresponds to a situation where the firm is taking full advantage of any available tax shields and at the same time minimizing risks that may lead to financial distress. In achieving this optimal balance, firms reduce their cost of capital to a minimum and shareholder value increases [Mauboussin (2006)]. If a firm buys back its stock, equity decreases; so by repurchasing stock, firms can alter their capital structure by increasing their debt/equity ratios. The leverage ratio can be further drastically adjusted if the firm borrows in order to repurchase.

Grullon and Ikenberry (2000) argue, however, that this leverage adjustment motive is not particularly convincing for open-market share repurchases because the number of shares sought in these programs generally represent only a small fraction of outstanding shares[9] and also because programs tend to span several years before achieving completion. Therefore, it is unlikely that radical changes would be realized using this approach. They rationalize that on the other hand, firms can use repurchase programs to make small modifications to leverage ratios little by little over time to prevent the need to make large adjustment overhauls. The authors assert that routine firm activities such as participation in employee stock ownership plans or dividend reinvestment plans effectively act as small scale equity offerings which result in eventual diminishing of the leverage ratio. Open-market share repurchases thus help in maintaining firm leverage levels.

[9] This is true for Canadian firms which are allowed to repurchase only a maximum of 5% of shares outstanding or 10% of the public float (whichever is greater) under their repurchase programs. For the Toronto Stock Exchange's rules governing open-market share repurchases, refer to TSX Company Manual, Part VI Changes in Capital Structure of Listed Issuers, L. Normal Course Issuer Bids, Sec. 628. General
http://tsx.complinet.com/en/display/display_main.html?rbid=2072&element_id=565

Researchers make a case that repurchases are therefore an appropriate measure to facilitate firms in either attaining their optimal leverage level or else in sustaining it. Dittmar (2000) finds support for the leverage hypothesis in the later years of her sample and concludes that the leverage ratio has statistically significant but slight consequences on the repurchase decision.

Dividend Substitution and the Rise of Repurchases. Prior to the early 80s, the favored method of payout was dividends. However, the popularity of repurchases has grown over the last 20 years.[10] Total expenditure on stock repurchases surpassed that of dividends for the first time in 1999. Ikenberry, Lakonishok, and Vermaelen (1995) argue that the regulatory environment prior to 1982 discouraged many firms from repurchasing stock. They find that the amount of money spent on repurchase programs tripled only a year after SEC Rule 10b-18 was passed.

Firms may prefer repurchases to dividends for two reasons: tax considerations and flexibility. Dividends are taxed as ordinary income at rates less favorable than the rates that capital gains are taxed. Grullon and Michaely (2002a) find that the substitution between dividends and share repurchases does not arise from companies cutting dividends and using the cash to repurchase stock, but rather from firms keeping dividend payout ratios constant while financing stock repurchases using the cash that would have gone toward dividend increases. The authors also observe that the market seems to respond favorably to the replacement of dividends with repurchases considering dividend cuts made by firms without repurchase plans experience significantly negative market reactions, but dividend cuts made by firms with repurchase plans experience insignificant market reactions. However, Fama and French (2001) argue that the

[10] Jagannathan and Stephens (2003) report that only 129 stock repurchase programs were initiated in 1985, roughly worth $16 billion, and by 1998 the number of repurchases rose to 1,434 with a value over $200 billion.

decline of dividends is due in part by a surge in smaller companies that have low profitability and high growth opportunities. These kinds of firms generally pay no dividends. Furthermore, they find that firms today tend to pay fewer dividends than they did 20 years ago, regardless of their characteristics. In spite of their findings, many studies suggest that a substitution of dividends by stock repurchases is occurring as a result of the relative benefits of stock repurchases.

Lie and Lie (1999) suggest that firms consider the tax circumstances of their shareholders in choosing repurchases over dividends, especially if their shares are held by institutional investors who might pressure the firm to provide them with that tax advantage. Also, repurchases provide more flexibility than dividends, presenting a particular advantage for firms that encounter temporary increases in cash flow. Jagannathan, Stephens, and Weisbach (2000) argue that dividend payments are a long-term commitment and firms are reluctant to increase dividends if they are unsure whether permanent operating cash flows can support the increase. Numerous empirical studies have shown that the market reacts negatively to dividend cuts. On the other hand, stock repurchases pose no such risks to the company as they do not imply that a repurchase program will be followed by subsequent repurchase programs.

EPS Management and the Offsetting of EPS Dilution. Studies have shown that there exists a widespread belief among managers that the earnings per share (EPS) ratio has significant effect on their stock prices [see for example, Andrade (1999)]. This accounting ratio is used by many analysts to evaluate firm performance and firm value. As a result, managers are reluctant to engage in investments that may have dilutive effects on EPS (of course there may be other reasons why managers hesitate to engage in dilutive transactions, for instance if their salary or bonus is in some way tied to EPS).

Some argue that repurchases are used to manage the EPS ratio because they have mechanical effects on the ratio's numerator and denominator. The numerator is affected because by repurchasing shares using its cash, the firm foregoes any return on cash or interest expense on cash borrowings. The denominator is the average number of shares outstanding in the fiscal period and is affected because repurchases lower the number of shares outstanding. These effects depend, however, on the timing of the repurchase in the firm's fiscal period. If the firm repurchases at the start of the fiscal period, then the repurchased shares are subtracted from the number of shares outstanding for the entire fiscal period. On the other hand, if the firm repurchases at the end of the fiscal period, then it has little impact. Similarly, current earnings will not be influenced much by foregone return if the firm decides to repurchase at fiscal end, though it will affect reporting in upcoming periods. Also, it is important to note that share repurchases boost EPS only in circumstances where the firm's earnings-to-price ratio exceeds the foregone return on cash. Hribar, Jenkins and Johnson (2006) suggest that firms may be using repurchases in order to meet analysts' EPS forecasts. They observe a surge in EPS boosting buybacks when these firms would have been just slightly short of analyst forecasts had they not engaged in these repurchases.

In addition to managing EPS, researchers also suggest that firms use repurchases to counter the effects of EPS dilution which result from the exercise of employee stock options. Mauboussin (2006) suggests that firms repurchase shares in order to maintain the number of shares outstanding at a steady level. He states that of the S&P 500 companies that have been participating in buybacks since 2000, more than 30 percent have not observed a decline in their outstanding shares. Bens, Nagar, Skinner and Wong (2003) also find corroborating evidence that

the firm's decision to repurchase is influenced by aims to offset dilutive effects of employee stock options.

Management Incentives and Misaligned Interests. Some argue that the personal incentives of managers play an influential role in the firm's repurchase activity. In particular, the decision to repurchase may be affected by the number of stock options that managers possess. This hypothesis is different from the optimal leverage hypothesis and the offsetting EPS dilution hypothesis. In those theories, it is assumed that managers' interests are aligned with those of shareholders and that the primary rationale behind engaging in repurchases is to increase firm value (by attaining or maintaining the optimal leverage or else maintaining certain equity-valuation ratios). Under the current hypothesis, managers choose to initiate share repurchase programs mainly for the purposes of increasing the stock price for personal benefit. Weisbenner (2000) finds that the amount of stock options held by executive employees affects payout policy in ways different from the amount held by other employees. Furthermore, it is argued that managers may refrain from engaging in activities that would bring down the stock price; activities such as the initiation of increases in dividend payments. Plenty of empirical evidence is found in support of this hypothesis. Lambert, Lanen and Larcker (1989) find evidence that the dividend payout ratio decreases after a firm introduces management stock option policies. Fenn and Liang (2001) produce similar findings and in addition they also document a significant positive relationship between stock repurchases and management stock options. Combined, these studies help explain the rise of stock repurchases and the decline of dividend payments. Hall and Liebman (1998) observe that managerial stock option compensation has grown substantially since the 1980s. When this finding is considered in conjunction with the findings of the aforementioned studies, the management incentive hypothesis seems to provide a plausible

explanation for the trend in increasing stock repurchases and decreasing dividends over the last 20 years.

Takeover Susceptibility and Deterrence. According to Bagwell (1991), share repurchases may be effective takeover deterrents because they increase the acquisition cost for the acquiring firm. When the potential target seeks to repurchase shares from the open-market, the shareholders who are the most willing to part with their shares are the first ones to sell. In doing so, the potential target eliminates the shareholders who would have sold their shares to the acquiring firm at the lowest prices. The shareholders that remain are the ones that are more reluctant to sell, and hence will hold out for a higher price. Therefore when the acquiring firm tries to purchase the target firm's shares, it must pay a larger premium, which may deter firms looking to acquire. Dittmar (2000) finds that compared to non-repurchasing firms, a higher proportion of repurchasing firms are under threat of takeover for certain sub-periods of her sample, which she interprets as suggesting that the susceptibility of being a takeover target may encourage firms to participate in repurchases. Billett and Xue (2006) suggest that although it may be true that open-market repurchases deter takeovers as a result of discouraging unwelcome bids, it could also be that repurchases lessen agency costs as previous discussed, and hence cause the firm to be less appealing as a takeover target by lowering the gains that arise from disciplinary takeovers. Empirically, they find a strong association between repurchase activity and takeover threat. They attribute the weak results or lack of results of other studies to modeling problems. In particular, they point out that other studies assume a sequence of events whereby repurchase activity occurs subsequent to takeover announcements. They argue, however, that if repurchases prevent takeovers at the outset, models used in other studies would be unable to detect the role of repurchases in fending off takeovers.

Repurchase Motives in the Context of the Current Study. The rationale of the current study relies on the information signal of the firm's repurchase program completion; the firm's voluntary repurchase compliance conveys information to the market about the integrity of the firm's management in following through with its corporate announcements. The focus of this study is in investigating whether it is costly for the firm to announce and not follow through. It is important to note that as many papers have stated [e.g., Dittmar (2000)], the decision to repurchase is likely attributable to multiple motives and it is doubtful that all firms announcing repurchase programs are impelled by a singular motive. Regardless of the motivation behind the firm's decision to repurchase, it is interesting to study the impact of the degree of the voluntary compliance.

2.2 Repurchase Completion Rates as a Form of Voluntary Compliance

Statements made in one of the U.S. Security and Exchange Commision's 2003 releases suggest that zero completion could be subject to legal ramifications: "If an issuer announced a repurchase program, but had no intention to make purchases, it may violate the anti-fraud and anti-manipulation provisions of the federal securities laws."[11] However, according to Banyi, Dyl and Kahle (2005, p. 2), "No legal obligation is incurred when a firm announces an intention to repurchase shares in the open market." As a result of this commitment flexibility, compliance with repurchase programs is not considered mandatory in Canada or the U.S. [Oded (2005); Grullon and Ikenberry (2000)]. For Canadian firms, Ikenberry, Lakonishok and Vermaelen (2000) document the mean completion rate within one year of the repurchase announcement to be 28.6 percent. For U.S. firms, Stephens and Weisbach (1998) report the mean completion rate

[11] Securities and Exchange Commission [Release Nos. 33-8335; 34-48766; IC-26252; File No. S7-50-02] retrieved from: http://www.sec.gov/rules/final/33-8335.htm

within three years of the announcement to be in the range of 74 to 82 percent of the announced program.

It is possible that repurchase completion rates, as a measure of the firm's voluntary compliance, may be an important means of reducing information asymmetry. Voluntary compliance may reveal to the market the responsibility of firm's management and whether this management is making good-faith efforts in complying with their announcements. Badrinath, Varaiya and Ferling (2001, p. 43) suggest that "completing a repurchase signals the level of commitment that the underlying firm has to the repurchase program." If a firm complies voluntarily with its announced repurchase program even when it faces no penalties if it fails to do so, this signals that the firm does not make spurious promises. In other words, this may convey information to the market about the integrity of the firm, particularly as it relates to its reliability in following through on its announced actions. Several other studies also suggest that voluntary compliance in the form of repurchase completion may be reflective of some aspect of the firm's quality. For example, Chan, Ikenberry, Lee and Wang (2005) find that repurchasing firms with low earnings quality (i.e. high discretionary accruals) have significantly lower repurchase program completion rates than repurchasing firms with high earnings quality. Lending evidence to the issue of firm quality, Moore (2005) suggests that the degree of fulfillment of a firm's repurchase program in the past is a credibility indicator of subsequent repurchase fulfillment. Mishra, Racine and Schmidt (2007) find empirical support for a positive association between a firm's completion credibility and the market reaction to subsequent repurchase announcements. They reason that firms that fail to complete their repurchase programs will be perceived by investors as being less credible than firms that do complete their programs.

Research suggests that various factors play a role in determining the portion of the intended program that the firm actually repurchases. Kirch, BarNiv and Zucca (1998) find that the fulfilling and non-fulfilling firms in their sample differ in terms of firm size and profitability. In particular, fulfilling firms tend to be larger (evaluated by total assets and total sales in the announcement year) and more profitable compared to non-fulfilling firms. Relative program size (measured as the number of shares targeted for repurchase as a fraction of the firm's total shares outstanding) does not appear to be a factor.

2.3 Voluntary Compliance as a Means of Disclosure

Although the literature does not explicitly refer to share repurchases as disclosures, we build on insights provided by Easley and O'Hara (2004, p. 1556), particularly that disclosure is a mechanism whereby private information is turned into public information. Proponents of the information signaling motive for repurchases contend that managers employ repurchases as a means of communicating their private information to the market, thereby converting their private information into public information in a semi-strong form efficient market. For example, Billett and Xue (2004) discuss the notion that payout policy can be used to convey private information to the market and furthermore, share repurchases are important in communicating value-relevant information. In discussing repurchases, Ikenberry, Lakonishok and Vermaelen (1995) contend that the traditional signaling motive of repurchases results from asymmetric information between firm managers and the market. Information asymmetry is a common motivating factor behind the voluntary disclosures made by firms and their participation in share repurchase activity. According to Stephens and Weisbach (1998, p. 316), "there is substantial evidence that asymmetric information is an important determinant of the initiation of repurchase programs." The signaling rationale in conjunction with the implications of papers on information disclosure leads us to reason that firms may be potentially able to lower their costs of capital by voluntarily

complying with their repurchase announcements because in doing so, they convey to the market that they abide by their promises (i.e. their integrity), which lowers information asymmetries between the firm and its investors.

2.4 Information Disclosure and the Cost of Equity Capital

Several theories which relate disclosure and the cost of capital rely on the concept of information asymmetry. For example, Leuz and Verrecchia (2000) explain that costs are created from information asymmetries because these asymmetries introduce adverse selection into transactions between buyers and sellers of firm shares. These increased costs are reflected in the firm's cost of capital and researchers suggest that by disclosing information to the market, firms can lower the level of information asymmetry, which in turn lowers the cost of capital. In rationalizing the effects of voluntary disclosure on the firm's cost of capital, the literature has gone in two main directions.

