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**THE DIVIDEND AND SHARE REPURCHASE POLICIES OF CANADIAN FIRMS:
EMPIRICAL EVIDENCE BASED ON A NEW RESEARCH DESIGN**

We empirically investigate dividend and share repurchase policies of Canadian firms. We use several logit regression analyses to test the structure and determinants of the dividend and share repurchase choice. We have sent a questionnaire to the 500 largest non-financial Canadian companies listed on the Toronto Stock Exchange, of which 191 usable responses were returned. These data are used to measure firm characteristics. Our results are consistent with a structure in which the company first decides whether it wants to pay out cash to its shareholders or not. In the second stage the firm decides on the form of the payout: dividends, share repurchases or both. Payout is determined by free cash flow. The type of payout depends on behavioral and tax preferences. Furthermore, the payout is less likely to be dividends if the company has executive stock option plans. Finally, we find evidence for the Brennan and Thakor (1990) model. According to this model the existence of asymmetric information amongst outsiders is associated with a preference for dividend payments over share repurchases.

1. Introduction

During their lifetime virtually all firms pay out cash to their shareholders at some point in time. Most firms regularly pay out dividends. An alternative for paying dividends is to repurchase shares from the shareholders. In this paper we empirically investigate the determinants of dividends and share repurchases for Canadian companies. We study three different types of models. The first model follows most of the existing theoretical and empirical literature in which dividends and share repurchases are studied in isolation. The second model allows dividends and share repurchases to influence each other. The third model uses a novel approach. In the first stage of this model the question is studied whether the company wants to pay out cash or not. If the firm decides to pay out cash then in the second stage the form of the payment is determined. This payment can be in the form of dividends and/or in the form of share repurchases, from now on to be referred to as share buy-backs (SBBs). By comparing these different models we can shed more light on the question whether the company sequentially decides on the payout question and on the form of the payout or whether the firm simultaneously decides on both the payout and on the form of the payout. In studying these models we also take the determinants of the payout and the form of the payout into account.

There is a large amount of theoretical literature on dividend and SBB policies. From this literature it can be concluded that free cash flow is an important factor in the payout decision. A company that has funds available for which it does not have positive net present value projects available is likely to pay out these funds. This payout can either be in the form of dividends, as a SBB or both. The most important distinguishing factor between the form of payout consists of taxes. Canadian corporations enjoy a tax advantage for the receipt of dividends. Canadian individuals enjoy a tax advantage if dividends are received at the same time as capital gains. However, capital gains can be deferred to the future. For this reason individuals, much like in the United States, may still have a preference for capital gains over dividends (see e.g. Davis and Pinches, 1997 or Ross et al., 1999). Other important factors that distinguish between dividends and SBBs are managerial option plans, the behavioral preference for dividends, asymmetric information between outsiders and the underpricing of shares. Managerial option plans are expected to reduce dividends, because dividends reduce the stock price and therefore the value of the options (Lambert, Larcker and Larcker, 1989). Similarly they induce SBBs because they are expected to increase stock prices (see Vermaelen, 1984). The behavioral preference for dividends is based on the theory of Shefrin and Statman (1984). Their theory states that individual investors have a preference for cash dividends over selling part of their stock. Brennan and Thakor (1990) present a model in which shareholders are differently informed about the firm. In this model large shareholders have a greater incentive to be informed about the firm's activities. This leads to a result where stock repurchases are associated with a wealth redistribution from small to large shareholders. Consequently, large shareholders prefer non pro-rata repurchases and smaller

shareholders have a preference for cash dividends. A specific reason for a firm to engage in a SBB is that if shares are undervalued, management may consider the firm's own stock as an attractive investment opportunity (see, e.g., Ikenberry, Lakonishok and Vermaelen, 1995).

In the empirical literature on dividend and SBB policies, both types of payout are generally considered in isolation. The empirical studies largely rely on capital market data. A large number of studies reveal that dividend increases are associated with positive abnormal returns. Dividend decreases are associated with (larger) negative abnormal returns¹. Similarly, announcements of share repurchase programs are associated with positive abnormal returns². In his seminal paper, Lintner (1956) finds that companies have a target payout ratio. Firms seek to maintain stable dividend payouts by changing or adapting them each year by only a fraction of the change indicated by earnings in conjunction with the target payout ratios. These results are also confirmed in questionnaire studies by Baker, Farrelly and Edelman (1985) for the United States and Jog and Srivastava (1994) for Canada. Another interesting finding from the study by Baker, Farrelly and Edelman (1985) is that several clientele effects exist. More specifically, they find that investors have different perceptions on the relative riskiness of dividends and retained earnings and that stockholders are attracted to firms with dividend policies appropriate to their tax environment. An empirical study by Lambert, Lanen and Larcker (1989) demonstrates that firms decrease their dividend payment after the adoption of executive stock option plans. The empirical literature pays little attention to the trade-off between dividends and SBBs. The only exception is the paper by Jagannathan, Stephens and Weisbach (1999). They study companies from the United States that increase the total payment to their shareholders in the form of dividends, SBBs or both. In their paper they investigate which factors determine whether the increased payout is caused by higher dividends, a larger amount of SBBs or both. Jagannathan, Stephens and Weisbach (1999) find evidence for their hypothesis that companies will only choose for dividends if the higher payout is permanent. These results are also consistent with Lintner's theory.

In our paper we study the dividend and SBB policies of Canadian firms. This country is of particular interest since share repurchase programs often occur. These programs usually have the form of open market repurchases. Unlike in the United States, Canadian companies need approval from the exchange for such a program. In the United States it is common to find that companies announce a repurchase program and subsequently buy back little or no shares³. Given the pre-approval screening process, this is not likely to be the case in Canada (Ikenberry, Lakonishok and Vermaelen, 1997). Another interesting aspect of the Canadian

¹ See e.g. Ang (1987) for an overview.

² See e.g. Dann (1981), Vermaelen (1981), and Comment and Jarrell (1991) for the United States and Li and McNally (1999) for Canada.

³ See Ikenberry, Lakonishok and Vermaelen (2000), and Li and McNally (1999) for a detailed discussion of the differences between U.S. and Canadian share repurchase programs.

market is that a large number of firms does not pay dividends⁴. The combination of these two facts lead to an interesting sample that includes companies that only pay dividends, companies that are only engaged in SBBs, companies that are engaged in both and companies that do not pay out any funds.

The methodology used in this paper consists of two steps. In the first step the variables are measured and in the second step the relationship between the variables is estimated. The variables are collected using a questionnaire. This questionnaire consists of simple questions that aim at measuring the characteristics of the firm and the composition of the shareholder structure. In order to reduce the respondent's bias, we ask multiple questions for some variables and we use the average score. Using the data of the firm's characteristics and shareholder structures we apply a diversity of models and regression techniques to determine the relationships. First, we use standard logit regressions in order to investigate the choice between paying dividends or not, and buying back shares or not. Second, we use a simultaneous logit model in which we explicitly deal with the potential trade-off between dividends and share buy-backs. Third, we test a nested logit model in which managers initially choose to pay out or not, and, if they pay out, whether they choose dividends, share buy-backs, or both. Finally, we compare the performance of the different models. A major advantage of our approach is that it allows us to use private data. The data give us the possibility to test, for example, agency theories and to assess the impact of underpricing as perceived by the managers. Accounting and stock market data are in general insufficiently informative in this respect. It is important to notice that our approach differs from the approach used in other studies that use questionnaire data. Previous questionnaire studies on dividend policy, by, e.g., Baker, Farrelly and Edelman (1985) and Jog and Srivastava (1994) use questionnaires to obtain data on the relationship between firm characteristics. In our paper the relationships are estimated from the information about the firm characteristics. This leads to another advantage of our approach, the respondent's bias is minimized because the respondents are not asked to judge on the relevance of the theoretical relationships. Instead they are asked questions about simple characteristics of the firm.

The questionnaire was sent to the 500 largest non-financial Canadian firms listed at the Toronto Stock Exchange (TSE). In total 191 usable responses were received (38.2%). We find that over the year 1997 41% of the firms paid dividends and that over the 3-year period preceding the questionnaire, 35% of the firms were engaged in at least one share buy-back. The most important results of the standard and simultaneous logit models are that dividend payments are significantly positive related to the existence of tax and behavioral preferences. Dividend payments are also significantly negative related to managerial option plans. SBBs are significantly positive related to free cash flow and the tax preference for SBBs. They are

⁴ La Porta et al. (2000) calculate a median dividend payout ratio for Canadian firms of 19.78%. This is one of the lowest dividend payout ratios in their sample of 33 countries. Only the Philippines (10.47%), Denmark (17.27%), Spain (18.33%) and South Korea (18.49%) have lower dividend payout ratios.

significantly negative related to the existence of asymmetric information amongst outsiders. Confirming these results, the

two-stage logit model shows a significantly positive relation between free cash flow and payout. In the second stage of this model we find a significantly positive relation between dividends and tax and behavioral preferences and between SBB and the tax preferences. Furthermore, we find a negative relation between managerial option plans and dividend payments. This model also shows a strong confirmation of the Brennan and Thakor (1990) model that the existence of asymmetric information between outsiders is associated with a preference for dividend payments over SBBs. A comparison of model selection criteria shows that this third model, the two-stage logit model, is the preferred model.