The first rationale involves the implications of information asymmetry among investors. Theory advanced in the models of Demsetz (1968), Copeland and Galai (1983), Glosten and Milgrom (1985) and Kyle (1985) suggests that adverse selection generally materializes in the form of low levels of liquidity in firm securities and that information plays a role in influencing liquidity levels. In particular, uninformed investors concerned that they will be exploited by informed investors engage in price-protection in anticipation of losses to their more-informed counterparts. They do so by lowering the price at which they are willing to buy and raising the price at which they are willing to sell, effectively widening the spread and thus reducing the liquidity. On this basis, several papers contribute to the notion that superior information disclosure lowers information asymmetry among investors, which reduces the bid-ask spread and improves market liquidity, thus diminishing the cost of capital. For instance, Amihud and Mendelson (1986) propose that stocks with larger bid-ask spreads have higher costs of equity

capital due to the compensation demanded by investors for the higher trading costs they incur. They maintain that firms may be able to lower their cost of capital by enhancing the liquidity of their stock. Although Amihud and Mendelson (1986) do not explicitly discuss the issue of disclosure, the connection between liquidity and disclosure is substantiated by several papers, including Welker (1995), Coller and Yohn (1997), Healy, Hutton and Palepu (1999), and Bloomfield and Wilks (2000). Also in line with the liquidity explanation, Diamond and Verrecchia (1991) associate information disclosure with the reduction in the cost of capital due to increased prices (resulting from increased demand). They assert that increased demand arises because information disclosure alleviates information asymmetry, making large investors more willing to make large trades. Easley and O'Hara (2004) theorize that the cost of capital of a firm is influenced by its information structure and more specifically, investors require superior returns for holding stocks with more private information and less public information. According to them, "private information thus induces a new form of systematic risk, and in equilibrium investors require compensation for this risk" (p.1554). Their explanation suggests that the increased return is attributable to the increased risk that private information represents to uninformed investors for holding the stock considering that informed investors are more able to modify their portfolio weights in response to new information.

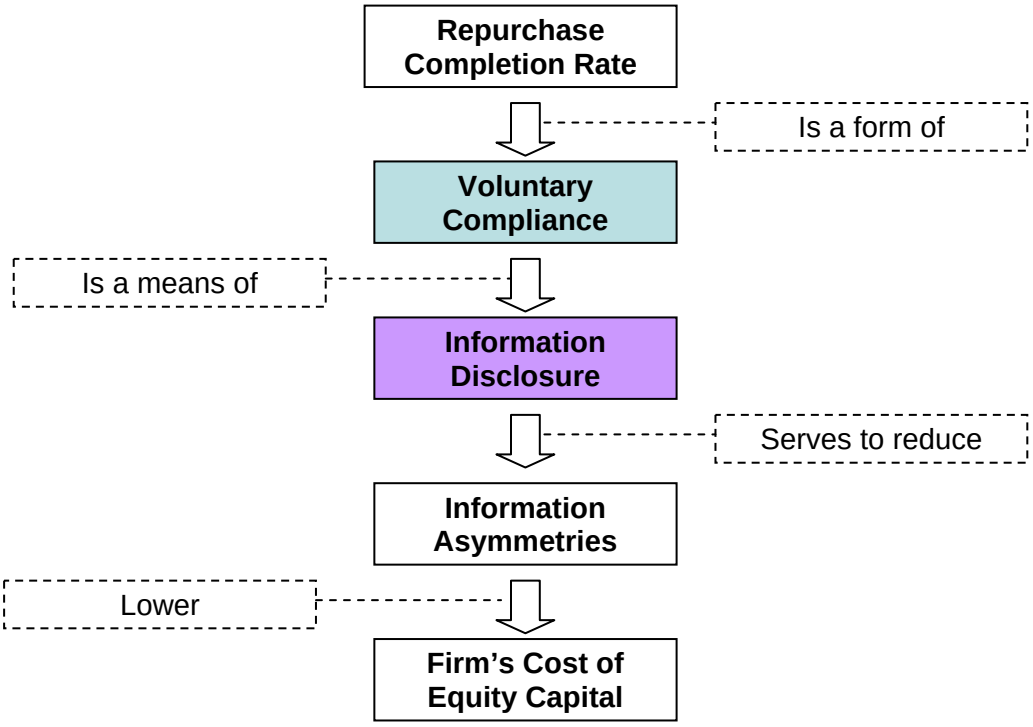
The second rationale often cited by researchers in relating disclosure and cost of capital is based on investors' estimation risk. This risk is a result of the uncertainty faced by investors in estimating the parameters of a security's return distribution, which is pertinent in determining the value and allocation of their investments. If this risk cannot be diversified away, as was suggested by Clarkson, Guedes and Thompson (1996), then investors demand compensation in the form of a higher return thus increasing the cost of equity capital. Researchers conjecture that

increased voluntary disclosure can lower information asymmetries, thus lowering the uncertainty that investors face in their estimation and in doing so reducing the firm's cost of capital. Barry and Brown (1985) and Handa and Linn (1993) use models incorporating differential information to show the premium required by investors for assuming the estimation risk arising from information asymmetries between managers and investors.

Empirical findings tend to support the theories. A negative association between voluntary disclosure and cost of capital is reported by Poshakwale and Courtis (2005), who find corroborating evidence in the banking industry of various countries. Botosan (1997) finds evidence that greater disclosure is related to a lower cost of equity capital (for her subset of firms with lower analyst following).

The associations between concepts discussed in Section 2.2 (repurchase completion rates as a form of voluntary compliance); Section 2.3 (voluntary compliance as a means of disclosure); and Section 2.4 (information disclosure and the cost of equity capital) are summarized in Figure 2.1. We consider the firm's repurchase program completion rate to be one indicator of voluntary compliance. This voluntary compliance is a means of information disclosure which serves to reduce information asymmetries between the firm and the market and thus lowers the firm's cost of equity capital.

Figure 2.1 Flowchart of Concepts



This figure illustrates the relationships between the concepts examined in the current study and serve to summarize the ideas discussed in Sections 2.2, 2.3 and 2.4.

This study examines whether the percentage of repurchase program completion is negatively related to the cost of equity capital. We postulate that investors may demand a lower return from firms that voluntarily comply with their announced repurchase programs because the voluntary compliance discloses information to investors about the integrity of the firm in fulfilling their promises, reducing information asymmetries between the firm and its investors and as a result, lowers the cost of equity.

2.5 The Implied Cost of Equity Estimation Approach

Estimates of the cost of equity capital are a key concern in investment decision-making. They are used by firms and shareholders (where the cost of equity represents the shareholder's expected rate of return) for purposes of valuation and also in the assessment of investment opportunities. In general, researchers have been using the capital asset pricing model (CAPM) to estimate the cost of equity. Under this approach, historical returns are used to obtain factor loadings. Despite the prevalence of its use, the CAPM is not without criticism. According to Gebhardt, Lee and Swaminathan (2001, p. 136), "the cost-of-capital estimates derived from average realized returns have proven disappointing in many regards." Fama and French (1997) document imprecision in estimates of industry cost of equity obtained from the CAPM and the Fama and French (1993) three-factor model. They suggest that problems in cost of equity estimation result from problems in identifying the correct asset pricing model, imprecision in estimates of factor sensitivities (they vary through time) as well as imprecision in estimates of risk premiums. They also contend that estimates for firms and projects would be even less precise in these circumstances. Elton (1999) specifically addresses the use of realized returns in asset pricing models. He explains that returns can be conceptually broken down into an expected return component and an unexpected return component. The unexpected return component is a result of firm specific events. He explains that the use of realized returns as a proxy for expected returns follows from the notion that unexpected returns are independent and that positive and negative unexpected returns cancel out over time, giving a mean of zero and consequently providing an unbiased estimate of expected returns. Elton (1999) asserts that information surprises may be so substantial that they have a permanent impact on the mean of the unexpected return component or that a succession of information surprises is correlated such that the cumulative impact is substantial enough to have an effect. He further suggests that these

surprises can considerably influence the estimate of returns. For these reasons, Elton (1999, p.1199) contends that realized returns are "a very poor measure" of expected returns and encourages the search for alternative proxies for expected returns.

Guay, Kothari and Shu (2005, p. 6) explain that "Accumulated evidence on the properties of the cost of capital estimates in the finance literature provides the impetus for estimating the cost of capital using forward-looking earnings information rather than historical stock returns." Fortunately, a search for potential alternative methods of estimation has given rise to an approach generally termed the "implied cost of equity estimation approach" whereby the cost of equity is estimated as the discount rate which equates the current share price with the present value of expected future earnings (analyst forecasts of earnings are used as proxies for the expected future earnings). Models proposed by Claus and Thomas (2001, hereafter CT), Gebhardt, Lee, and Swaminathan (2001, hereafter GLS), Ohlson and Juettner-Nauroth (2005, hereafter OJ) [as applied in Gode and Mohanram (2003)], and Easton (2004, hereafter ES) are among some of the estimation approaches that have recently been popular. These models rely on differing assumptions regarding forecast horizon and terminal growth. Recent research has employed a number of these approaches. Among them, Botosan (1997) examines the effect of disclosure level on the firm's cost of equity capital, using the OJ model to compute implied cost of equity. Dhaliwal, Krull, Li and Moser (2005) measure the impact of dividend taxes on the cost of equity of firms and rely mainly on the GLS model of estimation, although they also verify their results by examining estimates of the CT and OJ models. Hail and Leuz (2006) (whose research framework we follow) use the four abovementioned models to measure firms' implied cost of equity and investigate the effect of country-specific legal institutions and securities regulation on cross-country differences in cost of equity capital. Dhaliwal, Heitzman and Li

(2006) also apply these four models to examine the influence of taxes and leverage on the firm's cost of equity.

Given their underlying assumptions, these four models capture different sets of important information. For example, Easton (2004, p. 75) suggests that abnormal earnings growth models incorporate earnings information based on the income statement whereas residual income valuation models incorporate book value information based on the balance sheet. Ohlson (2000) states that residual income valuation models incorporate book value information through the use of the clean surplus assumption and that this assumption rarely holds in practice. Due to these differing views, it is not clear *a priori* which model is more appropriate or applicable. In fact, several papers specifically state that there is no consensus over the superiority of one particular model [Dhaliwal, Heitzman and Li (2006, p. 699); Witmer and Zorn (2007, p. 17)]. This is what leads them to focus their analysis on the simple average of the four estimates, a practice also followed by Hail and Leuz (2006). Combining estimates is a common approach used in forecasting. Makridakis and Winkler (1983, p. 995) maintain that "using averages of forecasts provides considerable practical benefits in terms of improved forecasting accuracy and decreased variability of accuracy." The rationale for using an aggregate estimate is further discussed in Section 3.2.

CHAPTER 3
DATA DESCRIPTION AND METHODOLOGY

We perform our analysis on open-market share repurchases in Canada. Canadian firms are required by law to report the number of shares repurchased every month and repurchase programs have a specific timeframe of 12 months in which to voluntarily complete their programs, whereas U.S. repurchases have no mandated termination period [Grullon and Ikenberry (2000)]. Further, until recently U.S. firms were not required to report the amount of shares repurchased. In addition, the provisions governing share repurchase programs are relatively ambiguous in the U.S. compared to Canada [Grullon and Ikenberry (2000)]. As a result, if completion rates have an impact on the cost of equity capital of repurchasing firms, it will be more apparent in results obtained from Canadian data.[12]

3.1 Sample Construction

The sample used in our analysis consists of 154 Canadian open-market share repurchases announced between January 1995 and December 2004. Canadian share repurchase program data are provided by Schmidt (2006), which he manually gathered from summaries of Normal Course

[12] We also examine completed U.S. open-market share repurchase programs announced between 1995 and 2004 for which the "latest completion date" fell within 12 months of the initial repurchase authorization date. Repurchase authorization dates and completion rates were obtained from Thomson Financial's SDC Platinum Mergers and Acquisitions database. Our sample contains 302 observations. Descriptive statistics of the completion rate show a mean of 93.2%, standard deviation of 31.06%, minimum of 0.46%, first quartile of 87.15%, median of 100%, third quartile of 100% and maximum of 203.38%. From the summary statistics, it is clear that very little variation is observed in the completion rate (median and third quartile are both 100%). Also the standard deviation is lower than that of the Canadian data set, despite the smaller sample size of the Canadian data set (154 observations, while the U.S. sample contains 302 observations).

Issuer Bids (a term used in Canada for open-market share repurchases) contained in the Toronto Stock Exchange's Daily Record publication. The dataset contains the name of the repurchasing firm, the repurchase announcement date, and the program completion rate. We merge this dataset with Compustat and I/B/E/S data; the former provides book value per share, dividend payout and other financial data, and the latter provides analyst earnings forecasts and price data required in all four implied cost of equity models. Following the framework of Hail and Leuz (2006), restrictions on our sample require that each repurchase program observation has all of the following:

1) completion rate and announcement date must be available
2) corresponding data in I/B/E/S and Compustat
3) non-negative one- and two-year-ahead earnings forecasts
4) either a three-year-ahead earnings forecast or a long-term growth rate
5) a minimum of two analysts providing forecasts in each of the one- and two-year-ahead cases
6) market share price for the year of the forecast
7) book value per share must be available
8) non-negative dividend payout ratio in Compustat

In addition to these considerations, it is important to note that I/B/E/S data contains analyst forecasts made several times throughout a given year. In computing cost of equity estimates, the earliest available earnings forecast after the repurchase completion period is used for each firm-year.

To describe the sample construction process in more detail, the original dataset provided by Schmidt (2006) contains 2,458 Canadian share repurchases announced between January 1995

and December 2005. We use four items from his data: the ticker symbol of the repurchasing firm, the repurchasing firm name, the repurchase program completion rate and the date of the repurchase announcement. Of the 2,458 observations in the original dataset, we exclude 350 observations because either the completion rate or the announcement date is unavailable, leaving a total of 2,108 observations (2,108 repurchase programs announced between January 1995 and December 2004 belonging to 799 individual firms).