The remainder of this paper is structured as follows. In section 2 we describe theories that can explain the dividend and share buy-back policies of Canadian firms. In section 3 we discuss the empirical methodology of this paper. In section 4 we describe the data. The empirical results of our analysis are included in section 5. We provide a summary and conclusions in section 6.

2. Dividend and share buy-back theories

2.1. Introduction

There are three ways to look at dividend and share buy-back policies. These three ways can be translated into three different models. These models are presented in Figure 1.

[Please Insert Figure 1 here]

The first possibility is to consider both policies in isolation. Some theories explain dividend payments. Other theories explain share buy-backs. This possibility is translated into model I. In this model firms choose whether to pay dividends or not, independently from the SBB decision. They also choose whether to buy back shares or not, independently from the dividend decision. Hence, these two decisions are unrelated. This framework is in line with many theories and empirical studies that are based on the assumption that dividends and share buy-backs are unrelated. The second possibility is that dividends and SBBs influence each other. The idea is that if a company pays dividends it may decide not to buy back shares and vice versa. In model II we include this possibility. In this model it is investigated whether dividends and SBBs substitute each other, the two decisions are modeled as related decisions. Of course, model I is encompassed by model II. The third possibility is that a company first decides whether it wants to pay back to its shareholders. After this decision is taken, the company decides on the method of payment. The payment can be a dividend payment, a share buy-back program or a combination of both. This possibility translates itself into model III where it is assumed that management first decides whether to pay out funds or not. If they decide to pay out, then in the second stage the type of payout is determined. Model III describes sequential decisions. We will keep the

distinctions between the payout or no payout and between the dividend and SBB decision in mind when discussing the theories. For each theory we will ask ourselves whether it is only driven by the wish to pay back cash to the shareholders or whether it is also driven by the specific wish to do it by dividend payment or by a buy back program.

2.2. The Miller and Modigliani irrelevance proposition

In their seminal paper Miller and Modigliani (1961) show that in a perfect and complete capital market the dividend policy of a firm does not affect its value. The underlying idea is that any desired stream of payments can be replicated by the stockholder by purchasing and selling equity. The conclusion that dividend policy is irrelevant in perfect and complete capital markets directly leads to the question whether dividend policy is relevant if market imperfections exist and/or if markets are incomplete. A similar reasoning applies to share buy-backs. These are also irrelevant in perfect and complete capital markets, but they may be relevant if these conditions do not hold.

2.3. Free cash flow

Free cash flow is the cash flow that remains after all positive net present value projects are undertaken (Jensen, 1986). The residual theory states that a firm will pay out its free cash flow to its shareholders. The direct hypothesis in our model is that the existence of free cash flow induces a payout. The indirect hypothesis is that the existence of free cash flow induces both dividends and share buy-backs.

2.4. Overinvestment

According to the overinvestment theory of Jensen (1986) managers aim for expanding their firm. The reason for this is that managers consider a large firm to be more prestigious than a small firm. They will pursue this goal even if they have to accept negative net present value projects. This is obviously not in the interest of the existing shareholders. Black (1976) argues that the overinvestment problem can be mitigated by paying dividends, because they reduce the amount of free cash flow. Easterbrook (1984) argues that dividends reduce the overinvestment problem because the payment of dividends increases the frequency with which firms have to go to equity markets in order to raise additional capital. In the process of attracting new equity, firms subject themselves to the monitoring and disciplining of these markets. This lowers agency costs. A share buy-back also reduces the amount of free cash flow, suggesting that overinvestment also positively influences share buy-backs. Those firms that are more likely to overinvest should pay out more. However, the managers of such firms will only pay out more if they have an incentive to do so. Therefore, we expect a positive relationship between overinvestment and payout if there is effective governance. Overinvestment also has an indirect relation with both dividends and share buy-backs. These indirect relationships are hypothesized

to be positive given effective monitoring and effective governance.

2.5. Managerial shareholdings

Managers have a preference not to pay out funds, because they enjoy the discretion over free cash flow. If managers own more shares, they are in a better position to keep funds within the firm (see e.g. Eckbo and Verma, 1994). For this reason we expect a negative relation between payout and managerial ownership. Therefore, the direct hypothesis is that the presence of managerial shareholdings prevents a payout. The indirect hypothesis is that the existence of managerial shareholdings prevents both dividends and share buy-backs.

2.6. Transaction costs on the company level

If companies pay dividends and at the same time attract new equity, substantial transaction costs are being made. Of course, this argument also holds for share buy-backs. Therefore, we expect a direct negative relationship between the amount of transaction costs that need to be made to attract new shares and payout. This also leads to negative indirect relations between transaction costs and dividends and between transaction costs and SBBs.

2.7. Transaction costs on the stockholder level

An investor who wants to receive a regular income from his security holdings has a choice between buying dividend paying stocks and cashing in the dividends, and buying non-dividend paying stocks and regularly selling a part of his portfolio. For a small individual investor the transaction costs of cashing in dividends may be significantly smaller than the transaction costs associated with selling a part of the stocks⁵. For this reason, a company may have a transaction costs clientele that finds the payment of dividends important. We expect that this holds for firms with relatively many small private investors.

2.8. Asymmetric information between managers and outsiders

A major question is whether information asymmetries determine the dividend and SBB decisions. Bhattacharya (1979) and Miller and Rock (1985) argue, as pioneers, that information asymmetries between firms and outside shareholders may induce a signalling role for dividends. They show that dividend payments communicate private information in a fully revealing manner. The most important element in their theory is that firms have to pay out funds regularly. Therefore, a similar reasoning applies to recurrent SBBs. This leads to the direct hypothesis that a larger information asymmetry between managers and outsiders leads to a higher payout. The indirect hypothesis that follows is that a larger information asymmetry induces both

⁵ See e.g. Allen and Michaely (1995).

higher dividends and more SBBs.

2.9. Asymmetric information amongst outsiders

Brennan and Thakor (1990) present a model in which shareholders are differently informed about the firm's activities. In their model there is a fixed cost of collecting information. Therefore, large shareholders will have a greater incentive to become informed about the firm's activities than small shareholders. The result is that stock repurchases will be associated with a redistribution of wealth from small shareholders to large shareholders. For this reason our direct hypothesis is that a majority of the firm's shareholders may prefer dividend payments over SBBs⁶.

2.10. Managerial option plans

Managerial option plans are generally not dividend protected. Murphy (1998) finds that only 1.1% of stock option plans by US firms are dividend protected. This implies that dividends decrease the value of executive stock options. Therefore, management has an incentive to reduce dividends in order to increase the expected value of their options. Lambert, Lanen and Larcker (1989) study the dividend behavior of 221 US firms just after they adopted managerial stock option plans. Their results show that firms decrease the level of dividends, relative to the level of expected dividends, after the adoption of an executive stock option plan. Therefore, we hypothesize a negative relation between managerial option plans and dividends. On the other hand, we hypothesize a positive relation between managerial option plans and SBBs. The reason for this is that the announcements of SBBs are associated with an increase in stock prices. In turn, this leads to higher values of executive stock options (see Vermaelen, 1984).

2.11. Taxes

Taxes are an important market imperfection. Canadian public corporations do not pay taxes on cash dividends received from the investment in another taxable Canadian firm. However, if they receive capital gains from selling the stock, they are taxed at 75% of the firm's marginal tax rate. In other words, dividends carry an important tax advantage for Canadian public corporations.