As previously mentioned, the computation of cost of equity estimates based on chosen models necessitates the merging of the repurchases dataset with data gathered from Compustat and I/B/E/S. This is done to obtain the book value per share from Compustat and the forecasted earnings per share and price per share at the time of repurchase announcement from I/B/E/S. To facilitate this merge, datasets for Compustat and I/B/E/S are first matched together. The matching process occurs in two rounds, the first of which involves matching by the first six digits of firms' CUSIP identifiers as well as the years to which the data correspond. The data that remain unmatched after the first round are carried on to the next round of matching. The second round match involves matching by the firm name and also again with the years to which the data correspond. This step is complicated by differences in the way that each database (Compustat and I/B/E/S) chooses to record and present the firm name, for instance the use of abbreviations (e.g. FNL for Financial). These difficulties are addressed by programming a function that computes a similarity rating which assigns penalties for each specific instance of dissimilarity between the firm name presented in Compustat and the one presented in I/B/E/S. The data is then sorted by this similarity rating score. Matches with a score of zero indicate a perfect name match. Scores higher than zero are manually verified to assess the accuracy of the match. After effectively matching the Compustat and I/B/E/S data, the combined dataset is then

merged with the repurchases set of 2,108 observations. Because the original dataset provided by Schmidt (2006) contains only the repurchasing firm name and the ticker symbol as firm identifiers, merging the repurchases set with the Compustat and I/B/E/S set is possible only by matching by firm name (using the method of rating character similarities as mentioned just prior). It is also important to note that the combined Compustat and I/B/E/S dataset is matched with the repurchases data one year following the year of the repurchase announcement. For example if a firm announces a repurchase in January 2000, the repurchase period is taken to be 12 months, so the month of completion is considered to be January 2001. Compustat data (book value per share, dividend payout, and other variables) are obtained for the year 2001 and analyst earnings forecasts are obtained from I/B/E/S for the month following the completion month, in our example, forecasts would be obtained for February 2001. If forecasts are unavailable for that month, the first available forecasts are obtained, for example, for March 2001, and if those are not available, then the following month's forecasts are obtained. For the final sample of 154 observations, 25 did not have forecast data available in the 13^{th} month, necessitating the use of forecast data for later months. This represents 16.2% of the final sample. Replicating the regressions in Table 4.1 after omitting these 25 observations led to results which are largely consistent with the findings obtained from the full sample of 154 observations. Completion rate and completion rate dummy coefficients remain statistically insignificant, consistent with results obtained from the full sample.

Observations in our sample with dividend payout ratios higher than 100 percent, as reported by Compustat, are truncated at 100 percent. Furthermore, for observations with data unavailable for the dividend payout ratio, the assumption made in this study is a payout ratio of 50 percent. Claus and Thomas (2001) use a 50 percent payout ratio to forecast upcoming dividends from

forecasted earnings. They also try payout ratios ranging from 25 to 75 percent and observe little effect on their discount rate estimations [See Claus and Thomas (2001), p. 1640]. Focusing on the dividend payout adjustments, out of the final sample of 154 observations, 5 observations (with dividend payout exceeding 100%) were truncated to 100% which represents 3.2% of the sample. No observations from the final sample were subject to the 50% payout assumption. Results obtained from regressions excluding the 5 observations were very similar to the results obtained from the full sample; the completion rate coefficient was insignificant and the coefficient magnitudes and significance levels of the other independent variables were also very similar to results from the full sample.

After eliminating observations that fail to fulfill data requirements, the sample consists of 209 repurchase programs, belonging to 81 firms. After estimation of the four models, 17 observations are removed because numerical solutions are not obtainable (3 observations fail to converge in the CT model, 15 observations are undefined in the OJ model, and 10 observations are undefined in the ES model). The final sample contains 192 repurchase programs, belonging to 77 unique firms. This study, however, also requires the repurchasing firm have sufficient available returns from the Canadian Financial Markets Research Centre (CFMRC) database for the estimation of the market beta to be used as an explanatory variable in the later regression analysis. We require monthly returns for a minimum of 24 of the 60 months prior to the month analyst earnings forecasts are recorded in I/B/E/S which restricts the dataset to 154 observations belonging to 64 firms. The number of repurchase programs per firm in this final data set ranges from one program to seven programs, though the majority are at the lower end of the spectrum. The breakdown of the number of announced programs per firm is as follows: 29 firms announce just one program; 11 firms announce two programs; 11 firms announce three programs; 2 firms

announce four programs; 5 firms announce five programs; 5 firms announce six programs; 1 firm announces seven programs. Details of the sample construction are summarized in Table 3.1.

Table 3.1 Summary of Sample Construction

Sample period	January 1995 – December 2004
Source of repurchase data	Schmidt (2006)
Source of firm-specific data	Compustat, I/B/E/S, CFMRC
Original number of repurchases (each repurchase is an observation)	2,458 (879 firms)
Number of observations with completion rate and announcement date available	2,108 (799 firms)
Number of observations with corresponding I/B/E/S and Compustat available	654 (257 firms)
Number of observations which fulfill all eight data requirements	209 (81 firms)
Number of observations which have cost of equity estimates for all four models	192 (77 firms)
Number of observations with sufficient data to estimate *Beta* (monthly returns for a minimum of 24 of the 60 months preceding the analyst earnings forecast month)	154 (64 firms)

This table summarizes the process used to obtain the final sample of the data set.

3.2 Implied Cost of Equity Capital Estimation

We examine the impact of voluntary compliance of Canadian repurchasing firms on the cost of equity capital in the year following the repurchase announcement. That is, we compute the cost of equity in the month immediately after the repurchase completion month (which is taken to be 12 months after the announcement month). If data is not available for the month immediately subsequent to the completion month, then cost of equity estimates are computed for the earliest subsequent month with available data. For instance if the repurchase announcement is made in January 2000, the completion month is considered to be 12 months after (January 2001) and we compute the cost of equity using analyst earnings forecasts made in February 2001 if available (or if unavailable, the first subsequent available month). The one year time frame is chosen because Canadian regulation allows the repurchasing firm 12 months to carry out the open-market repurchase program.

The cost of equity estimate is a simple average of the estimates of each of the four models described in Sections 3.2.1 to 3.2.4. An average is taken because there is a lack of consensus over the superiority of any one model. For example, Guay, Kothari and Shu (2005) suggest the Gebhardt, Lee and Swaminathan (2001) estimate is a good predictor of future realized returns. But Botosan and Plumlee (2005) suggest that the relationship between the Gebhardt, Lee and Swaminathan (2001) estimate and traditional risk proxies is inconsistent. Differences between the models are mainly reflected in their treatments of the forecast horizon and steady state growth rate. As such, each model may be considered to have its strengths and weaknesses. For instance, the Claus and Thomas (2001) model assumes a forecast horizon of five years and the growth rate beyond the terminal year is assumed to equal the inflation rate. The longer forecast horizon may be appealing because it is more realistic. However, many analysts make one- and two-year-ahead forecasts, but relatively few analysts provide five-year-ahead earnings forecasts.

Thus the longer horizon forecasts may be less reliable and this is a potential weakness for models such as the CT model.

The Gebhardt, Lee and Swaminathan (2001) model assumes a forecast horizon of 12 years and additionally assumes that the firm's return on equity reverts to the industry average return on equity after the terminal year. One of the potential strengths of this model is that it incorporates industry information. The Ohlson and Juettner-Nauroth (2005) model makes no explicit assumptions about the terminal year but assumes that steady state growth is equivalent to the rate of inflation [consistent with the Claus and Thomas (2001) model]. A potential strength of the Ohlson and Juettner-Nauroth (2005) model is that only the one- and two-year-ahead earnings forecasts are necessary for the model's estimation, and the model does not involve book value or return on equity forecasts, making dividend assumptions unnecessary beyond the forecasted one-year-ahead dividend per share.

The Easton (2004) model also makes no explicit assumptions about the terminal year [consistent with the Ohlson and Juettner-Nauroth (2005) model] and furthermore makes no assumptions regarding abnormal earnings growth beyond two years. Some might argue that the seemingly more simplistic approach of the Ohlson and Juettner-Nauroth (2005) and Easton (2004) models represents an advantage over the other models due to fewer assumptions about payout and the requirement of only the one- and two-year ahead earnings forecasts for estimation, while others may argue that the additional assumptions of the Claus and Thomas (2001) and Gebhardt, Lee and Swaminathan (2001) approaches make these models superior because explicit assumptions are realistically necessary. Researchers are cautious when using implied cost of equity estimates, paying particular attention to the sensitivity of estimates to measurement error and noise [see for example, Guay, Kothari and Shu (2005)]. We take these

collective factors into account and use the equally-weighted average across the four cost of equity estimates as the estimate in our study. By taking an average of the four models, we follow the methodology of Hail and Leuz (2006) and Dhaliwal, Heitzman and Li (2006). According to them, "aggregating across the four models reduces some measurement error" [Hail and Leuz (2006, p. 493)] and serves to "mitigate the effect that particular assumptions of each model might have" on results [Dhaliwal, Heitzman and Li (2006, p. 700)]. In the following sections, 3.2.1 to 3.2.4, each model is discussed in more detail and a summary comparison is presented in Table 3.2 at the end of Section 3.2.4.

3.2.1 The Claus and Thomas (2001) Approach

We will refer to this approach as the CT model. As previously mentioned, the CT model is a version of the Edwards-Bell-Ohlson residual income valuation model, which itself is derived from the classic dividend discount model and relies on explicit definitions of income and residual income. The CT model is based on book values and forecasted earnings for five years in the future, and then assumes residual earnings grow at a steady rate beyond those five years.

$$P_t = B_t + \sum_{\tau=1}^{5} \frac{EPS_{t+\tau} - K_{CT} \cdot B_{t+\tau-1}}{(1+K_{CT})^{\tau}} + \frac{(EPS_{t+5} - K_{CT} \cdot B_{t+4})(1+g)}{(K_{CT} - g)(1+K_{CT})^{5}} \qquad (3.1)$$

Where:

t = the repurchase announcement year + 1.

P_t = the price per share at time t (obtained at the time the analyst forecasts are recorded in I/B/E/S).

B_t = the fiscal year end book value per share (obtained from Compustat).

$EPS_{t+\tau}$ = the one- to five-year-ahead mean earnings per share forecast (obtained from I/B/E/S).

g = the growth rate beyond five years. At that time, residual earnings are assumed to grow at the inflation rate, which we compute as the annualized percentage change in the consumer price index (retrieved from Statistics Canada's CANSIM database for year t).

K_{CT} = the cost of equity capital as estimated by equating the two sides of equation (3.1). The subscript refers to the CT model. Subscripts will be used to identify estimates from each of the models.

B_{t+i} = the book value per share of future periods and is estimated using an accounting identity known as the clean-surplus relation shown in equation (3.2).

$$B_{t+i} = B_{t+i-1} + EPS_{t+i} - D_{t+i} \tag{3.2}$$

The clean-surplus relationship is based on the idea that all gains and losses are reflected in net income. Changes in book value arise from income and dividends (here, EPS_{t+i} denotes the forecasted earnings per share and D_{t+i} denotes dividends per share which is computed as the dividend payout ratio (obtained from Compustat) multiplied by forecasted earnings per share). The dividend payout ratio is used if it is available from Compustat. Otherwise we assume a payout ratio of 50 percent of forecasted earnings, following Claus and Thomas (2001). We also impose a maximum payout ratio of 100 percent of forecasted earnings.

As outlined in the restrictions of our sample construction, observations must have a one-year-ahead and two-year-ahead forecast to be included in our sample, as well as either a three-year-ahead forecast or a long-term growth rate. All of the forecasts are used if available. In cases where the long-term growth rate is unavailable, it is estimated as the mean growth rate computed from the one-, two- and three-year-ahead forecasts. If the three-year-ahead forecast is unavailable, it is estimated using the long-term growth rate and the two-year-ahead forecast. In cases where the four-year-ahead forecast is unavailable, it is estimated with the long-term growth rate (where available, otherwise with the estimated growth rate) and the three-year-ahead forecast. Similarly, the method is employed to estimate the five-year-ahead forecast if it is unavailable.

3.2.2 The Gebhardt, Lee and Swaminathan (2001) Approach

This approach, which we will refer to as the GLS model, is based on the same residual income valuation framework as the CT model. However, several key features distinguish the GLS model from the CT model, notably the forecast horizon and terminal value assumptions, as well

as the distinctive approach of the GLS model in incorporating industry return on equity into the valuation.

$$P_t = B_t + \sum_{\tau=1}^{12} \frac{EPS_{t+\tau} - K_{GLS} \cdot B_{t+\tau-1}}{(1+K_{GLS})^{\tau}} + \frac{EPS_{t+12} - K_{GLS} \cdot B_{t+11}}{K_{GLS}(1+K_{GLS})^{12}} \tag{3.3}$$

Where:

t = the repurchase announcement year + 1.

P_t = the price per share at time t (obtained at the time the analyst forecasts are recorded in I/B/E/S).

B_t = the fiscal year end book value per share (obtained from Compustat).

$EPS_{t+\tau}$ = the one- to three-year-ahead mean earnings per share forecast (obtained from I/B/E/S).

K_{GLS} = the cost of equity capital as estimated by equating the two sides of equation (3.3).

B_{t+i} = the book value per share of future periods and is estimated using the clean-surplus relation previously shown in equation (3.2).

Gebhardt, Lee and Swaminathan (2001) re-specify equation (3.3) using the relationship between return-on-equity, earnings per share, and book value per share shown in equation (3.4) to obtain an alternative specification [equation (3.3a)] of the original model which is re-arranged to be explicitly in terms of return-on-equity.

$$ROE_{t+\tau} = \frac{EPS_{t+\tau}}{B_{t+\tau-1}} \tag{3.4}$$

$$P_t = B_t + \sum_{\tau=1}^{12} \frac{(ROE_{t+\tau} - K_{GLS}) \cdot B_{t+\tau-1}}{(1+K_{GLS})^{\tau}} + \frac{(ROE_{12} - K_{GLS}) \cdot B_{11}}{K_{GLS}(1+K_{GLS})^{12}} \tag{3.3a}$$

Where,

ROE_{12} = median industry ROE

The GLS model requires a two-stage approach to estimation. First, it entails a three-year explicit forecast horizon. In other words, the one- through three-year-ahead explicit forecasts of earnings per share (obtained from I/B/E/S) are used to compute the return-on-equity (ROE) values for years t + 1 through t + 3. Second, the ROE values for years t + 4 through t + 12 are

implicitly forecasted by linearly mean-reverting the ROE at time $t + 3$ to the median industry ROE (computed at the two-digit SIC code level from the sample for the entire sample period). The mean-reversion is accomplished with the use of straight linear interpolation and is intended to exhibit the convergence in characteristics of firms in the same industry over the long-run. Lastly, the model estimates value beyond year $t + 12$ by computing the residual earnings at $t + 12$ as a perpetuity and discounts this value back to time t. It is important to note, however, that the model does not make the assumption that earnings or cash flow stop growing after year $t + 12$, but merely that residual earnings stay constant.

$$P_t = B_t + \sum_{\tau=1}^{3} \underbrace{\frac{\left(ROE_{t+\tau} - K_{GLS}\right) \cdot B_{t+\tau-1}}{\left(1 + K_{GLS}\right)^{\tau}}}_{\text{Explicit forecasts used}} + \sum_{\tau=4}^{12} \underbrace{\frac{\left(ROE_{t+\tau} - K_{GLS}\right) \cdot B_{t+\tau-1}}{\left(1 + K_{GLS}\right)^{\tau}}}_{\text{Implicit forecasts used}} + \frac{\left(ROE_{12} - K_{GLS}\right) \cdot B_{11}}{K_{GLS}\left(1 + K_{GLS}\right)^{12}} \tag{3.3b}$$

Equation (3.3b) is mathematically the same as equation (3.3a), but serves to further clarify the approach by showing the breakdown of the first two stages of estimation. As in the manner of the CT model, the cost of equity of the GLS model is estimated by solving for the value of K_{GLS} that equates the two sides of equation (3.3b).

3.2.3 The Ohlson and Juettner-Nauroth (2005) Approach

We will refer to this approach as the OJ model and we largely follow assumptions made by Gode and Mohanram (2003). The OJ model is structured on the firm's abnormal change in earnings which is specifically computed in excess of the return required by investors for the firm's retention of earnings. A key feature of the OJ model is that it does not restrict the short term growth rate to equal the long term growth rate. Rather, it permits the possibility that the two may differ, and the short term growth will eventually decline towards the asymptotic long term growth rate. Gode and Mohanram (2003) specify the OJ model as follows:

$$K_{OJ} = A + \sqrt{A^2 + \frac{EPS_{t+1}}{P_t}\left(g_{ST} - g_{LT}\right)} \tag{3.5}$$

Where:

$$A = \frac{1}{2}\left(g_{LT} + \frac{D_{t+1}}{P_t} \right)$$

t = the repurchase announcement year + 1.

P_t = the price per share at time t (obtained at the time the analyst forecasts are recorded in I/B/E/S).

EPS_{t+1} = the one-year-ahead mean earnings per share forecast (obtained from I/B/E/S).

EPS_{t+2} = the two-year-ahead mean earnings per share forecast (obtained from I/B/E/S).

D_{t+1} = the dividend per share (computed as the dividend payout ratio (obtained from Compustat) multiplied by the forecasted earnings per share).

g_{ST} = the short term growth rate defined as: $g_{ST} = \frac{EPS_{t+2} - EPS_{t+1}}{EPS_{t+1}}$

g_{LT} = the long term growth rate. In our study it is assumed to equal the inflation rate, which we compute as the annualized percentage change in the consumer price index (retrieved from Statistics Canada's CANSIM database for year t).

K_{OJ} = the cost of equity capital as determined by equation (3.5).

In order for the model to obtain a numerical solution, the difference between the one-year-ahead and two-year-ahead earnings forecasts must be positive (yielding a positive short term growth rate), and the short term growth rate must be greater than the long term growth rate. In other words, the value within the square root of equation (3.5) must be positive.

3.2.4 The Easton (2004) Approach

This approach will be referred to as the ES model. It is based on the OJ model which is concerned with abnormal earnings growth valuation. As in the OJ model, the ES model involves forecasted earnings values for one and two years ahead as well as forecasted dividends per share and the actual price per share. The ES model assumes that abnormal earnings growth continues steadily and perpetually after the explicitly forecasted periods.

$$P_t = \frac{\left(EPS_{t+2} + K_{ES} \cdot D_{t+1} - EPS_{t+1}\right)}{K_{ES}^2} \tag{3.6}$$

Where:

t = the repurchase announcement year + 1.

P_t = the price per share at time t (obtained at the time the analyst forecasts are recorded in I/B/E/S).

EPS_{t+1} = the one-year-ahead mean earnings per share forecast (obtained from I/B/E/S).

EPS_{t+2} = the two-year-ahead mean earnings per share forecast (obtained from I/B/E/S).

D_{t+1} = the dividend per share (computed as the dividend payout ratio (obtained from Compustat) multiplied by the forecasted earnings per share).

K_{ES} = the cost of equity capital as estimated by equating the two sides of equation (3.6).

The cost of equity is estimated for each repurchase program observation for the Claus and Thomas (2001) model, Gebhardt, Lee and Swaminathan (2001) model and the Easton (2004) model by minimizing the difference between the share price and the discounted value of future cash flows. Estimates for the Ohlson and Juettner-Nauroth (2005) model are obtained directly without the need for optimization techniques.

Table 3.2 Summary of Similarities and Differences among the Four Estimation Models

Model	CT	GLS	OJ	ES
Model Type	Residual Income Valuation	Residual Income Valuation	Abnormal Earnings Growth	Abnormal Earnings Growth
Book Value Per Share Used?	Yes	Yes	No	No
Expected Dividend Per Share Used?	Yes	Yes	Yes	Yes
Forecasts Used of Future Earnings	5 years ahead (actual forecasts where available, otherwise forecasted using 5 year consensus growth rate for years 3 to 5)	12 years ahead: Year 1 to 3 explicit forecasts, where available, otherwise 3rd year based on five year growth rate), then for year 4 to 12, implicitly forecasted by fading ROE such that firm's ROE_{12} is equal to median industry ROE	2 years ahead	2 years ahead
Growth Assumption of Residual Income or Abnormal Earnings	Steady growth beyond 5 years (set equal to inflation)	Zero growth beyond 12 years (residual earnings stay constant)	Steady growth beyond 2 years (set equal to inflation)	Steady growth beyond 2 years
Clean Surplus Assumption Used?	Yes	Yes	No	No
Other Assumptions			2 growth rates used: short term and long term	Abnormal earnings growth persists into perpetuity

This table compares and contrasts the characteristics of the four cost of equity estimation approaches used in this study.

As described, the CT, GLS, OJ, and ES models share similarities but are also different in a number of ways. A summary comparison of the four models is shown in Table 3.2. Key differences between the models are model type and forecast horizon. The models fall under two categories: residual income valuation models (CT and GLS) and abnormal earnings growth models (OJ and ES). The forecast horizon is five years for the CT model, 12 years for the GLS model and two years for the OJ and ES models.

Table 3.3 Summary Statistics of *RP* Estimates

Panel A: Descriptive Statistics of *RP* Estimates

Variable	N	Mean	Std Dev	Min	Q1	Median	Q3	Max
RP_{CT}	154	6.70%	6.50%	-1.60%	4.30%	5.90%	7.70%	73.30%
RP_{GLS}	154	5.60	3.10	-1.50	3.40	5.80	7.50	19.90
RP_{OJ}	154	8.40	4.50	-0.90	5.90	7.60	9.70	29.90
RP_{ES}	154	7.90	4.30	0.20	5.50	7.10	9.00	29.50
RP	154	7.10	3.40	-0.30	4.90	6.90	8.50	24.40

Panel B: Pearson Correlation Coefficients of *RP* Estimates

	RP_{CT}	RP_{GLS}	RP_{OJ}	RP_{ES}
RP_{GLS}	0.1926			
RP_{OJ}	**0.3268**	**0.2547**		
RP_{ES}	**0.3318**	**0.3032**	**0.9936**	
RP	**0.7248**	**0.4967**	**0.8481**	**0.8614**

This table reports the summary statistics of the estimates obtained from each of the models discussed in Section 3.2. Panel A contains descriptive statistics while Panel B contains Pearson correlations between estimates. Correlations are bolded to indicate statistical significance at the 1% level. The sample contains 154 observations belonging to 64 firms.

Table 3.3 Panel A displays summary statistics for the cost of equity estimates of our sample of repurchase programs. Estimates obtained from the abnormal earnings growth models (ES and OJ) exceed those of the residual income valuation models (CT and GLS). This is consistent with prior research, such as Guay, Kothari and Shu (2005), Hail and Leuz (2006), and Dhaliwal, Heitzman and Li (2006). Also consistent with our estimates, these studies report that their GLS estimates tend to be the lowest and their OJ estimates are the highest across the four models. Here, the simple average cost of equity estimate in excess of the risk free rate, *RP*, has a mean of 7.10% and correlations of the four model estimates with the simple average estimate range from 49.67% (GLS estimate) to 86.14% (ES estimate). As expected, the estimates are positively correlated with each other. The correlation between the OJ model and ES model estimates is the highest [consistent with Dhaliwal, Heitzman and Li (2006)] which is unsurprising because of their similar assumptions (see Table 3.2).

3.3 Explanatory Variables used in Regression Analysis

We use a cross sectional regression model to study the impact of various factors on the cost of equity (the equation of this model is provided in Section 4). The dependent variable of the model is the estimate of the cost of equity and the primary test variable is the repurchase program completion rate (the measure of voluntary compliance).

In addition to the primary test variable, we also include a number of firm-level controls: size, growth, dispersion of analyst forecasts, the ratio of market to book, leverage, industry membership and firm beta. In particular, we use *Analyst Coverage* as a proxy for firm size. The inclusion of the size variable is motivated by Fama and French (1992) who consider size to be a factor in explaining some of the cross-sectional variation in returns, formally incorporating the size effect documented by Banz (1981). We reason that the larger the firm, the lower the associated information asymmetries on the basis that larger firms are generally subject to

increased exposure and analyst coverage. Gode and Mohanram (2003) contend that firms highly linked to information intermediaries (institutional investors and analysts, for instance) are associated with lower costs of equity as a result of enhanced information availability, which reduces information asymmetry between the firm and the market and reduces the informational risk faced by its investors. Ashbaugh, Collins and LaFond (2004) and Hail and Leuz (2006) include a proxy variable for size in their implied cost of equity regressions. Both studies find the sign on the coefficient of the size variable to be negative. As an alternative size proxy, we also use *Log Assets*. We take a natural logarithmic transformation of assets in order to reduce variance and linearize the relationship between assets and cost of equity, considering the cost of equity values are between 0 and 100% while firm asset values do not have an upward bound (range of 0 to millions).

Also included in the regressions is long-term growth in earnings, referred to as *Growth.* Both a positive and negative sign have been predicted for this variable. La Porta (1996) demonstrates that high long-term growth firms exhibit lower subsequent returns. He suggests that this finding can be explained by analyst over-optimism in the case of higher long term growth firms. Evidence presented by La Porta (1996) prompts Gebhardt, Lee and Swiminathan (2001) to expect a negative relation between long-term growth and implied cost of equity. They reason that if analysts are likely to be overly optimistic about high long-term growth firms and hence make overly optimistic earnings forecasts, then these high long-term growth firms would have overly high share prices and their implied cost of equity would be exceedingly low. On the other hand, Gode and Mohanram (2003) suggest that this expectation is contingent on whether investors are able to recognize the analyst over-optimism and use the appropriate discount rate. They argue that there is difficulty in anticipating how the implied cost of equity will be affected in this case,

as it hinges on the relation between price and earnings forecasts. Gode and Mohanram (2003) predict the sign on long-term growth to be positive under the belief that high-growth firms are observed by investors as riskier in general. They suggest that potential errors in growth estimation would influence prices substantially. A positive sign is documented by Dhaliwal, Krull, Li and Moser (2005) and Dhaliwal, Heitzman and Li (2006). Gebhardt, Lee and Swaminathan (2001) also find, contrary to their beliefs, a positive relation between long-term growth and implied cost of equity in a multivariate setting.

We include the dispersion of analyst forecasts, which we refer to as *Variance Analyst Coverage*, as an explanatory variable. The market perceives higher divergence in forecasts among analysts as an indication of uncertainty about the firm's earnings, thus increasing the return they require from the firm. Gebhardt, Lee and Swaminathan (2001, p. 146) use dispersion of analyst forecasts to proxy for "earnings variability which is likely to capture fundamental cash flow risk." They also suggest that earnings variability translates to firm valuation risk. We therefore predict a positive relation between the volatility of analyst coverage and the cost of capital. Empirical literature largely supports this prediction [for example, Dhaliwal, Heitzman and Li (2006)].

As in the case of the size proxy, the inclusion of the *Market to Book* variable is largely motivated by Fama and French (1992) whose model demonstrates the explanatory power of the book to market ratio in relation to the cross-sectional variation of returns. Gebhardt, Lee and Swaminathan (2001) suggest that if firms with high book to market ratios (or low *Market to Book* ratios in our case) are undervalued, then these firms would have high implied costs of equity until the mispricing is resolved. Gode and Mohanram (2003) also predict a positive sign for the book to market ratio (meaning a negative sign for the *Market to Book* ratio), though they

note that a low *Market to Book* ratio could be a sign of "lower growth opportunities, lower accounting conservatism, or high perceived risk" (p.406) and that there is difficulty in making a case for the impact on the cost of equity from these confounding factors. Gebhardt, Lee and Swaminathan (2001) and Dhaliwal, Krull, Li and Moser (2005) find a positive sign for the book to market ratio (meaning a negative sign for the *Market to Book* ratio). Ashbaugh, Collins and LaFond (2004) also find a negative sign on the *Market to Book* variable in their results. We therefore predict a negative sign on the *Market to Book* variable.

Modigliani and Miller (1958) demonstrate that the firm's cost of equity should be positively tied to its leverage; the more the firm is levered, the higher the risk to the firm's equity and therefore the higher the return that is required by shareholders. Fama and French (1992) examine historical returns and report a positive relationship between leverage and stock returns. The sign is found to be positive by Gode and Mohanram (2003) and Gebhardt, Lee and Swaminathan (2001). Thus, we predict *Leverage* has a positive impact on the cost of equity.

The inclusion of a variable for industry membership, which we refer to as *Industry Cost of Equity*, is motivated by Gebhardt, Lee and Swaminathan (2001) who find industry effects to be a significant factor in cross-sectional variation in implied cost of equity. In fact, they observe that "the market consistently ascribes a higher discount rate to certain industries" (p. 137). Their finding suggests that a firm's implied cost of equity is potentially associated with its industry membership likely as a result of specific industry characteristics (e.g. industry regulation, concentration). Our prediction for the industry average cost of equity is therefore positive. Hail and Leuz (2006) also include industry controls in their regressions and Dhaliwal, Krull, Li and Moser (2005) find industry effects to be positively related to the implied cost of equity of firms in their sample.

According to the CAPM, the market beta of a firm should be positively associated with its cost of equity. We predict a positive sign for this variable. A positive sign is also documented by Botosan (1997), Gode and Mohanram (2003), Ashbaugh, Collins and LaFond (2004), Dhaliwal, Krull, Li and Moser (2005), Dhaliwal, Heitzman and Li (2006) and Hail and Leuz (2006). Summary statistics of the variables to be used in the regressions are presented in Table 3.4.