The taxation of dividends received by Canadian individuals is organized in the following way (see

⁶ Brennan and Thakor (1990) assume that shareholders are differently informed about the prospects of a firm due to the fact that the collection of information by investors is costly. They argue that the main difference between dividends and non-proportionate SBBs is that only non-proportionate SBBs may affect the ownership structure. This change in rights has implications for each investor's wealth. Consequently, a shareholder has to decide either to collect costly new information or to run the risk of expropriation of wealth by better informed investors. The hypothesis is that for these reasons firms are less likely to opt for SBBs when the information heterogeneity amongst shareholders is larger. Asymmetric information amongst shareholders may have an indirect effect on dividends. The idea is that a smaller or an absent SBB program may induce a higher dividend level. Practically all Canadian SBBs are open market repurchases, and hence are non-proportionate SBBs.

e.g. Davis and Pinches, 1997 or Ross et al., 1999). The dividends received from taxable Canadian corporations are first grossed up with 25% in order to arrive at the taxable dividend. The outcome is taxed at the marginal federal income tax rate. Then a dividend tax credit of 13.33% is allowed to be deducted from the federal income tax in arriving at the net federal tax payable. Finally a provincial tax is added to the federal tax. If the individual would receive an income from capital gains instead of from dividends, he would be taxed for 75% of his marginal tax rate. In Appendix A an example is presented for an Ontario resident who receives Can. \$ 10,000 of taxable dividends from a Canadian corporation. We also study the case where he receives Can. \$ 10,000 of capital gains from the sale of Canadian stock instead. In this example, the individual is, for tax reasons, better off with dividends than with capital gains. This is also the normal case for a typical individual Canadian investor (see Davis and Pinches, 1997 and Ross et al., 1999). However, it is important to notice that capital gains can be deferred to the future. If they are deferred far enough into the future, the present value of the capital gains taxes is relatively small. Most Canadian SBBs are open market repurchases. The capital gains realized by the investors in these repurchases are treated as ordinary capital gains⁷. Although capital gains that are realized in an open market repurchase are taxed less favorably than dividends, they still carry a tax advantage. This tax advantage consists of the fact that an individual investor can decide whether to sell her shares or not. With a dividend payment, all private investors receive a payment that is subject to income tax.

2.12. Behavioral finance

Shefrin and Statman (1984) develop a theory of dividends based on the idea that, even if the amount of cash received is the same, it can still make a difference for the investor whether the cash comes in the form of dividends, share repurchases, or in the form of selling part of the investors securities. Their model is not based on utility maximization, but on a behavioral theory. In their theory, investors want dividends because of self control. This argument comes down to investors wanting to restrict themselves from consuming too much in the present. They do not want to dip into capital and, therefore, they only allow themselves to consume current income such as dividends. The effect described by Shefrin and Statman (1984) is especially strong for elderly (retired) investors, as they have less income from labor. For this reason they rely more heavily on income from their securities holdings. Shefrin and Statman (1984) refer to this as the behavioral life cycle⁸.

⁷ If the shares are not repurchased on the open market, the situation is more complex. If a Canadian investor is dealing at "arm's length" with the company, the sale is also treated as a capital gain. In other cases, Revenue Canada can treat the SBB as a combination of a "deemed dividend", a capital gain and an untaxed return of "paid-up capital".

⁸ Shefrin and Statman (1984) argue that their theory is supported by the outcomes of a study from Lease, Lewellen and Schlarbaum (1976) who find that elderly persons have a stronger preference for dividend paying stocks than younger persons.

2.13. The undervaluation of the firms shares

Ikenberry, Lakonishok and Vermaelen (1995) argue that an important reason for managers to buy back shares is that their shares are undervalued. Managers consider their own stock as an attractive investment. For this reason, managers of undervalued firms may prefer a share buy-back over paying cash dividends and over no payout.

2.14. A summary of the hypotheses

In this sub-section we summarize the theories on dividend payments and SBBs. We show how these theories fit in the different models that we test. The three alternative models that managers may use in the payout choice are included in Figure 1 (see sub-section 2.1). Based on the distinction between (un)related dividend and SBB decisions and the sequential payout and type of payout decisions, it is possible to attribute theories and hypotheses to the models. The hypotheses are described in Table 1.

[Please insert Table 1 here]

The direct hypotheses are included in panel A of Table 1. Columns (2) and (3) reflect models I and II. These columns refer to respectively the dividend decision and the SBB decision. The negative sign for SBBs in column (2) indicates the hypothesized trade-off between the two forms of payout. The negative sign for managerial option plans reflects the hypothesized negative relation between the existence of managerial option plans and the possibility of a dividend payment (see sub-section 2.10). In addition, the dividend choice is positively influenced by the transaction costs on the stockholder level (2.7), the tax preference (2.11) and the behavioral preference (2.12). Next to measuring the perceived tax and behavioral preferences, we have also asked for the actual existence of clienteles. For example, we asked for the presence of public corporations amongst the shareholders. If they are heavily presented, the firm has a tax clientele for public corporations. Other clienteles included are the retired persons clientele, that is based on the behavioral preference for dividends, and the small investor clientele, that is based on the importance of transaction costs for small parties. In column (3) we see that the direct determinants of SBBs are the trade-off with dividends, underpricing (2.13), managerial option plans (2.10) and the tax preference for SBBs (2.11).

Model III is described in columns (4) and (5). First we describe in column (4) the theories that deal with the payout decision. In this column we include free cash flow (2.3), overinvestment (2.4), managerial shareholdings (2.5), transaction costs on the company level (2.6) and asymmetric information between managers and outsiders (2.8). In column (5) we include the single hypothesis that directly refers to the type of payout, i.e. asymmetric information amongst outsiders (2.9).

In the second part of Table 1, panel B, both the direct and the indirect hypotheses are included. The indirect hypotheses, which are in parentheses, are all derived from the direct hypotheses. For example, the direct hypothesis for free cash flow is that its existence will lead to a payout (model III). This leads to indirect

hypotheses for dividend payment and share buy-backs (models I and II).

3. Methodology

3.1. Introduction

In order to test the theories discussed in section 2, we empirically examine the relevant determinants of payout policies. The empirical methodology should provide information about why managers pay dividends and why they buy back shares. In addition, the methodology should also provide insight into the sequential decision moments with respect to the payout decision. Two requirements are put on our methodology. First, the methodology must allow for different decision-making processes. It should be possible to test three structures, (i) unrelated decisions (i.e. dividend and buy back choice are not related), (ii) simultaneous decisions (i.e. dividend and buy back choices are mutually related), and (iii) sequential decisions (i.e. firms first decide on whether to pay out or not, and thereafter choose between dividends and share buy backs). We use three different logit models to capture these three decision-making processes. The second requirement is that the methodology must allow for a comparison of the predictive power of these three logit models. Below we discuss the three logit models and the model selection methods.

3.2. Logit analyses

3.2.1. Introduction

We model the dividend and payout policy as two discrete choices for which we apply several logit models. With such models it can be examined why a firm pays out dividends or not, and why a firm purchases back shares or not. The base case is a two-choice and one-equation model, which we discuss in subsection 3.2.2. A more general model is the simultaneous decision model, in which two mutually related bivariate models are tested. We describe this simultaneous decision model in subsection 3.2.3. The third model is a sequential decision model. In the first step the model determines whether the firm pays out money. In the second step, the model describes whether the firm chooses for dividend, share buy back or both. We describe in subsection 3.2.5. several measures that let us compare the power of the three different models.

3.2.2. Unrelated decisions: single logit equations

The dividend and share buy-back decisions can be considered as two separate processes. The firm chooses to pay dividends independently of the current SBB policy and vice versa. One choice is between dividend (D) and no dividend (ND). The other choice is between share buy-back (S) and no share buy-back (NS). The choice between the alternatives within each process is based on the relative attractiveness, which

can be modeled by utility functions. Binary response models are used to model such dichotomous decisions. In this subsection we explain them by means of the dividends versus no-dividend model. Substitution of the subscript S for D gives the share buy back process. For firm i the total utility U_{iD} associated to paying dividend is,

$$U_{iD} = v_{iD} + e_{iD} \quad (1)$$

where v_{iD} denote the systematic component and e_{iD} the error term, which is unknown to the researcher and known to the firm. The idea behind the use of binary response models to describe the dividend policy is that a firm i pays dividends only if U_{iD} is higher than a particular threshold. In general a linear specification is assumed for the systematic part, i.e.

$$v_{iD} = \sum_k x_{iDk} \cdot b_k^D \equiv x_{iD}' \beta_D \quad (2)$$

where b_k^D are parameters and x_{iDk} firm characteristics that are potentially related to dividend payout. The vectors x_{iD} and β_D contain x_{iDk} and b_k^D , respectively. The standard logit model assumes that the error terms are independently and identically Gumbel distributed. Given this assumption, it can be derived that the probability P_i that a firm i chooses for the payment of dividends is:

$$P_i(D) = \frac{\exp(v_{iD})}{1 + \exp(v_{iD})} \quad (3)$$

The probability $P_i(ND)$ equals $1 - P_i(D)$. Estimates for b_k^D and inference can be obtained by standard maximum likelihood methods. As stated before, in a similar way probabilities derived for $P_i(S)$ and $1 - P_i(NS)$. It is interesting to note that the standard logit model also embodies the case in which firms consider the repayment process as a single process having four outcomes. The easiest way to see this is to verify that the estimation results from the multinomial logit model, which is typically used for this type of choice sets, are about identical to running standard logit regressions on different pairs of outcomes.