Table 3.4 Summary of Regression Variables

Panel A: Descriptive Statistics of Regression Variables

Variable	N	Mean	Std Dev	Min	Q1	Median	Q3	Max
Completion Rate	154	0.29	0.35	0	0	0.12	0.52	1
Log Assets (Size Proxy)	154	8.49	2.25	3.98	6.89	8.29	9.76	13.06
Analyst Coverage (Size Proxy)	154	9.07	4.05	2	6	9	12	21
Growth	154	16.7	16.4	-3.62	9.39	12.77	16.76	145.55
Variance Analyst Coverage	154	0.1	0.22	0	0.02	0.04	0.1	2.4
Market to Book	154	2.33	1.07	0.16	1.64	2.24	2.99	7.16
Leverage	154	44.9	28.71	0	22.29	44.98	56.28	100
Industry Cost of Equity	154	0.11	0.01	0.08	0.1	0.11	0.11	0.15
Beta	154	0.49	0.43	-0.34	0.19	0.43	0.73	1.95
K	154	0.11	0.03	0.05	0.09	0.1	0.11	0.28
IAK	154	-0	0.03	-0.08	-0.02	-0.01	0.01	0.17
RP	154	0.07	0.03	-0	0.05	0.07	0.09	0.24

Panel B: Pearson Correlation Coefficients of Regression Variables

	Completion Rate	*Log Assets*	*Analyst Coverage*	*Growth*	*Variance Analyst Coverage*	*Market to Book*	*Leverage*	*Industry Cost of Equity*	*Beta*	*K*	*IAK*
Log Assets	**0.3319**										
Analyst Coverage	**0.3522**	**0.4778**									
Growth	-0.1042	**-0.2795**	-0.0446								
VAnalystCoverage	-0.0740	-0.1914	-0.0719	**0.4507**							
Market to Book	0.0046	0.0438	0.0599	-0.0067	-0.1732						
Leverage	**0.2166**	**0.5974**	0.2019	-0.1847	-0.0764	-0.0150					
IndustCostofEquity	0.2056	0.0334	**0.2540**	**0.2283**	0.1799	0.0594	-0.0739				
Beta	0.0123	-0.0070	0.1518	0.1540	0.1223	**-0.2845**	0.1174	0.0220			
K	0.1153	-0.0991	0.0157	**0.4381**	**0.3586**	**-0.2701**	-0.0793	**0.2644**	0.1478		
IAK	0.0347	-0.1154	-0.0873	**0.3570**	**0.2951**	**-0.3016**	-0.0513	-0.1358	0.1429	**0.9196**	
RP	0.0863	-0.0658	0.0148	**0.3959**	**0.3016**	**-0.2569**	-0.0841	**0.2327**	0.0269	**0.9486**	**0.8797**

This table reports the summary statistics of the variables used in the regression models of our sample. Panel A contains descriptive statistics while Panel B contains Pearson correlations between variables. Correlations are bolded to indicate statistical significance at the 1% level. The sample contains 154 observations belonging to 64 firms. See Table 3.5 for an explanation of variable sources and definitions.

From Panel A of Table 3.4, we can see that firms in our sample have repurchased within the range of 0 to 100% of their announced programs in the year following their repurchase announcements. On average, firms repurchase 29% of their programs with the majority of firms purchasing less than this portion (median of 12%). Pairwise correlations shown in Panel B indicate that the main explanatory variable, *Completion Rate*, is significantly positively correlated with both size proxies (*Log Assets* and *Analyst Coverage*) as well as *Leverage*. We use *Analyst Coverage* as the main proxy for size because it is correlated with fewer variables compared to *Log Assets*. A robustness check is performed (results reported in Table 4.3) by running the regression with each of the size proxies as well as omitting size altogether in order to determine whether the correlation between size and the main test variable has an effect on results. By including these variables we control for size, growth, the ratio of market to book value, leverage, industry membership and beta so that we can focus on accurately measuring the impact of *Completion Rate* on the firm's cost of equity. A summary of regression variable definitions is provided in Table 3.5.

Table 3.5 Definitions of Regression Variables

Variable	Definition	Source
RP (dependent variable)	Calculated as ($K - R_f$), where the risk free rate for is the annualized 91-day T-bill rate.	Estimated
K (Alternative specification for dependent variable)	The repurchasing firm's cost of equity estimate of the cost of equity capital. It is an average of the estimates of the four models discussed in Section 3.2.	Estimated
IAK (Alternative specification for dependent variable)	The industry-adjusted cost of equity estimate, calculated as (*K* – *Industry Cost of Equity*).	Estimated
Completion Rate (main explanatory variable)	The rate of repurchase program fulfillment. This is defined as the number of shares a firm actually repurchases as a fraction of the total number of shares authorized for repurchase.	Schmidt (2006)
Log Assets	The natural log of the firm's total assets. It serves as an alternate control for size (used to verify the robustness of results computed using *Analyst Coverage* as a proxy for size).	Compustat
Analyst Coverage	The number of analysts providing EPS forecasts for a given firm in a given year. Included to control for firm size.	I/B/E/S
Growth	The mean consensus earnings forecasts of long-term growth.	I/B/E/S
Volatility Analyst Coverage	The standard deviation of analysts' one-year-ahead mean EPS forecast as a fraction of the one-year-ahead mean forecast.	I/B/E/S
Market to Book	The ratio of market value of equity to book value of equity.	Compustat
Leverage	The ratio of total book value of debt to total capital (market value of equity + book value of debt). This is truncated at 100%.	Compustat
Industry Cost of Equity	The average of the implied cost of equity estimates for all available firms. Computed at the first-digit SIC code for each year of our sample.	Estimated
Beta	The CAPM beta estimated from monthly returns for a minimum of 24 of the 60 months prior to the month for which analyst earnings forecasts are made. CFMRC value-weighted returns are used for the market portfolio and 3-month Canadian T-bills used for the risk free rate.	CFMRC, Estimated

CHAPTER 4
EMPIRICAL EVIDENCE

We investigate whether a relationship exists between the firm's voluntary repurchase compliance and its cost of equity capital. We test whether a higher degree of voluntary compliance is associated with lower costs of equity capital in the year following the announcement. In examining this association, we control for various factors which have been identified in the literature as having an impact on the implied cost of equity. Our main model is shown in equation (4.1). It is a cross-sectional regression model. Note that *RP* [expected return in excess of the risk free (T-bill) rate] is used as the dependent variable in the regression. Because the risk free rate is a constant term across all firms in the *RP* expression, but changes every year, the objective here is to control for time-series variation in the risk-free rate and potential fixed-year effects (as explained by Hail and Leuz, 2006, p. 496). Expressing the return in excess of the risk free rate is a standard technique in the cost of capital literature [see for example, Gebhardt, Lee and Swaminathan (2001), Gode and Mohanram (2003), Dhaliwal, Krull, Li, and Moser (2006)].

$$RP = \alpha_0 + \alpha_1 CompletionRate + \alpha_2 FirmLevelControls + \varepsilon \quad (4.1)$$

Where:

RP = computed as the aggregate cost of equity estimate in excess of the risk free rate (annualized Canadian 91-day T-bill rate). The aggregate cost of equity estimate is calculated as the average of estimates computed from the four models discussed in Section 3.2 for the most recent month subsequent to the share repurchase program end date.

CompletionRate = the repurchase program completion rate [from the dataset of Schmidt (2006)], computed as the number of shares actually repurchased as a fraction of the total number of shares authorized for repurchase from the initiation to the program end date.

Controls = a set of firm-level control variables described in Section 3.2.

ε = an error term.

The model was initially run using OLS but White's (1980) test indicated significant heteroskedasticity in the residuals of our regression. As such, the reported *t*-statistics are computed from heteroskedasticity-corrected standard errors. In addition to this diagnostic, we also test whether our residuals are white noise after using corrected standard errors. Statistics from our Q-test (Ljung-Box test) are insignificant at the 5% level at all lags which indicates that the residuals are white noise and that our model is an adequate fit to the repurchase program and cost of equity data (see Appendix for test statistics).

4.1 Effect of Voluntary Compliance and the Cost of Equity

Table 4.1 reports empirical results from the estimation of the model shown in equation (4.1). The cost of equity capital in excess of the risk free rate, *RP*, is the dependent variable in the four models presented in Table 4.1. The main test variable in Model 1 is the *Completion Rate*, which is a continuous variable ranging from 0 to 100%.

Table 4.1 Effect of Voluntary Compliance on the Implied Cost of Equity

DEPVAR		*RP*	*RP*	*RP*	*RP*
Variable	**Expected Sign**	**Model 1**	**Model 2**	**Model 3**	**Model 4**
Intercept	(?)	0.044	0.043	0.045	0.046
		(1.41)	(1.35)	(1.40)	(1.51)
Completion Rate (x10)	(–)	0.104	0.030	0.071	0.115
		(1.34)	(0.27)	(0.48)	(1.30)
Completion_High[Median] (x10)	(?)		0.007		
			(0.99)		
Completion_High[Q3] (x10)	(?)			0.003	
				(0.26)	
Completion_Dummy (x10)	(?)				-0.002
					(-0.26)
Analyst Coverage (x100)	(−)	0.004	0.001	0.004	0.006
		(0.06)	(0.01)	(0.06)	(0.08)
Growth (x100)	(+)	0.073**	0.074**	0.073**	0.072**
		(2.34)	(2.33)	(2.32)	(2.33)
Volatility Analyst Coverage	(+)	0.015	0.015	0.015	0.015
		(0.58)	(0.58)	(0.58)	(0.58)
Market to Book (x100)	(−)	-0.902***	-0.908***	-0.899***	-0.895***
		(-3.41)	(-3.41)	(-3.41)	(-3.31)
Leverage (x1000)	(+)	-0.02	-0.015	-0.021	-0.021
		(-0.2)	(-0.15)	(-0.21)	(-0.21)
Industry Cost of Equity	(+)	0.342	0.345	0.337	0.335
		(1.05)	(1.05)	(1.02)	(1.04)
Beta	(+)	-0.01	-0.01	-0.01	-0.01
		(-0.91)	(-0.90)	(-0.92)	(-0.90)
Adj R^2		0.237	0.235	0.232	0.232
N		154	154	154	154

This table reports the regression results of the implied cost of equity on the repurchase program completion rate while controlling for various factors cited in the literature as having an impact on the cost of equity. The dependent variable in all of these models *RP,* is computed as the aggregate cost of equity estimate in excess of the risk free rate (annualized Canadian 91-day T-bill rate).

Model 1: *Completion Rate*, the main explanatory variable of interest, is the rate of repurchase program fulfillment. This is defined as the number of shares a firm actually repurchases as a fraction of the total number of shares authorized for repurchase.

Model 2: *Completion_High[Median]* is a dummy variable equal to one if the completion rate is greater than the median completion rate and equal to zero otherwise.

Model 3: *Completion_High[Q3]* is a dummy variable equal to one if the completion rate is

greater than the third quartile completion rate and equal to zero otherwise.
Model 4: *Completion_Dummy* is a dummy variable equal to one if the completion rate is greater than zero and equal to zero otherwise.
Repurchase data is from Schmidt (2006). For descriptions and sources of variables, see Table 3.5. The robust *t*-statistic is reported immediately below each estimate. The superscript asterisks ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively (two-tailed).

In Model 1 of Table 4.1, the explanatory variables collectively explain 23.7% of the variation in the cost of equity of repurchasing firms. Focusing first on the main test variable, we observe that the coefficient of *Completion Rate* is positive but insignificant. Thus, contrary to our prediction, there is no evidence to suggest that a firm's higher voluntary repurchase compliance lowers perceptions of associated risk. We discuss the interpretation of this relationship later on in conjunction with results of robustness checks. We next examine whether the inclusion of dummy variables used to indicate high completion and low completion categories provide any additional explanatory power. We report the results associated with these dummies in Models 2, 3 and 4, which tell us the extent to which cost of equity for firms with higher completion rates deviates from that of firms with lower completion rates. Model 2 of Table 4.1 contains a dummy variable which takes the value of unity if the completion rate is higher than the median completion rate (which is 12% as shown in Table 3.4 Panel A). In much the same manner, Model 3 contains a dummy variable which takes the value of unity if the completion rate is higher than the third quartile completion rate (which is 52% as shown in Table 3.4 Panel A). Model 4 contains a dummy variable which takes the value of one if the firm makes any degree of progress in its repurchase program (i.e. a non-zero completion rate). None of the three dummy variables is statistically significant, suggesting that there are no completion rate levels or hurdles to pass before the cost of equity is affected.

In addition to the completion rate variable in each of the models, we also include a number of firm-specific and industry factors (explained in detail in Section 3.3). Coefficient signs and significance levels are consistent across all four models in Table 4.1. *Growth*, *Market to Book* and *Industry Cost of Equity* exhibit the expected sign although only *Growth* and *Market to Book* are statistically significant. *Analyst Coverage*, *Leverage* and *Beta* neither exhibit the expected sign nor are they significant.

A positive and statistically significant impact of *Growth* on *RP* is consistent with the findings of Gebhardt, Lee and Swaminathan (2001), Gode and Mohanram (2003), Dhaliwal, Krull, Li and Moser (2005), Dhaliwal, Heitzman and Li (2006). The positive relation that we observe supports the argument of Gode and Mohanram (2003) that investors may be perceiving high long-term growth firms as riskier. The coefficient of the *Volatility Analyst Coverage* variable (a measure of the dispersion of analyst forecasts) is positive, as predicted, though not statistically significant. Dhaliwal, Heitzman and Li (2006) also find a positive relation between the implied cost of equity and the dispersion of analyst forecasts in their sample. There is a negative and significant association (at the 1% level) between *RP* and *Market to Book* across all models. This finding is consistent with Gebhardt, Lee and Swaminathan (2001), who find that undervalued firms have high costs of equity. Our result is also consistent with the findings of Gode and Mohanram (2003), Ashbaugh, Collins and LaFond (2004) and Dhaliwal, Krull, Li and Moser (2005).

The coefficient of the *Leverage* variable is directionally inconsistent with our prediction, though it is not statistically significant. It is possible that the contradictory sign is a result of the significant correlation between *Leverage* and *Completion Rate*. A similar correlation issue arises between *Analyst Coverage* and *Completion Rate*. These issues will be explored in the robustness section. The coefficient of *Industry Cost of Equity* is positive, as predicted, though not

statistically significant. The positive sign is consistent with studies such as Gebhardt, Lee and Swaminathan (2001) and Dhaliwal, Krull, Li and Moser (2005).

To summarize our main findings, we find no evidence of a negative association between the firm's cost of equity and its voluntary repurchase compliance. This suggests that share repurchase completion rates have little or no impact in reducing firms' systematic risk and thus cost of equity capital. In the following section we perform a series of robustness tests to determine whether the findings are sensitive to the methodology used to generate the dependent variable, the choice of independent variables, and the choice of dependent variable specification.

4.2 Robustness Checks

In order to investigate the strength of our findings, we execute several robustness checks. We determine whether each of the following considerations have an effect on our results: (1) the approach used to estimate the cost of equity; (2) the significant correlation between *Completion Rate* and *Analyst Coverage* (3); the significant correlation between *Completion Rate* and *Leverage*; and (4) the specification of the dependent variable.

In Table 4.2, we study whether the relationship between cost of equity and the firm's voluntary compliance as shown in Table 4.1 is robust to the approach used to estimate the cost of equity. Rather than using *RP* (the aggregate cost of equity estimate in excess of the 91-day T-bill rate) as the dependent variable, we use estimates based on each of the individual models: the cost of equity in excess of the risk free rate estimated from the Claus and Thomas (2001) approach in Model 1, the Gebhardt, Lee and Swaminathan (2001) approach in Model 2, the Ohlson and Juettner-Nauroth (2005) approach in Model 3, and the Easton (2004) approach in Model 4 (subscripts in Table 4.2 denote the estimation approach followed).

Table 4.2 Effect of Voluntary Compliance on Individual Model *RP*

DEPVAR		RP_{CT}	RP_{GLS}	RP_{OJ}	RP_{ES}
Variable	**Expected Sign**	**Model 1**	**Model 2**	**Model 3**	**Model 4**
Intercept	(?)	0.128*	0.051**	0.026	0.031
		(1.67)	(2.42)	(1.04)	(0.94)
Completion Rate (x10)	(−)	0.069	0.063	0.135	0.402*
		(0.60)	(0.92)	(1.42)	(1.87)
Analyst Coverage (x100)	(−)	0.078	-0.094	-0.110	0.195
		(0.54)	(-1.32)	(-1.20)	(1.04)
Growth (x100)	(+)	0.014	0.001	0.093***	0.068**
		(0.16)	(0.09)	(3.34)	(2.32)
Volatility Analyst Coverage	(+)	0.095	-0.005**	0.031***	0.031***
		(1.21)	(-2.20)	(5.84)	(5.57)
Market to Book (x100)	(−)	-0.753*	-0.720***	-0.828**	-0.592
		(-1.68)	(-3.16)	(-2.50)	(-1.55)
Leverage (x1000)	(+)	-0.192	0.026	-0.165	-0.642**
		(-0.83)	(0.30)	(-1.47)	(-2.18)
Industry Cost of Equity	(+)	-0.609	0.343	0.737***	0.633**
		(-0.73)	(1.63)	(3.09)	(2.12)
Beta	(+)	0.017	-0.02***	-0.008	-0.017*
		(0.55)	(-4.24)	(-1.33)	(-1.90)
Adj R^2		0.142	0.102	0.358	0.165
N		164	167	232	238

This table reports the regression results of the implied cost of equity in excess of the risk free (91-day T-bill) rate on the repurchase program completion rate while controlling for various factors cited in the literature as having an impact on the cost of equity. Dependent variables are the *RP* estimates computed from the implied cost of equity estimates following the approaches of Claus and Thomas (2001), Gebhardt, Lee and Swaminathan (2001), Ohlson and Juettner-Nauroth (2005), and Easton (2004), respectively (discussed in Section 3.2), in excess of the risk free rate (annualized Canadian 91-day T-bill rate). *Completion Rate*, the main explanatory variable of interest, is the rate of repurchase program fulfillment. This is defined as the number of shares a firm actually repurchases as a fraction of the total number of shares authorized for repurchase. Repurchase data is from Schmidt (2006). For descriptions and sources of variables, see Table 3.5. The robust *t*-statistic is reported immediately below each estimate. The superscript asterisks ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively (two-tailed).

The results of Table 4.2 confirm the findings of Table 4.1: completion rate does not affect the cost of equity, with the exception of model 4, where the ES cost of equity estimates are used. A stronger relation between RP_{ES} and *Completion Rate* as opposed to the relation between RP_{OJ} and *Completion rate* can possibly be explained by differences in the assumptions of these models. As previously shown in Table 3.2, the ES model assumes abnormal earnings growth persists into perpetuity while the OJ model does not. As such, a stronger relation between RP_{ES} and *Completion Rate* may result from these two variables picking up on a common trend. The positive (significant at 10%) completion rate coefficient in Model 4 (Table 4.2) is likely a spurious result. Dhaliwal, Heitzman and Li (2006, p. 699-700) support this argument and the use of an average estimate: "Limiting empirical analysis to just one measure may produce spurious results if particular attributes of the model are correlated with the variable of interest" and using the average of the four estimates following Hail and Leuz (2006) is a method of alleviating "the effect that particular assumptions of each model might have on […] results." Though the ES and OJ cost of equity estimates are highly correlated, as reported in Table 3.3 Panel B, the differing regression results between the two models shown in Table 4.2 are possible because the data sets involved are different; the ES regression includes 238 observations, while the OJ regression includes 232 observations. The number of observations is different because of the data requirements of each cost of equity model (the OJ model implicitly requires that the two-year ahead earnings forecast exceeds the one-year ahead forecast, while the ES model involves no such requirement). As was discussed in Section 2.5 and shown in Table 3.2 of Section 3.2.4, the models capture different sets of information and it is not clear *a priori* that a particular model is more appropriate.

The main regressions (Table 4.1) use *Analyst Coverage* to measure information availability, which is proxied by size. However, size is significantly correlated (although the correlation is low) with *Completion Rate* (see Panel B of Table 3.4 for pairwise correlations). A strong and significant correlation between *Completion Rate* and *Analyst Coverage* may interfere with the interpretation of the impact of *Completion Rate* on the cost of equity. To address this concern, we used an alternative popular proxy of size, *Log Assets*, which also turned out to be significantly correlated with the main explanatory variable. Nonetheless, in the current robustness check, we address the information availability issue by including each size proxy individually (Table 4.3, Models 1 and 2) and omitting the size proxy altogether (Table 4.3, Model 3) to see whether the magnitude and significance of the *Completion Rate* variable changes. We find that the magnitude of the coefficient of *Completion Rate* is consistent across the three models (0.104, 0.096, and 0.105) and the level of significance is also consistent (insignificant across all three models). From these results, we conclude that the choice of size proxy does not have a significant impact on our results, and also that the results are not sensitive to the correlation between the size proxy and the main explanatory variable. This may be because although the correlations are significant, they are low (in the range of 0.3).

Table 4.3 Robustness Check for Size Proxy

DEPVAR		*RP*	*RP*	*RP*
Variable	**Expected Sign**	**Model 1**	**Model 2**	**Model 3**
Intercept	(?)	0.044	0.040	0.044
		(1.41)	(1.22)	(1.43)
Completion Rate (x10)	(−)	0.104	0.096	0.105
		(1.34)	(1.22)	(1.40)
Analyst Coverage (x100)	(−)	0.004		
		(0.06)		
Log Assets (x10)	(−)		0.008	
			(0.60)	
Growth (x100)	(+)	0.073**	0.075**	0.073**
		(2.34)	(2.34)	(2.33)
Volatility Analyst Coverage	(+)	0.015	0.015	0.015
		(0.58)	(0.61)	(0.59)
Market to Book (x100)	(−)	-0.902***	-0.904***	-0.900***
		(-3.41)	(-3.36)	(-3.37)
Leverage (x1000)	(+)	-0.02	-0.054	-0.02
		(-0.20)	(-0.50)	(-0.20)
Industry Cost of Equity	(+)	0.342	0.333	0.345
		(1.05)	(1.09)	(1.13)
Beta	(+)	-0.01	-0.009	-0.01
		(-0.91)	(-0.85)	(-0.87)
Adj R^2		0.237	0.238	0.242
N		154	154	154

This table reports the results of the regression of *RP* (computed as the aggregate implied cost of equity estimate in excess of the risk free rate) on the repurchase program completion rate while controlling for various factors cited in the literature as having an impact on the cost of equity. This table enables comparison of the magnitude and significance level of the coefficient of *Completion Rate* in regressions using *Analyst Coverage* as a proxy for size (Model 1), *Log Assets* as a proxy for size (Model 2) and with the size proxy omitted (Model 3). The dependent variable in the three models is *RP*, defined as the aggregate cost of equity estimate in excess of the risk free rate (annualized Canadian 91-day T-bill rate). *Completion Rate*, the main explanatory variable of interest, is the rate of repurchase program fulfillment. This is defined as the number of shares a firm actually repurchases as a fraction of the total number of shares authorized for repurchase. Repurchase data is from Schmidt (2006). For descriptions and sources of variables, see Table 3.5. The robust *t*-statistic is reported immediately below each estimate. The superscript asterisks ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively (two-tailed).

Completion Rate and *Leverage* are also weakly correlated (0.22). Similar to the above robustness check, we determine whether the magnitude and significance level of the coefficient of *Completion Rate* changes in regressions including *Leverage* (Table 4.4 Model 1) and omitting *Leverage* (Table 4.4 Model 2).

Table 4.4 Robustness Check for Possible Collinearity Problems with Leverage

DEPVAR		*RP*	*RP*
Variable	**Expected Sign**	**Model 1**	**Model 2**
Intercept	(?)	0.044	0.043
		(1.41)	(1.50)
Completion Rate (x10)	(−)	0.104	0.101
		(1.34)	(1.33)
Analyst Coverage (x100)	(−)	0.004	0.002
		(0.06)	(0.03)
Growth (x100)	(+)	0.073**	0.074**
		(2.34)	(2.44)
Volatility Analyst Coverage	(+)	0.015	0.015
		(0.58)	(0.58)
Market to Book (x100)	(−)	-0.902***	-0.903***
		(-3.41)	(-3.44)
Leverage (x1000)	(+)	-0.020	
		(-0.20)	
Industry Cost of Equity	(+)	0.342	0.347
		(1.05)	(1.11)
Beta	(+)	-0.01	-0.01
		(-0.91)	(-0.97)
Adj R^2		0.237	0.242
N		154	154

This table reports regression results of *RP* (the aggregate implied cost of equity estimate in excess of the risk free rate) on the completion rate while controlling for various factors cited in the literature as having an impact on the cost of equity. This table enables comparison of the magnitude and significance level of the coefficient of *Completion Rate* in regressions including *Leverage* (Model 1) and omitting *Leverage* (Model 2). The dependent variable in both models is *RP*, defined as the aggregate cost of equity estimate in excess of the risk free rate (annualized Canadian 91-day T-bill rate). *Completion Rate*, the main explanatory variable of interest, is the rate of repurchase program fulfillment, defined as the number of shares a firm actually repurchases as a fraction of the total number of shares authorized for repurchase. Repurchase data is from Schmidt (2006). For descriptions and sources of variables, see Table 3.5. The robust *t*-statistic is reported immediately below each estimate. Superscript asterisks ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively (two-tailed).

We observe that the magnitude of the *Completion Rate* coefficient (0.104 and 0.101) and the significance level (insignificant in both models) remains the same. We therefore conclude that the correlation between the two variables does not affect our results.

In Table 4.1, our dependent variable is *RP* -- the cost of equity in excess of risk free rate. We investigate the robustness of the results of Table 4.1 with modified specifications of the aggregate cost of equity. The current objective is to examine the results for different specifications of the aggregate cost of equity estimate as the dependent variable. In Table 4.5, we use the raw aggregate cost of equity estimate, *K*, as the dependent variable instead of *RP*. Most notably, we again do not find a negative relationship between the alternative cost of equity specification and the main test variable, *Completion Rate*. Also similar to the results of Table 4.1, dummy variables distinguishing higher and lower levels of completion rates are not significant.

Table 4.5 Effect of Voluntary Compliance on the Implied Cost of Equity Capital

DEPVAR		*K*	*K*	*K*	*K*
Variable	**Expected Sign**	**Model 1**	**Model 2**	**Model 3**	**Model 4**
Intercept	(?)	0.068**	0.066**	0.069**	0.064**
		(2.39)	(2.27)	(2.36)	(2.32)
Completion Rate (x10)	(−)	0.138*	0.040	0.086	0.109
		(1.97)	(0.40)	(0.56)	(1.40)
Completion_High[Median] (x10)	(?)		0.009		
			(1.43)		
Completion_High[Q3] (x10)	(?)			0.005	
				(0.37)	
Completion_Dummy (x10)	(?)				0.004
					(0.76)
Analyst Coverage (x100)	(−)	-0.025	-0.03	-0.025	-0.029
		(-0.39)	(-0.45)	(-0.39)	(-0.45)
Growth (x100)	(+)	0.070**	0.071**	0.070**	0.072**
		(2.28)	(2.27)	(2.26)	(2.36)
Volatility Analyst Coverage	(+)	0.021	0.021	0.021	0.021
		(0.85)	(0.85)	(0.85)	(0.85)
Market to Book (x100)	(−)	-0.772***	-0.780***	-0.768***	-0.788***
		(-2.84)	(-2.84)	(-2.86)	(-2.83)
Leverage (x1000)	(+)	-0.028	-0.021	-0.029	-0.025
		(-0.31)	(-0.23)	(-0.32)	(-0.28)
Industry Cost of Equity	(+)	0.379	0.383	0.371	0.399
		(1.28)	(1.27)	(1.23)	(1.37)
Beta	(+)	0.001	0.001	0.001	0.001
		(0.07)	(0.07)	(0.06)	(0.08)
Adj R^2		0.292	0.294	0.288	0.289
N		154	154	154	154

This table reports the results of the regression of implied cost of equity on repurchase program completion rates while controlling for various factors cited in the literature as having an impact on the cost of equity. The dependent variable in all of these models is the aggregate estimate, taken as the average across the four cost of equity models for observations where all four estimates are obtainable.

Model 1: *Completion Rate*, the main explanatory variable of interest, is the rate of repurchase program fulfillment. This is defined as the number of shares a firm actually repurchases as a fraction of the total number of shares authorized for repurchase.

Model 2: *Completion_High[Median]* is a dummy variable equal to one if the completion rate is greater than the median completion rate and equal to zero otherwise.

Model 3: *Completion_High[Q3]* is a dummy variable equal to one if the completion rate is

greater than the third quartile completion rate and equal to zero otherwise.
Model 4: *Completion_Dummy* is a dummy variable equal to one if the completion rate is greater than zero and equal to zero otherwise.
Repurchase data is from Schmidt (2006). For descriptions and sources of variables, see Table 3.5. The robust *t*-statistic is reported immediately below each estimate. The superscript asterisks ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively (two-tailed).