3.2.3. Simultaneous decisions: structural logit equation model

The two standard logit models consider the dividend and SBB policy as separate decisions, which do not influence each other. This specification is interesting if we want to uncover the determinants of the two policies. The reason for this is that the two standard logit models can be considered as reduced-form specifications, which are obtained from a simultaneous model that is solved for endogenous variables. In order to understand the way in which the payout process operates, we should also consider the interactions

between the instruments. In other words, we should examine how the system works as a whole by considering the potential trade-off between dividends and SBBs. This suggests that the standard logit model should be extended by incorporating a dividend or share buy back variable in the systematic parts of the two utility functions. Therefore, the utility of dividend payout depends on SBB, and the utility of SBB depends on the dividend payout. These adjustments change the model in a simultaneous equations logit model. The structural-form representation of this model is given by,

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$$\begin{aligned} U_{iD} &= U_{iS} \cdot \gamma_D + x_{iD} \cdot \beta_D + e_{iD} \\ U_{iS} &= U_{iD} \cdot \gamma_S + x_{iS} \cdot \beta_S + e_{iS} \end{aligned} \quad (4)$$

U_{iD} and U_{iS} are the unobserved utilities obtained from dividend payment and share buy-back by firm i . The γ_D and γ_S are parameters and the β_D and β_S are vectors of parameters. Exogenous variables are contained in x_{iD} and x_{iS} . The error terms are denoted by e_{iD} and e_{iS} . The firm knows these error terms, the researcher does not. We only observe whether U_{iD} and U_{iS} are above particular thresholds since we only observe whether the firms pays dividends or not and buys back shares or not.

Since the procedure to obtain estimates for the parameter in a simultaneous equations model with dichotomous variables is not evident, we briefly discuss the essentials. Mallar (1977) examines such simultaneous equations and shows the relationship between the probability that a SBB or a dividend payment occurs, and the structural-form representation. He argues that a two-stage estimator is appropriate to estimate the system using standard techniques for models with dichotomous variables. In the first stage the parameters of the reduced-form representation of (4) are estimated. The estimated parameters are used to obtain consistent estimates U_{iD}^* and U_{iS}^* for U_{iD} and U_{iS} in the right-hand side of (4). In the second stage, after substitution of the estimates U_{iD}^* and U_{iS}^* for U_{iD} and U_{iS} in the right-hand side of (4), the structural-equations representation is estimated. If we assume that e_{iD} and e_{iS} follow the Gumbel distribution then standard logit estimators can be used in stage one and two. Note that in stage two the probabilities are similar as in (3) and its analog for the share buy back decision using,

$$\begin{aligned} v_{iD} &= U_{iS}^* \cdot \gamma_D + x_{iD} \cdot \beta_D \\ v_{iS} &= U_{iD}^* \cdot \gamma_S + x_{iS} \cdot \beta_S \end{aligned} \quad (5)$$

Nelson and Olson (1978) suggest a similar procedure as Mallar (1977) and note that the exact specification of the asymptotic distribution of the parameter estimate is difficult to obtain due to the presence of generated regressors in the second stage. This distribution can be used for the tests of the statistical significance of the parameter estimates. Amemiya (1979) derives the asymptotic distribution and shows that it depends on the

unknown parameters γ_1 and γ_2 and nuisance parameters. We apply the bootstrap method to obtain the distribution of the parameter estimates. Besides simplicity, the advantage of the procedure is that the findings hold for our finite sample. Our bootstrap method draws the error terms in (4) from the Gumbel distribution. In total we obtain 10,000 bootstrap parameter estimates from which we can make inference on the standard errors of our parameter estimates. See Davidson and MacKinnon (1993) and the references therein for an introduction to the bootstrap method.

3.2.4. *Sequential decisions: nested logit model*

Payout to shareholders can be seen as a sequential process in which first a decision is made whether to pay out money to shareholders or not. Correlations between dividends and SBBs can be due to variables that affect both policies. These variables influence the payout and not necessarily whether this occurs by a dividend payment or a share repurchase program. Thereafter, conditional on this first choice, a combination of instruments is selected, i.e. dividend payment only, SBB only, or both. Hence, different variables affect the first and second decision. Ben-Akiva and Lerman (1985, Chapter 10) argue that the nested logit model is a natural choice to model two-stage decision processes. The model is firmly based on utility theory and considers the attractiveness of the alternatives in a way that acknowledges similarities between the instruments⁹.

Decision processes of this kind are frequently encountered in other fields of the academic literature. Examples are the recreation demand literature (see e.g. Morey, 1997, and the literature on consumer theory, e.g. Verboven, 1996). To explain further the ideas behind a nested logit model we provide an example, which is derived from Morey (1997). Consider, an individual who first decides whether he will go fishing or not. This decision may depend on the weather. If he decides to go fishing he might choose between saltwater, lake and river fishing. It is interesting to note that after the decision about fishing or not fishing has been made, the weather might become unimportant. Factors like individual's age and expected catch rate may play a role. Similarly, when the firm has decided to pay out, some variables that are significant for the first stage, might be unimportant for the next stage in which the firm chooses how to pay out.

Let PN and PY denote the first choice of not paying and paying, respectively. The second choice is described by S , D , and DS which denote only share buy-back, only dividend payment and the simultaneous use of both instruments, respectively. Consequently, the choice set is, $C = \{(PN), (PY, S), (PY, D), (PY, DS)\}$.

The nested logit model that describes the choice set C has several underlying assumptions, which will be discussed briefly. In addition, we summarize several general properties of the model. The first important underlying assumption is that the attractiveness of choice c in C is described by utility functions,

⁹ Strictly speaking, the nested logit model does not require that the actual process is a sequential process. The only requirement is that some variables affect groups of decisions.

$$U_{ic} = v_{iPY} + v_{iI} + e_{iPY} + e_{iI} \quad \text{if } c = PY \quad (6)$$

and

$$U_{ic} = v_{iPN} + e_{iPN} \quad \text{if } c = PN \quad (7)$$

where $I \in \{S, D, DS\}$, v_{iPN} , v_{iI} and v_{iPY} are the systematic components of the utility function related to firm i , respectively, and e_{iPN} , e_{iPY} and e_{iI} are the error terms of the utility related to pay out and instrument choice. The firms know these error components, the researcher does not. Note that the error components in the utility functions are correlated, which is not the case in the standard logit and multinomial models. Using Ben-Akiva and Lerman (1985) and their assumptions for the distribution of $(e_{iPN}, e_{iPY}, e_{iS}, e_{iD}, e_{iDS})$, we can derive that

$$P_i(PN) = \frac{\exp[v_{iPN}]}{\exp[v_{iPN}] + \exp[(v_{iPY} + v_{iPY}^*)\mu]} \quad (8)$$

$$P_i(PY) = \frac{\exp[v_{iPY} + v_{iPY}^*\mu]}{\exp[v_{iPN}] + \exp[(v_{iPY} + v_{iPY}^*)\mu]} \quad (9)$$

and

$$P_i(I) = \frac{\exp[v_{iI} + v_{iPY}]}{\sum_{J=S,D,DS} \exp[v_{iJ} + v_{iPY}]} \quad (10)$$

where μ is a scaling parameter of the distribution of U_{ic} and

$$v_{iPN}^* = \ln \sum_I \exp(v_{iI}). \quad (11)$$

The next step is to determine the specification of the systematic components in the utility function. As above, we assume that linear specifications are appropriate, i.e.

$$v_{iPN} = \sum_k a_k x_{ik}^{PN}, \quad v_{iPY} = \sum_k b_k x_{ik}^{PY} \quad \text{and} \quad v_{iI} = \sum_k c_k x_{ik}^I \quad (12)$$

where a_k , b_k and c_k are parameters and x_{ik}^{PN} , x_{ik}^{PY} and x_{ik}^I are explanatory variables.

4. Data description

Although theory provides us with numerous potential determinants, many of these firm characteristics are difficult to measure empirically. We employ questionnaire data to measure these determinants. A questionnaire is very useful since it allows us to use private information of the firm's managers. Hence, the data allow us to test theories that cannot be tested with the use of publicly available information like accounting and stock market data. For example, from section 2 it can be concluded that the perceived preferences of clienteles play a role. The extent to which managers perceive such a clientele to be present cannot be measured with the use of public data. Other topics that specifically call for the use of private data are asymmetric information related theories, e.g., the model of Brennan and Thakor (1990) and the impact of perceived underpricing of the firm' shares as suggested by Ikenberry, Lakonishok and Vermaelen (1995).