4.3 Discussion

Summarizing our findings, we find no evidence of a negative relationship between cost of equity and the repurchase program completion rate. The main results presented in Table 4.1, in conjunction with results from robustness tests presented in Tables 8 and 9 lead to several possible explanations:

(i) Investors and firms do not consider repurchase activity as a form of compliance.

(ii) Repurchase compliance is important to the firm but investors find this information irrelevant in determining the cost of equity.

(iii) The repurchase completion rate is a form of voluntary compliance and lowers the cost of capital. However, the effect is offset by decreased liquidity stemming from the presence of the firm in the market for its shares.

Our empirical results do not support a negative relationship between the firm's share repurchase completion rate and its cost of equity. This may reflect a weak link between the completion rate and voluntary compliance. More specifically, the completion rate may not be a perfect measure of voluntary compliance, and one may exercise caution in interpreting these results as the size of repurchase programs may be too small for the market to take notice in assessing the credibility of firm management. The Toronto Stock Exchange allows firms to repurchase up to the greater of 5% of shares outstanding or 10% of the public float (see Footnote 8 in Section 2.1.2). Potential alternative measures of voluntary compliance might include any

instance where the firm announces some action and the degree of follow-through is clearly measurable. For instance, Chapple, Cooke, Galt and Paton (2001) investigate attributes of firms in the U.K. which voluntarily comply with international environmental management standards. Consider also Dumontier and Raffournier (1998) who discuss the characteristics of firms in Switzerland (with their low national accounting regulation) that voluntarily comply with the comparatively more stringent International Accounting Standards.

The lack of relationship between the repurchase program completion rate and the firm's cost of equity is perhaps consistent with alternative theories for the determinants of completion rates. A number of studies suggest that the underlying rationale for a firm's repurchase activity can be attributed to undervaluation theories. For instance, Ikenberry, Lakonishok and Vermaelen (2000) examine Canadian share repurchase programs and suggest that the firm's repurchase activity is the result of managers' sensitivity to price movements. They contend that when prices rise, issues related to undervaluation are alleviated and there is less incentive for firms to repurchase. A drop in prices increases the incentives of repurchasing to address issues related to undervaluation and share mispricing and leads to a higher number of shares repurchased. They also find that value stocks have higher completion rates in general compared to growth stocks, which is also consistent with the undervaluation motive for repurchases. Focusing on French firms, Ginglinger and Hamon (2007) similarly conclude that firms repurchase for reasons of price support. They observe that firms repurchase contrary to market trends. If undervaluation is the impetus behind share repurchases then it would explain why we observe no evidence of a relationship between the firm's completion rate and the cost of equity; managers are not trying to signal their commitment or reliability and the market regards the completion rate as a signal of undervaluation and not of voluntary compliance.

A second possible explanation for our results is that the cost of capital is not a channel through which the voluntary compliance affects firm value. Several studies document a positive price reaction immediately surrounding the repurchase program announcement [eg. Grullon and Michaely (2002b); Chan, Ikenberry and Lee (2004); Ikenberry, Lakonishok and Vermaelen(2000)] and also post-announcement [eg Ikenberry, Lakonishok and Vermaelen(2000); Chan, Ikenberry and Lee (2004)]. Mishra, Racine and Schmidt (2007) document a relationship between the firm's completion credibility and the price reaction to subsequent repurchase program announcements. According to the classic discounted cash flow equation, a firm's value is a function of its expected cash flows (the numerator) and the cost of equity (the denominator). Since our models allow us to estimate cost of equity while simultaneously controlling for expected cash flows, our results suggest that cost of equity is not a channel through which voluntary compliance measured by share repurchase completion affects firm value.

A third possible explanation for our results is that the repurchase completion rate is a form of voluntary compliance and indeed lowers cost of equity, however, the effect is offset by decreased liquidity. Empirical evidence, [Barclay and Smith (1988)] suggests that open-market repurchases lead to a decrease in liquidity because of the firm's presence in the secondary market for its shares. For example, consider the presence of the firm (an informed insider) in the market, the market-maker (an uninformed outsider) anticipates losses to this more-informed trader (firm) and seeks to recover these losses by widening the bid-ask spread, thus lowering liquidity. Barclay and Smith (1988) find evidence in support of this theory for U.S. open-market share repurchases announced between 1970 and 1978. More recently, Brockman and Chung (2001) also report wider bid-ask spreads during repurchase periods for stocks on the Hong Kong Stock Exchange.

Wider bid-ask spreads imply increased information asymmetry, and increased (decreased) information asymmetry factors into a higher (lower) cost of capital [Easley and O'Hara (2004); Diamond and Verrecchia (1991)]. Therefore, the increase in the cost of capital due to the perceived increase in information asymmetry between the informed trader (firm) and uninformed trader (market maker) may be large enough to offset any reduction in cost of capital associated with voluntary compliance imbedded in share repurchases completion. A test for this argument is beyond the scope of this thesis and thus left for future research.

CHAPTER 5
CONCLUSION

We use a sample of Canadian repurchase events to examine the effect of voluntary compliance (measured by the share repurchase completion rate) on the firm's cost of equity capital.

The regulatory environment governing repurchases in Canada allows firms a great deal of flexibility concerning their repurchase completion. As such, we anticipated that open-market share repurchases would be an informative measure of voluntary compliance. Theoretical research discusses the effect of voluntary information disclosure on the cost of equity capital with particular emphasis on the role of disclosure in reducing information asymmetries between the firm and its investors. Despite our prediction that a firm might be able to lower its cost of equity by signaling its reliability through increased voluntary repurchase compliance, we find no evidence to support this notion. Evidence shows that even if the firm leaves its repurchase program incomplete, market perceptions of firm risk remain unaffected.

One possible explanation for our findings is that the firm's repurchase activity and hence its degree of program completion may be dependent on various situational factors such as managers' sensitivity to price movements which make repurchasing in some instances more advantageous. These factors may have little bearing on firm risk and are not indicative of managerial reliability. From the perspective of the firm and also of the investors, the degree of program completion is therefore not considered a form of compliance. The second possible explanation for our results is that the repurchase program completion rate may indeed be positively interpreted by the market as a measure of the firm's credible fulfillment of its

corporate promises, however, the cost of equity is not the channel through which this credibility is factored into firm value. The third possibility is that the firm's repurchase completion rate is a form of voluntary compliance and lowers the cost of equity, but this effect is offset by decreased liquidity effects resulting from the presence of the firm (as a more-informed trader) in the market.

We do not explicitly test these explanations in the current study, but leave them as avenues for future research. For instance, future research might include explicitly investigating the impact of the repurchase program completion rate on the firm's liquidity.

5.1 Limitations

Potential limitations of the current study fall into categories of data availability, timing of measurement, and potential biases in the data sources. First, in order to estimate the cost of equity following the four models and to run the regression of cost of equity on completion rate and control variables, data was obtained from IBES and Compustat. Analyst coverage is likely to be better for larger firms; hence, it is possible that smaller firms that normally receive less analyst coverage are excluded from the final sample. Because of this, the IBES database might offer limited data on these firms, and they are naturally excluded when constructing our sample. The issue of survivorship bias in Compustat data is discussed by Falkenstein (2000) who suggests that small firms with irregular financial reporting or that exist for only one or two years and become bankrupt will generally not be included in Compustat. Therefore our data set excludes such small firms.

The impact of a large firm bias could be an important point to consider when interpreting the results of this study. It is possible that the finding of no relationship between cost of equity and voluntary repurchase compliance does not apply to smaller firms. Thus we must proceed with

caution in extrapolating the current conclusions to an expanded set of firms with sizes outside the range used in this study; of course, this type of caveat is valid for any research.

A second potential limitation relates to the gap in time between when the firm makes its repurchases and when the cost of equity is measured in the 13th month. This might be an issue for instances in which firms make all of their repurchases prior to the termination month of the repurchase program. In cases such as these, the cost of equity is less likely to fully capture the effect of the firm's voluntary compliance. And the earlier the firm completes its repurchases the higher the chance that the cost of equity in the 13th month is capturing the effect of some other event in the intervening months. The existence of this time gap could present a possible reason behind this study's findings if conflicting events are diluting the predicted effect. It would be ideal if daily repurchase data could be obtained so that the completion rate could also be computed daily. The cost of equity could then be immediately estimated at the completion date of the repurchase program. In the current study we use the completion rate available in the 12th month due to data availability. Future research may consider estimating cost of equity closer to the actual termination of the repurchase program.

Third, the I/B/E/S database reports sell-side analyst forecasts which tend to be more optimistic [Conroy and Harris (1995); Dugar and Nathan (1995)]. This may lead to an upward bias in cost of equity estimates [Easton and Sommers (2006)]. If forecasts are consistently optimistic across our sample, that is, the increment in the earnings forecast is uniform across all firms, then adjustments can be made accordingly. These modifications are difficult to make if the optimism is unevenly applied. Therefore a potential limitation of the current study is in implicitly assuming that if a forecast bias exists in the sample, it is a uniform bias that results in increases in earnings forecasts that are consistent across all firms included in IBES.

5.2 Contributions

Prior research finds that repurchase program completion rates are associated with a positive market reaction [Mishra, Racine and Schmidt (2007)]. The current study contributes by examining whether the cost of equity is a channel through which share repurchases affect post-completion firm value. Our findings suggest the cost of equity is not a significant channel through which the completion rate affects firm value. However, our results have implications for practitioners. For example, repurchasing firm managers may not need to adjust their cost of equity to reflect the degree of completion.

This study makes two other contributions. First, we explore the information conveyed through the repurchase program completion rate, which researchers have only recently begun to focus on [e.g., Stephens and Weisbach (1998); Ikenberry, Lakonishok and Vermaelen (2000); Chan, Ikenberry, Lee and Wang (2005)]. The current study contributes to this line of research by examining the repurchase completion rate as a measure of the firm's voluntary compliance and examining whether it has an impact on the firm's cost of equity. To this author's knowledge, the relationship between repurchase program completion rate and the firm's implied cost of equity has not been previously directly examined.

A second contribution made by this study is in applying recently developed approaches to estimate the cost of equity. The implied cost of equity estimation approach allows a direct test of the perceived impact of share repurchases in the firm's cost of capital (denominator term of the discounted cash flow equation), while simultaneously controlling for its impact in expected cash flows (numerator term).

5.3 Suggestions for Future Research

The current study makes progress in addressing the question of whether the repurchasing firm's cost of equity is affected by its voluntary compliance. There are indeed many possible

avenues for future research. If monthly repurchase data was gathered, it would be interesting to see whether firms that made all of their repurchases immediately, for instance in the first month or first few months, experienced an impact in their cost of equity that was different from firms that took their time and made their share repurchases in stages over the span of the 12-month period. It is possible that investors perceive firms that immediately complete their programs as more committed than firms that choose to wait. Future research might also focus on identifying the actual date of repurchase program completion and estimating the cost of equity at a point subsequent to that date.

Another suggestion for future research would be to examine the cost of equity impact of the voluntary compliance of firms that are frequent repurchasers versus firms that repurchase infrequently. Jagannathan and Stephens (2003) suggest that firms which repurchase infrequently may be characterized as having higher degrees of information asymmetry. It would be interesting to see whether the degree of voluntary repurchase compliance has a larger impact on the cost of equity for these firms.

A third prospective avenue for research is in examining the firm's voluntary repurchase compliance and the impact on the cost of equity in conjunction with the reason behind the repurchase. Rules of the Toronto Stock Exchange pertaining to open-market share repurchase programs specify that the repurchasing firm must issue a press release which includes the reason for repurchasing. It might be interesting to categorize observations based on the reason for repurchase and examine whether the level of the firm's voluntary compliance is different among these categories and also to determine whether the impact on the cost of equity is different among these categories.

LIST OF REFERENCES

Akerlof, G.A., 1970, The Market for Lemons: Qualitative Uncertainty and the Market Mechanism, *Quarterly Journal of Economics* 84, 488-500.

Alford, A., 1992, The Effect of the Set of Comparable Firms on the Accuracy of the Price-Earnings Valuation Method, *Journal of Accounting Research* 301, 94-108.

Amihud, Y. and H. Mendelson, 1986, Asset Pricing and the Bid-Ask Spread, *Journal of Financial Economics* 32, 223-249.

Andrade, G., 1999, Do Appearances Matter? The Impact of EPS Accretion and Dilution on Stock Prices, Working Paper, Harvard University.

Ashbaugh, H., D.W. Collins and R. LaFond, 2004, Corporate Governance and the Cost of Equity Capital, Working Paper, University of Iowa and University of Wisconsin.

Badrinath, S.G., N.P. Varaiya, and R.L. Ferling, 2001, Share Repurchase: To Buy or Not to Buy, *Financial Executive* 17, 43-48.

Bagwell, L.S., 1991, Share Repurchase and Takeover Deterrence, *RAND Journal of Economics* 22, 72-88.

Baker, H.K., G.E. Powell, and E.T. Veit, 2003, Why Companies Use Open-Market Repurchases: A Managerial Perspective, *Quarterly Review of Economics and Finance* 43, 483-504.

Banyi, M., E.A. Dyl, and K.M. Kahle, 2005, Measuring Share Repurchases, Working Paper, Oregon State University and University of Arizona.

Banz, R.W., 1981, The Relationship Between Return and Market Value of Common Stocks, *Journal of Financial Economics* 9, 3-18.

Barclay, M. and C. Smith Jr., 1988, Corporate Payout Policy: Cash Dividends versus Open-Market Repurchases, *Journal of Financial Economics* 22, 61-82.

Barry, C.B. and S.J. Brown, 1985, Differential Information and Security Market Equilibrium, *Journal of Financial and Quantitative Analysis* 20, 407-422.

Bens, D.A., V. Nagar, D.J. Skinner, and M.H.F. Wong, 2003, Employee Stock Options, EPS Dilution, and Stock Repurchases, *Journal of Accounting and Economics* 36, 51-90.

Billett, M.T. and H. Xue, 2004, Share Repurchases and the Need for External Finance, Working Paper, University of Iowa.

Billett, M.T. and H. Xue, 2006, The Takeover Deterrent Effect of Open Market Share Repurchases, Working Paper, University of Iowa.

Bloomfield, R.J. and T.J. Wilks, 2000, Disclosure Effects in the Laboratory: Liquidity, Depth, and the Cost of Capital, *The Accounting Review* 75, 13-41.

Botosan, C.A., 1997, Disclosure Level and the Cost of Equity Capital, *The Accounting Review* 72, 323-349.