Our questionnaire design should avoid respondents bias in two ways¹⁰. First, the questionnaire consists of simple questions that only aim to measure the potential determinants. Hence, no questions are included on the relations that are examined. Second, two or three questions for some determinants are included to diversify idiosyncratic errors. We use the average score of the questions that approximate the same determinant. The use of questionnaire data with several questions for one determinant is widely applied in other fields of science, but not in finance. In the field of corporate finance two studies use a similar methodology. First, De Jong and Van Dijk (2000) empirically investigate the determinants of leverage and agency problems for Dutch companies as well as the relations between leverage and agency problems. As in Titman and Wessels (1988) they use structural equations modelling with latent variables. Titman and Wessels (1998), however, use annual report and capital market data, whereas De Jong and Van Dijk (2000), like the underlying paper, use questionnaire data. Second, Ang and Jung (1993) test the pecking order hypothesis related to capital structure decisions. In their paper questionnaires are used to measure asymmetric information and marginal financing preferences.

The questionnaire was sent out to the 500 largest non-financial Canadian firms listed at the Toronto Stock Exchange¹¹. The firms are identified from the Compact Disclosure Canada Database of October 1997. This database covers more than 8,500 Canadian firms. In order to identify the 500 largest firms we used the Report on Business 1000 list of July 1997. We omitted financial firms, i.e. firms with an SIC-code starting with a six (banks, insurance companies, offices of holding companies, brokers, real estate agencies, etc.). We aimed at having the questionnaires filled in by the CFOs of the firms. For this reason we addressed the questionnaire to the CFO if his or her name was included in the data-set. In case we did not have the name

¹⁰ Appendix B contains the questions of the questionnaire that are used in our analysis.

¹¹ Firm size was measured by market capitalization.

of the CFO, we addressed the questionnaire to the CEO of the firm. The list of officers was used to select the CFO (or the CEO, Vice-president Finance, controller, treasurer, or a combination). The questionnaire was anonymous. Respondents were promised a copy of the research report if they would fill in a separate form containing the name and the address of the respondent. We ensured anonymity by supplying separate return envelopes for the questionnaire and the form for the respondents name, position, and address to obtain the results of the research. The questions deal with firm characteristics such as the presence of managerial option plans, asymmetric information, and the presence of specific clienteles amongst the shareholders. All questions could be answered on a scale from 1 to 7, or by indicating an answer on an alternative scale. The only exception on this rule were two questions in which we asked for respectively the Earnings Per Share and the Dividends Per Share, based on regular dividends, that the firm paid over the financial year 1997. The questionnaire was mailed to the 500 firms in May 1998, followed by a second mailing in June 1998 to improve the response rate and reduce potential non-response bias. The questionnaire yielded 191 usable responses (38.2%). This compares favorably with responses on other surveys. All returned surveys were received within a period of four months from the first mailing.

5. The results

In this section the empirical results are discussed. After a discussion of the summary statistics, the results of the individual models are analyzed. This is followed by a comparison of the performance of the individual models. In Table 2 the summary statistics are presented.

[Please insert Table 2 here]

The variable *dividend paying* in Table 2 is a dummy variable based on the question whether the company has paid a dividend over the year 1997. This dummy is one if the company has paid a dividend over 1997 and zero otherwise. According to Table 2, 41% of the companies has paid dividends and 59% of companies did not do so. We also asked whether the company has undertaken a SBB in the three year period preceding the questionnaire¹². The result of the SBB dummy in Table 2 shows that this was the case for 35% of the companies. Some of the explanatory variables in Table 2 are measured by two or three questions. This applies for example to the *asymmetric information amongst outsiders* (questions 18 and 19) and the behavioral preference for dividends (questions 14, 15 and 16) variables. For such variables we present the average of the relevant questions. In Table 2 we also compare the mean and standard deviation of a number of variables between different groups of companies. The standard deviations in Table 2 show that there is a sufficient

¹² SBBs were measured over the 3-year period preceding the questionnaire. Dividends were only measured over 1997. However, the dividend policy of Canadian firms is very stable over time. From a study of Canadian companies over the period 1995-1997 we find that 97% of the firms that did not pay dividends in 1997 also did not pay dividends in 1995.

cross-section variation in the answers to the various questions. The remainder of Table 2 shows univariate comparisons between the determinants and the payout choice. Since (most of) the results are consistent with those from our logit regressions, we postpone their discussion.

In Table 3 the results of the tests for model I are included. In model I dividends and share buy-backs are assumed to be unrelated. This model is tested by carrying out single logit regressions. The regression results include both the direct and the indirect determinants.

[Please insert Table 3 here]

The first column of Table 3 provides the coefficients and the t -values of the regression in which dividend is explained. We find the expected significant negative relations between *dividend payments* and *transaction costs on the company level* and *managerial option plans*. We also find the expected positive significant relationships between *dividend payments* and the *tax preference for dividends* and the *behavioral preference for dividends*. The existence of different clienteles, including a tax clientele, confirms the earlier mentioned results of Baker, Farrelly and Edelman (1985).

The second column in Table 3 provides the determinants of the share buy-back decision. We find the expected significant positive parameter estimates for *free cash flow* and the *tax preference for share buy-backs*. We also find the expected significant negative sign for the variable *asymmetric information amongst outsiders*. Underpricing shows the expected positive coefficient. However, contrary to e.g. Li and McNally (1999) and Ikenberry, Lakonishok and Vermaelen (2000) we do not find a significant effect. Appendix C contains the results of the multinomial model which is mathematically identical to the single logit models (see section 3). The estimation gives similar results.

In Table 4 the results of the tests for Model II are included. In model II dividends and share buy-backs are assumed to influence each other. This model is tested by carrying out simultaneous logit regressions.

[Please insert Table 4 here]

The results in Table 4 are comparable to the single equation logits in Table 3. The estimates for the coefficients *dividend paying* and *share buy-back* are not significant. This would indicate that the decisions do not influence each other. Furthermore, it can be noticed that the signs of the coefficients do not change compared to model I in Table 3. The magnitude of the t -statistics decreases in most cases. First, this can be due to the fact that model II is less parsimonious than model I. This would indicate that model I gives a closer representation of the decision process than model II. Second, the more complex estimation method can be less effective in finite samples.

In Table 5 the results for model III are included. Model III is the nested logit model in which the firm decides in the first stage whether to pay out and in the second stage on the form of the payout.

[Please insert Table 5 here]

The first column in Table 5 is labelled "no payout" and it presents the determinants for the payout choice. *Free cash flow* has the expected significantly negative sign, indicating that the existence of free cash flow makes it less likely that the firm will *not* pay out funds. Columns (2) and (3) present the influence of individual variables on the type of payout. A significantly negative coefficient is found for managerial option plans. This means that the existence of an executive stock option plan makes it less likely that the firm pays dividends. This finding is consistent with an earlier empirical study for the United States by Lambert, Lanen and Larcker (1989)¹³. We find significantly positive results for the behavioral preference for dividends. This is in line with the Shefrin and Statman (1984) model. Furthermore, it can be noticed that there are significantly positive results for the tax preferences for both dividends and SBBs. Apparently, the choice for the type of payout is influenced by the tax clientele of the firm. Table 5 also shows that the actual clienteles do not give significant results. *Asymmetric information amongst outsiders* shows the expected negative sign in the third column. In other words, in firms with large informational asymmetries amongst outsiders, the payout is less likely to be done by SBBs. This confirms the model of Brennan and Thakor (1990).

In Table 6 the fit of the models is compared.

[Please insert Table 6 here]

Table 6 can be read as follows. If we first look at the results of the separate logit models (model I) in panel A, we see that in total 45 companies only paid dividends. The separate logit models correctly predict 27 of these companies (60%). In four cases the model incorrectly predicts that the company both pays dividends and carries out a SBB, while actually only a dividend was paid. Also, in 14 cases the model incorrectly predicts that the company will not pay out at all. The numbers on the diagonals are the correct predictions. It can be seen that the separate logit model especially does a good job in predicting companies that only pay dividends and companies that do not pay out at all. The sum of the diagonals is 98, indicating that 56% of the observations are correctly predicted. Note that without any information, this would be about 25%. The simultaneous logit model (model II) approximately shows the same results. In section 3 we have argued that the separate logit model (model I) can be rewritten as a multinomial model. The findings with regard to the number of correct predictions are similar for the separate logit model and the multinomial logit model.