Botosan, C. and M. Plumlee, 2002, A Re-Examination of Disclosure Level and the Expected Cost of Equity, *Journal of Accounting Research* 40, 21-40.

Brockman, P. and D.Y. Chung, 2001, Managerial Timing and Corporate Liquidity: Evidence from Actual Share Repurchases, *Journal of Financial Economics* 61, 417-448.

Chan, K., D. Ikenberry, and I. Lee, 2004, Economic Sources of Gain in Stock Repurchases, *Journal of Financial and Quantitative Analysis* 39, 461-480.

Chan, K., D. Ikenberry, I. Lee, and Y. Wang, 2005, Share Repurchases as a Tool to Mislead Investors: Evidence from Earnings Quality and Stock Performance, Working Paper, National Taiwan University.

Chapple, W., A. Cooke, V. Galt, and D. Paton, 2001, The Determinants of Voluntary Investment Decisions, *Managerial and Decision Economics* 22, 453-463.

Chen, K.C.W., Z. Chen, and K.C.J. Wei, 2004, Corporate Governance, Agency Costs, and Expected Stock Returns: Evidence from Analysts' Earnings Forecasts, Working Paper, Hong Kong University of Science and Technology.

Clarkson, P., J. Guedes, and R. Thompson, 1996, On the Diversification, Observability, and Measurement of Estimation Risk, *Journal of Financial and Quantitative Analysis* 31, 69-84.

Claus, J. and J. Thomas, 2001, Equity Premia as Low as Three Percent? Evidence from Analysts' Earnings Forecasts for Domestic and International Stock Markets, *Journal of Finance* 56, 1629-1666.

Coller, M. and T.L. Yohn, 1997, Management Forecasts and Information Asymmetry: An Examination of Bid-Ask Spreads, *Journal of Accounting Research* 35, 181-191.

Comment, R. and G.A. Jarrell, 1991, The Relative Signalling Power of Dutch-Auction and Fixed-Price Self-Tender Offers and Open-Market Share Repurchases, *Journal of Finance* 46, 1243-1271.

Conroy, R.M. and R.S. Harris, 1995, Analysts' Earnings Forecasts in Japan: Accuracy and Sell-Side Optimism, *Pacific-Basin Finance Journal* 3, 393-408.

Cook, D.O., L. Krigman, and J.C. Leach, 2004, On the Timing and Execution of Open Market Repurchases, *Review of Financial Studies* 17, 463-498.

Copeland, T.E. and D. Galai, 1983, Information Effects on the Bid-Ask Spread, *Journal of Finance* 38, 1457-1469.

Dann, L., 1981, Common Stock Repurchases: An Analysis of Returns to Bondholders and Stockholders, *Journal of Financial Economics* 9, 113-138.

Demsetz, H., 1968, The Cost of Transacting, *Quarterly Journal of Economics* 82, 33-53.

Dhaliwal, D., L. Krull, O.Z. Li, and W. Moser, 2005, Dividend Taxes and Implied Cost of Equity Capital, *Journal of Accounting Research* 43, 675-708.

Dhaliwal, D., S. Heitzman, and O.Z. Li, 2006, Taxes, Leverage, and the Cost of Equity Capital, *Journal of Accounting Research* 44, 691-723.

Diamond, D.W. and R.E. Verrecchia, 1991, Disclosure, Liquidity, and the Cost of Capital, *Journal of Finance* 46, 1325-1359.

Dittmar, A.K., 2000, Why do Firms Repurchase Stock? *Journal of Business* 73, 331-355.

Dugar, A. and S. Nathan, 1995, The Effect of Investment Banking Relationships on Financial Analysts' Earnings Investment Recommendations, *Contemporary Accounting Research* 12, 131-160.

Dumontier, P. and B. Raffournier, 1998, Why Firms Comply Voluntarily with IAS: an Empirical Analysis with Swiss Data, *Journal of International Financial Management and Accounting* 9, 216-245.

Easley, D. and M. O'Hara, 2004, Information and the Cost of Capital, *Journal of Finance* 59, 1553-1583.

Easterbrook, F.H., 1984, Two Agency-Cost Explanations of Dividends, *American Economic Review* 74, 650-659.

Easton, P.D., 2004, PE Ratios, PEG Ratios, and Estimating the Implied Expected Rate of Return on Equity Capital, *The Accounting Review* 79, 73-95.

Easton, P.D. and G.A. Sommers, 2006, Bias in Expected Rates of Return Implied by Analysts' Earnings Forecasts, Working Paper, University of Notre Dame.

Elton, E.J., 1999, Expected Return, Realized Return, and Asset Pricing Tests, *Journal of Finance* 54, 1199-1220.

Falkenstein, E., 2000, Similarities and Differences between Public and Private Firm Risk, *Commercial Lending Review* 15, 25-30.

Fama, E.F. and K.R. French, 1992, The Cross-Section of Expected Stock Returns, *Journal of Finance* 47, 427-465.

Fama, E.F., and K.R. French, 1993, Common Risk Factors in the Returns on Stocks and Bonds, *Journal of Financial Economics* 33, 3-56.

Fama, E.F. and K.R. French, 1997, Industry Costs of Equity, *Journal of Financial Economics* 73, 153-193.

Fama E.F. and K.R. French, 2001, Disappearing Dividends: Changing Firm Characteristics or Lower Propensity to Pay? *Journal of Financial Economics* 60, 3-43.

Fenn, G.W. and N. Liang, 2001, Corporate Payout Policy and Managerial Stock Incentives, *Journal of Financial Economics* 60, 45-72.

Francis, J., R. LaFond, P. Olsson, and K. Schipper, 2005, The Market Pricing of Accruals Quality, *Journal of Accounting and Economics* 39, 295-327.

Gebhardt, W.R., C.M.C. Lee, and B. Swaminathan, 2001, Toward and Implied Cost of Capital, *Journal of Accounting Research* 39, 135-176.

Ginglinger, E. and J. Hamon, 2007, Actual Share Repurchases, Timing and Liquidity, *Journal of Banking and Finance* 31, 915-938.

Glosten, L.R. and P.R. Milgrom, 1985, Bid, Ask and Transaction Prices in a Specialist Market with Heterogeneously Informed Traders, *Journal of Financial Economics* 14, 71-100.

Gode, D. and P. Mohanram, 2003, Inferring the Cost of Capital Using the Ohlson-Juettner Model, *Review of Accounting Studies* 8, 399-431.

Gray, P., P. Koh, and Y.H. Tong, 2007, Accruals Quality, Information Risk and Cost of Capital: Evidence from Australia, Working Paper, Hong Kong University of Science and Technology.

Grullon, G. and D.L. Ikenberry, 2000, What Do We Know about Stock Repurchases? *Journal of Applied Corporate Finance* 13, 31-51.

Grullon, G. and R. Michaely, 2002a, Dividends, Share Repurchases, and the Substitution Hypothesis, *Journal of Finance* 57, 1649-1684.

Grullon, G. and R. Michaely, 2002b, The Information Content of Share Repurchase Programs, Working Paper, Rice University.

Guay, W., S.P. Kothari and S. Shu, 2005, Properties of the Implied Cost of Equity Using Analysts' Forecasts, Working Paper, University of Pennsylvania.

Guedhami O. and D. Mishra, 2007, Excess Control, Corporate Governance, and Implied Cost of Equity: International Evidence, Working Paper, Memorial University of Newfoundland and University of Saskatchewan.

Hail, L. and C. Leuz, 2006, International Differences in the Cost of Equity Capital: Do Legal Institutions and Securities Regulation Matter? *Journal of Accounting Research* 44, 485-531.

Hall, B.J. and J.B. Liebman, 1998, Are CEOs Really Paid Like Bureaucrats? *Quarterly Journal of Economics* 113, 653-691.

Handa, P. and S.C. Linn, 1993, Arbitrage Pricing with Estimation Risk, *Journal of Financial and Quantitative Analysis* 28, 81-100.

Healy, P.M., A.P. Hutton, and K.G. Palepu, 1999, Stock Performance and Intermediation Changes Surrounding Sustained Increases in Disclosure, *Contemporary Accounting Research* 16, 485-520.

Hribar, P., N.T. Jenkins, and W.B. Johnson, 2006, Stock Repurchases as an Earnings Management Device, *Journal of Accounting and Economics* 41, 3-27.

Ikenberry, D., J. Lakonishok, and T. Vermaelen, 1995, Market Underreaction to Open Market Share Repurchases, *Journal of Financial Economics* 39, 181-208.

Ikenberry, D., J. Lakonishok, and T. Vermaelen, 2000, Stock Repurchases in Canada: Performance and Strategic Trading, *Journal of Finance* 55, 2373-2397.

Jagannathan, M. and C.P. Stephens, 2003, Motives for Multiple Open-Market Repurchase Programs, *Financial Management* 32, 71-91.

Jagannathan, M., C.P. Stephens, and M.S. Weisbach, 2000, Financial Flexibility and the Choice Between Dividends and Stock Repurchases, *Journal of Financial Economics* 57, 355-384.

Jensen, M.C., 1986, Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers, *American Economic Review* 76, 323-329.

Jensen, M.C. and W.H. Meckling, 1976, Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure, *Journal of Financial Economics* 3, 305-360.

Kirch, D.P., R. BarNiv, and L.J. Zucca, 1998, Investment Strategies Based on Completion of Open Market Repurchase Programs, *Journal of Financial Statement Analysis* 3, 5-13.

Kyle, A.S., 1985, Continuous Auctions and Insider Trading, *Econometrica* 53, 1315-1335.

La Porta, R., 1996, Expectations and the Cross-Section of Stock Returns, *Journal of Finance* 51, 1715-1742.

Lambert, R.A., W.N. Lanen, and D.F. Larcker, 1989, Executive Stock Option Plans and Corporate Dividend Policy, *Journal of Financial and Quantitative Analysis* 24, 409-425.

Leland, H.E. and D.H. Pyle, 1977, Information Asymmetries, Financial Structure, and Financial Intermediation, *Journal of Finance* 32, 371-387.

Leuz, C. and R.E. Verrecchia, 2000, The Economic Consequences of Increased Disclosure, *Journal of Accounting Research* 38, 91-124.

Lie, E. and H.J. Lie, 1999, The Role of Personal Taxes in Corporate Decisions: An Empirical Analysis of Share Repurchases and Dividends, *Journal of Financial and Quantitative Analysis* 34, 533-552.

Makridakis, S. and R.L. Winkler, 1983, Averages of Forecasts: Some Empirical Results, *Management Science* 29, 987-996.

Mauboussin, M.J., 2006, Clear Thinking About Share Repurchases, *Legg Mason Capital Management*.

Miller, M.H. and K. Rock, 1985, Dividend Policy Under Asymmetric Information, *Journal of Finance* 40, 1031-1051.

Mishra, D., M. Racine, and L. Schmidt, 2007, Credibility of Corporate Announcements and Market Reaction: Evidence from Canadian Share Repurchase, Working Paper, University of Saskatchewan.

Modigliani, F. and M.H. Miller, 1958, The Cost of Capital, Corporation Finance and the Theory of Investment, *American Economic Review* 48, 261-297.

Moore, J.M., 2005, Stock Repurchases in Canada: The Effect of History and Disclosure, Working Paper, University of Waterloo.

Oded, J., 2005, Why do Firms Announce Open-Market Repurchase Programs? *Review of Financial Studies* 18, 270-300.

Ohlson, J.A., 2000, Residual Income Valuation: The Problems, Working Paper, New York University.

Ohlson, J.A. and B.E. Juettner-Nauroth, 2005, Expected EPS and EPS Growth as Determinants of Value, *Review of Accounting Studies* 10, 349-365.

Poshakwale, S. and J.K. Courtis, 2005, Disclosure Level and Cost of Equity Capital: Evidence from the Banking Industry, *Managerial and Decision Economics* 26, 431-444.

Schmidt, L., 2006, Credibility of Corporate Announcements and Market Reaction: Evidence from Canadian Share Repurchase Programs, Master's Thesis, University of Saskatchewan.

Stephens, C.P. and M.S. Weisbach, 1998, Actual Share Reacquisitions in Open-Market Repurchase Programs, *Journal of Finance* 53, 313-333.

Securities and Exchange Commission, Purchases of Certain Equity Securities by the Issuer and Others, Release Nos. 33-8335; 34-48766; IC-26252; File No. S7-50-02. Retrieved on October 30, 2007 from: http://www.sec.gov/rules/final/33-8335.htm

TSX Company Manual, Part VI Changes in Capital Structure of Listed Issuers, L. Normal Course Issuer Bids, Sec. 628. General. Retrieved on May 30, 2008 from: http://tsx.complinet.com/en/display/display_main.html?rbid=2072&element_id=565

TSX Company Manual, Part VI Changes in Capital Structure of Listed Issuers, L. Normal Course Issuer Bids, Section 629 Special Rules Applicable to Normal Course Issuer Bids. Retrieved on May 30, 2008 from: http://tsx.complinet.com/en/display/display.html?rbid=2072&element_id=566

Vermaelen, T., 1981, Common Stock Repurchases and Market Signalling: An Empirical Study, *Journal of Financial Economics* 9, 139-183.

Weisbenner, S.J., 2000, Corporate Share Repurchases in the 1990s: What Role Do Stock Options Play? Working Paper, Federal Reserve Board.

Welker, M., 1995, Disclosure Policy, Information Asymmetry, and Liquidity in Equity Markets, *Contemporary Accounting Research* 11, 801-827.

White, H., 1980, A Heteroskedasticity-consistent Covariance Matrix Estimator and a Direct Test for Heteroskedasticity, *Econometrica* 48, 817-838.

Witmer, J. and L. Zorn, 2007, Estimating and Comparing the Implied Cost of Equity for Canadian and U.S. Firms, Working Paper, Bank of Canada.

APPENDIX A
APPENDIX OF DIAGNOSTICS

White's Test (test for heteroskedasticity)

DF	ChiSq	Probability
44	62.870	0.0323

Q-test (test whether residuals are white noise)

Summary Statistics of Residuals	
Mean	1.64E-17
Standard Deviation	0.0271
Number of Observations	154

Autocorrelation Check for White Noise

ToLags	ChiSq	DF	ProbChiSq	Autocorrelations					
6	10.621	6	0.101	0.129	0.118	0.135	0.100	0.060	0.066
12	15.976	12	0.192	-0.040	-0.031	-0.117	-0.075	-0.095	-0.036
18	27.874	18	0.064	-0.023	-0.112	0.112	0.139	-0.065	0.138
24	35.286	24	0.064	0.103	0.012	0.145	-0.050	0.045	-0.068