Since the multinomial model is similar to the two single logit models and the simultaneous model has no added value, we are left with the question whether we should prefer the multinomial logit or the nested logit model. The performance of the two models can be compared using measures of fit. In section 3 we have already argued that there are three well-known measures of fit: the likelihood criterion, the Akaike Information (AIC) criterion and the Schwarz criterion. The major advantage of rewriting model I to the multinomial model is that for this model the three criteria can be compared to that of the nested logit model, since the likelihood function is known for the multinomial model. In section 3 we also argued that the model

¹³ See sub-section 2.10.

with the highest value for the AIC and Schwarz measures is the preferred model. Panel B of Table 6 shows that for both measures the nested logit model is the preferred model. The nested logit model imposes much more structure on the problem in terms of less parameters, which is not translated into a lower value of the likelihood function. This is remarkable. In short, our analysis shows that the nested logit model is the preferred model to explain dividend and SBB policies.

6. Conclusion

In this paper we have tested three models for dividend and share buy-back (SBB) policies. In the first model dividends and SBBs are studied in isolation. In the second model dividends and SBBs influence each other. The third model assumes that a firm first decides whether it wants to pay out cash to its shareholders or not. After this decision is taken, the company decides on the form of the payout: dividends, SBBs or both. The methodology that we use consists of two steps: in the first step we measure firm variables. In the second step we measure the relationships between the variables. The variables were collected using a questionnaire, which was sent to the 500 largest non-financial companies on the Toronto Stock Exchange. The final analysis was carried out on the 191 usable responses that we received.

We find strong empirical evidence for the third model in which the company first decides on the payout question and then on the form of the payout. The payout decision is driven by the existence of free cash flow. The choice for dividend as payout is caused by factors such as tax and behavioral preferences. The choice for SBBs is driven by tax preferences. We also find evidence that the payout for firms with managerial option plans is less likely to be dividends. Finally, our analysis shows a strong confirmation for the Brennan and Thakor (1990) model. This model states that the existence of asymmetric information amongst outsiders is associated with a preference for dividends over SBBs.

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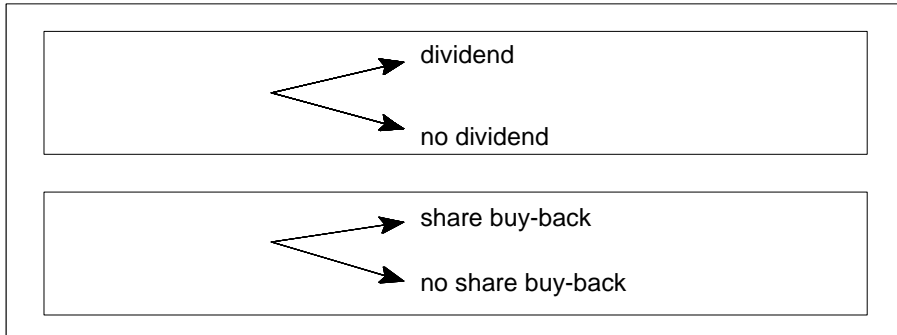
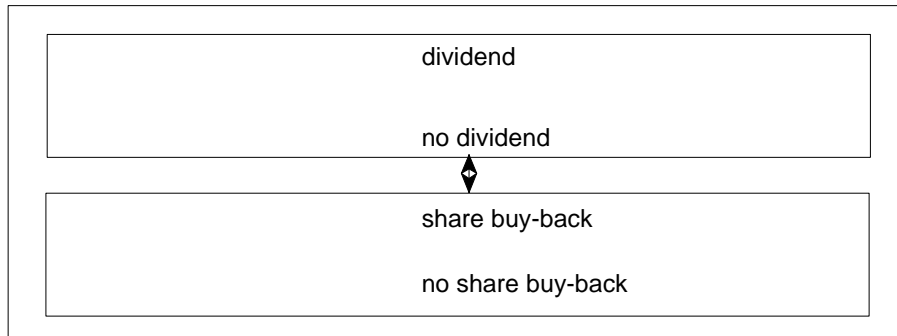
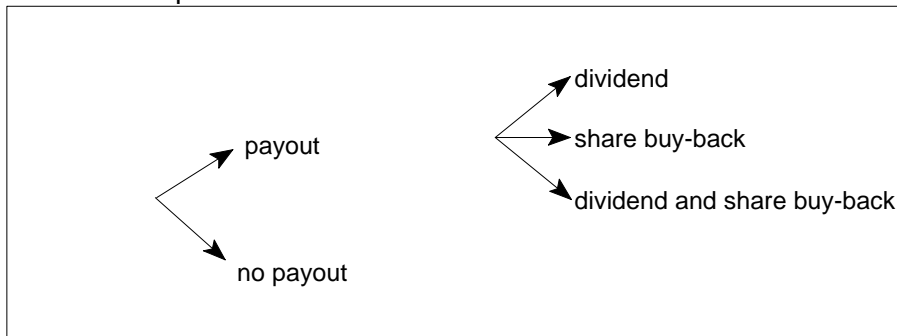
Figure 1: Decision-making trees**Model I: Unrelated decisions****Model II: Related decisions****Model III: Sequential decisions**

Table 1: Hypotheses on dividend and share buy-back policies of Canadian firms
Panel A: Direct hypotheses

Variable (1)	Models I/II: Dividend/ no dividend (2)	Model I/II: SBB/ no SBB (3)	Model III: Payout/ no payout (4)	Model III: if payout: only div/only SBB/ div and SBB (5)
Dividend paying		-		
SBB in last three years	-			
Free cash flow			+	
Underpricing		+		
Transaction costs firm			-	
Asym.info mgt vs. outsiders			+	
Asym.info amongst outsiders				Div +, SBB -
Overinvestment			+/-	
Managerial shareholdings			-	
Managerial option plans	-	+		
Tax preference for dividends	+			
Behavioral preference for dividends	+			
Tax preference for SBBs		+		
Transaction costs preference stockholders	+			
Cientele, retired persons	+			
Cientele, public corporations	+			
Cientele, small investors	+			

Table 1: Hypotheses (Continued)**Panel B: Direct and indirect hypotheses** (indirect hypotheses are in parentheses)

Variable (1)	Models I/II: Dividend/ no dividend (2)	Model I/II: SBB/ no SBB (3)	Model III: Payout/ no payout (4)	Model III: If payout: only div/only SBB/ div and SBB (5)
Dividend paying		-		
SBB in last three years	-			
Free cash flow	(+)	(+)	+	(=)
Underpricing		+	(+)	(s=b>d)
Transaction costs firm	(-)	(-)	-	(=)
Asym.info mgt vs. outsiders	(+)	(+)	+	(=)
Asym.info amongst outsiders	(+)	(-)		d>s (d>b>s)
Overinvestment	(+/-)	(+/-)	+/-	(=)
Managerial shareholdings	(-)	(-)	-	(=)
Managerial option plans	-	+	(-/+)	(s>b>d)
Tax preference for dividends	+		(+)	(d=b>s)
Behavioral preference for dividends +			(+)	(d=b>s)
Tax preference for SBBs		+	(+)	(s=b>d)
Transaction costs preference stockholders	+		(+)	(d=b>s)
Clientele, retired persons	+		(+)	(d=b>s)
Clientele, public corporations	+		(+)	(d=b>s)
Clientele, small investors	+		(+)	(d=b>s)

Table 1: continued

The table includes the hypotheses that are tested in the paper. Direct positive "+" and negative "-" relations are indicated. Indirect relations are in parentheses. Dividends are indicated as "d", share buy-backs as "s" and dividends and share buy-backs together as "b" (both). If the occurrence of the two methods of payments is equally likely, it is indicated as "=". If one method of payment is more likely than another, it is indicated as ">", respectively as "<".

Table 2: Summary statistics on dividend and share buy-back policies of Canadian firms based on 191 completed questionnaires of non-financial firms on the Toronto Stock Exchange

		(1) All firms	(2) Dividend	(3) No dividend	(4) (2) vs. (3)	(5) Share buy-back	(6) No share buy-back	(7) (5) vs. (6)	
variable	question(s)	mean(st.dev.)	mean(st.dev.)	mean(st.dev.)	diff.(p-value)	mean(st.dev.)	mean(st.dev.)	difference (p-value)	
Dividend paying	20	0.41	1.00	0.00	-	0.45	0.38	0.07 (0.348)	
SBB in last three years	21	0.35	0.38	0.32	0.07 (0.348)	1.00	0.00	-	
Free cash flow	2,8	2.89 (1.45)	3.24 (1.50)	2.64 (1.38)	0.60 (0.005)**	3.26 (1.52)	2.69 (1.39)	0.57 (0.010)**	
Underpricing	1	4.42 (1.74)	4.17 (1.77)	4.59 (1.70)	-0.42 (0.099)	4.65 (1.69)	4.30 (1.76)	0.35 (0.184)	
Transaction costs firm	9	3.47 (1.52)	2.97 (1.46)	3.81 (1.47)	-0.84 (0.000)**	3.77 (1.39)	3.31 (1.56)	0.46 (0.051)	
Asym.info mgt. versus outsiders	3	5.29 (1.30)	5.07 (1.29)	5.44 (1.30)	-0.38 (0.051)	5.20 (1.30)	5.34 (1.31)	-0.14 (0.488)	
Asym.info amongst outsiders	18,19	5.27 (1.17)	5.24 (1.21)	5.29 (1.14)	-0.04 (0.799)	5.08 (1.11)	5.37 (1.19)	-0.28 (0.109)	
Overinvestment	6,7	3.00 (1.29)	2.84 (1.19)	3.11 (1.34)	-0.27 (0.158)	2.86 (1.15)	3.07 (1.35)	-0.22 (0.270)	
Managerial shareholdings	4	3.88 (1.92)	3.90 (2.02)	3.87 (1.86)	0.03 (0.919)	3.98 (1.94)	3.82 (1.92)	0.16 (0.581)	
Managerial option plans	5	3.35 (1.14)	3.01 (1.32)	3.60 (1.42)	-0.60 (0.004)**	3.52 (1.44)	3.26 (1.40)	0.26 (0.228)	
Tax preference for dividends	10,11	3.00 (1.57)	3.74 (1.36)	2.47 (1.50)	1.26 (0.000)**	3.16 (1.49)	2.91 (1.61)	0.26 (0.292)	
Behavioral pref. for dividends	14-16	2.90 (1.33)	3.55 (0.99)	2.41 (1.33)	1.13 (0.000)**	3.10 (1.20)	2.77 (1.37)	0.33 (0.103)	
Tax preference for SBB	12,13	2.62 (1.44)	2.87 (1.42)	2.45 (1.45)	0.43 (0.051)	3.12 (1.54)	2.36 (1.33)	0.76 (0.001)**	
Transaction costs pref. for payout	17	3.06 (1.32)	3.19 (1.28)	2.97 (1.34)	0.22 (0.258)	3.35 (1.27)	2.91 (1.32)	0.44 (0.028)*	
Clientele, retired persons	22	1.86 (2.24)	1.96 (2.21)	1.80 (2.26)	0.17 (0.617)	2.14 (2.34)	1.72 (2.18)	0.42 (0.222)	
Clientele, public corporations	23	2.59 (2.50)	2.69 (2.52)	2.52 (2.49)	0.17 (0.645)	2.67 (2.42)	2.55 (2.54)	0.11 (0.764)	
Clientele, small investors	24	2.76 (2.33)	2.71 (2.36)	2.80 (2.32)	-0.09 (0.791)	2.97 (2.25)	2.65 (2.37)	0.32 (0.365)	
Observations		191	78	113		66	125		

Table 2: Summary statistics (continued)

		(1) All firms	(2) Payout	(3) No payout	(4) (2) vs. (3)	
variable	question(s)	mean(st.dev.)	mean(st.dev.)	mean(st.dev.)	difference (p-value)	
Dividend paying	20	0.41	0.68	0.00	0.68	(0.000)**
SBB in last three years	21	0.35	0.58	0.00	0.58	(0.000)**
Free cash flow	2,8	2.89 (1.45)	3.13 (1.48)	2.53 (1.35)	0.61	(0.004)**
Underpricing	1	4.42 (1.74)	4.40 (1.75)	4.45 (1.74)	-0.06	(0.827)
Transaction costs firm	9	3.47 (1.52)	3.36 (1.51)	3.62 (1.52)	-0.26	(0.255)
Asym.info mgt. versus outsiders	3	5.29 (1.30)	5.13 (1.27)	5.53 (1.32)	-0.41	(0.034)*
Asym.info amongst outsiders	18,19	5.27 (1.17)	5.17 (1.15)	5.42 (1.18)	-0.26	(0.138)
Overinvestment	6,7	3.00 (1.29)	2.87 (1.22)	3.18 (1.36)	-0.31	(0.103)
Managerial shareholdings	4	3.88 (1.92)	3.86 (1.95)	3.91 (1.89)	-0.05	(0.859)
Managerial option plans	5	3.35 (1.41)	3.26 (1.41)	3.52 (1.39)	-0.26	(0.218)
Tax preference for dividends	10,11	3.00 (1.57)	3.37 (1.49)	2.42 (1.52)	0.95	(0.000)**
Behavioral pref. for dividends	14-16	2.90 (1.33)	3.24 (1.16)	2.33 (1.37)	0.91	(0.000)**
Tax preference for SBB	12,13	2.62 (1.44)	2.88 (1.48)	2.21 (1.31)	0.68	(0.002)**
Transaction costs pref. for payout	17	3.06 (1.32)	3.27 (1.30)	2.74 (1.28)	0.53	(0.007)**
Clientele, retired persons	22	1.86 (2.24)	1.94 (2.24)	1.75 (2.24)	0.19	(0.576)
Clientele, public corporations	23	2.59 (2.50)	2.68 (2.52)	2.45 (2.47)	0.23	(0.534)
Clientele, small investors	24	2.76 (2.33)	2.77 (2.33)	2.74 (2.34)	-0.03	(0.927)
Observations		191	114	77		

Table 2: Summary statistics (continued)

		(1) All firms	(2) Dividend (no buy-back)	(3) Share buy-back (no dividend)	(4) Dividend and share buy-back	(5) (2) vs. (3)	(6) (2) vs. (4)	(7) (3) vs. (4)
variable	question(s)	mean(st.dev.)	mean(st.dev.)	mean(st.dev.)	mean(st.dev.)	diff. (p-value)	diff. (p-value)	diff. (p-value)
Dividend paying	20	0.41	1.00	0.00	1.00	-	-	-
SBB in last three years	21	0.35	0.00	1.00	1.00	-	-	-
Free cash flow	2,8	2.89 (1.45)	2.96 (1.41)	2.89 (1.42)	3.70 (1.53)	0.07 (0.825)	-0.74 (0.032)*	-0.81 (0.030)*
Underpricing	1	4.42 (1.74)	4.04 (1.79)	4.89 (1.61)	4.37 (1.75)	-0.85 (0.029)*	-0.32 (0.438)	0.52 (0.213)
Transaction costs firm	9	3.47 (1.52)	2.81 (1.51)	4.24 (1.26)	3.23 (1.36)	-1.43 (0.000)**	-0.42 (0.215)	1.00 (0.003)**
Asym.info mgt. versus outsiders	3	5.29 (1.30)	5.02 (1.22)	5.25 (1.23)	5.14 (1.41)	-0.23 (0.402)	-0.12 (0.704)	0.11 (0.733)
Asym.info amongst outsiders	18,19	5.27 (1.17)	5.28 (1.20)	5.00 (1.00)	5.18 (1.25)	0.28 (0.258)	0.10 (0.731)	-0.18 (0.510)
Overinvestment	6,7	3.00 (1.29)	2.89 (1.33)	2.94 (1.30)	2.75 (0.95)	-0.05 (0.862)	0.14 (0.610)	0.19 (0.497)
Managerial shareholdings	4	3.88 (1.92)	3.68 (1.97)	3.78 (1.81)	4.23 (2.10)	-0.10 (0.818)	-0.55 (0.245)	-0.46 (0.346)
Managerial option plans	5	3.35 (1.41)	2.89 (1.31)	3.78 (1.50)	3.20 (1.35)	-0.88 (0.005)**	-0.31 (0.325)	0.58 (0.107)
Tax preference for dividends	10,11	3.00 (1.57)	3.65 (1.46)	2.57 (1.47)	3.88 (1.17)	1.08 (0.001)**	-0.23 (0.475)	-1.31 (0.000)**
Behavioral pref. for dividends	14-16	2.90 (1.33)	3.44 (1.09)	2.57 (1.24)	3.72 (0.78)	0.86 (0.001)**	-0.29 (0.219)	-1.15 (0.000)**
Tax preference for SBB	12,13	2.62 (1.44)	2.57 (1.35)	2.92 (1.61)	3.38 (1.41)	-0.34 (0.296)	-0.80 (0.017)*	-0.46 (0.240)
Transaction costs pref. for payout	17	3.06 (1.32)	3.17 (1.36)	3.44 (1.36)	3.24 (1.15)	-0.28 (0.357)	-0.07 (0.806)	0.20 (0.525)
Clientele, retired persons	22	1.86 (2.24)	1.67 (2.10)	1.89 (2.35)	2.43 (2.33)	-0.22 (0.649)	-0.77 (0.136)	-0.54 (0.350)
Clientele, public corporations	23	2.59 (2.50)	2.71 (2.67)	2.67 (2.55)	2.67 (2.29)	0.04 (0.943)	0.04 (0.944)	0.00 (1.000)
Clientele, small investors	24	2.76 (2.33)	2.50 (2.43)	2.92 (2.29)	3.03 (2.24)	-0.42 (0.428)	-0.53 (0.334)	-0.46 (0.398)
Observations		191	48	36	30			

The table reports the summary statistics of the 191 completed questionnaires of non-financial companies on the Toronto Stock Exchange. The number of the question refers to Appendix B where the questionnaire is presented. Dividend payment and share buy-back (SBB) were either answered confirmative (= 1) or non-confirmative (= 0). All other questions were answered on a scale from 1 (non confirmative) to 7 (confirmative). In questions 22 to 24 we asked for the relative representation of groups of shareholders of a firm. Some variables are measured using two or three questions. For such variables we present the average of the relevant questions. Over the sample we present all averages and standard deviations (in parentheses). We also present results for different subsamples. In addition, the differences between subsamples and the p-values (in brackets) are reported. The symbol ‘**’ denotes that the estimate is significant at the 1% level. The symbol ‘*’ denotes the 5% significance level.

Table 3: Results of the single logit regressions on dividend and share buy-back policies of Canadian firms (model I)

	<u>Dividend paying</u>		<u>Share buy-back</u>	
Intercept	1.250	(0.77)	-0.866	(-0.64)
Free cash flow	0.251	(1.67)	0.263	(2.00)*
Underpricing			0.080	(0.70)
Transaction costs firm	-0.506	(-3.07)**	0.298	(2.17)*
Asym.info mgt. versus outsiders	-0.261	(-1.67)	-0.181	(-1.25)
Asym.info amongst outsiders	-0.115	(-0.66)	-0.310	(-1.98)*
Overinvestment	-0.308	(-1.72)	-0.310	(-1.91)
Managerial shareholdings	0.045	(0.41)	-0.006	(-0.06)
Managerial option plans	-0.307	(-2.01)*	0.088	(0.13)
Tax preference for dividends	0.368	(2.27)*		
Behavioral pref. for dividends	0.619	(2.81)**		
Tax preference for SBB			0.447	(3.25)**
Transaction costs pref. for payout	0.024	(0.14)		
Clientele, retired persons	0.135	(1.22)		
Clientele, public corporations	0.025	(0.28)		
Clientele, small investors	-0.119	(-1.06)		
<i>Observations</i>	<i>174</i>		<i>174</i>	
<i>R²</i>	<i>0.383</i>		<i>0.183</i>	

This table presents the results of single logit regressions in which dividend payments and share buy-backs are related to their direct and indirect determinants. The data are collected using 191 usable responses from a questionnaire amongst non-financial firms listed on the Toronto Stock Exchange. In the table the coefficients and the *t*-values (in parentheses) are reported. The symbol ‘***’ denotes that the estimate is significant at the 1% level ($t > 2.57$). The symbol ‘**’ denotes the 5% significance level ($t > 1.96$).

Table 4: Results of the simultaneous logit regressions on dividend and share buy-back policies of Canadian firms (model II)

	<u>Dividend paying</u>		<u>Share buy-back</u>	
Intercept	0.894	(0.43)	-0.869	(-0.55)
Dividend paying			0.001	(0.01)
Share buy-back	-0.272	(-0.79)		
Free cash flow	0.361	(1.51)	0.263	(1.69)
Underpricing			0.080	(0.63)
Transaction costs firm	-0.434	(-1.96)*	0.299	(1.77)
Asym.info mgt. versus outsiders	-0.305	(-1.49)	-0.181	(-1.09)
Asym.info amongst outsiders	-0.181	(-0.77)	-0.310	(-1.81)
Overinvestment	-0.398	(-1.53)	-0.311	(-1.69)
Managerial shareholdings	0.038	(0.29)	-0.006	(-0.06)
Managerial option plans	-0.291	(-1.18)	0.088	(0.58)
Tax preference for dividends	0.398	(1.86)		
Behavioral pref. for dividends	0.620	(2.30)*		
Tax preference for SBB			0.447	(2.82)**
Transaction costs pref. for payout	0.091	(0.39)		
Clientele, retired persons	0.151	(1.11)		
Clientele, public corporations	0.031	(0.28)		
Clientele, small investors	-0.108	(-0.80)		
<i>Observations</i>	<i>174</i>		<i>174</i>	
<i>R²</i>	<i>0.386</i>		<i>0.183</i>	

This table presents the results of simultaneous logit regressions in which dividend payments and share buy-backs are related to their direct and indirect determinants. The data are collected using 191 usable responses from a questionnaire amongst non-financial firms listed on the Toronto Stock Exchange. In the table the coefficients and the *t*-values (in parentheses) are reported. The symbol ‘**’ denotes that the estimate is significant at the 1% level ($t > 2.57$). The symbol ‘*’ denotes the 5% significance level ($t > 1.96$).

Table 5: Results of the nested logit regressions on dividend and share buy-back policies of Canadian firms (model III)¹⁴

	<u>No Payout</u>	<u>Dividend (no SBB)</u>	<u>Share buy-back (no div.)</u>
Free cash flow	-0.135 (-2.19)*		
Underpricing			0.209 (1.29)
Transaction costs firm	0.007 (0.13)		
Asym.info mgt. versus outsiders	0.048 (0.90)		
Asym.info amongst outsiders		-0.316 (-1.80)	-0.591 (-2.94)**
Overinvestment	0.098 (1.50)		
Managerial shareholdings	-0.024 (-0.64)		
Managerial option plans		-0.377 (-2.11)*	0.040 (0.24)
Tax preference for dividends		0.472 (2.19)*	
Behavioral pref. for dividends		0.748 (2.23)*	
Tax preference for SBB			0.645 (2.44)*
Transaction costs pref. for payout		-0.201 (-0.95)	
Clientele, retired persons		0.206 (1.49)	
Clientele, public corporations		0.037 (0.34)	
Clientele, small investors		-0.225 (-1.51)	
observations	174		
μ	1.693 (2.61)		

This table presents the results of nested logit regressions. In the first stage of these regressions payout is related to its direct determinants. In the second stage the form of the payout is related to their direct determinants. The data are collected using 191 usable responses from a questionnaire amongst non-financial firms listed on the Toronto Stock Exchange. In the table the coefficients and the t -values (in parentheses) are reported. The symbol ‘**’ denotes that the estimate is significant at the 1% level ($t > 2.57$). The symbol ‘*’ denotes the 5% significance level ($t > 1.96$).

¹⁴ The variables that are allowed to affect the likelihood on a dividend and SBB are the union of the variables that are allowed to affect dividends (no SBBs) and to affect SBBs (no dividends). The parameters are restricted to be equal to those for the single instruments cases.

Table 6: Comparison of the logit regression models on dividend and share buy-back policies of Canadian firms**Panel A***Separate logit (Table 3): 96 correct (55%)*

<u>Predicted</u>	<u>Actual</u>			
	Div	SBB	Both	No payout
Dividend	27	3	9	12
	[60.0]	[9.1]	[33.3]	[17.4]
SBB	0	7	3	5
	[0.0]	[21.2]	[11.1]	[7.2]
Both	4	3	11	1
	[8.9]	[9.1]	[40.7]	[1.4]
No payout	14	20	4	51
	[31.1]	[60.6]	[14.8]	[73.9]
Total	45	33	27	69
	[100]		[100]	[100]

Simultaneous logit (Table 4): 99 correct (57%)

<u>Predicted</u>	<u>Actual</u>			
	Div	SBB	Both	No payout
Dividend	30	3	9	12
	[66.7]	[9.1]	[33.3]	[17.4]
SBB	0	7	3	5
	[0.0]	[21.2]	[11.1]	[7.2]
Both	4	3	11	1
	[8.9]	[9.1]	[40.7]	[1.4]
No payout	11	20	4	51
	[24.4]	[60.6]	[14.8]	[73.9]
Total	45	33	27	69
	[100]	[100]	[100]	[100]

Multinomial logit (Appendix C.): 95 correct (55%)

<u>Predicted</u>	<u>Actual</u>			
	Div	SBB	Both	No payout
Dividend	27	3	9	12
	[60.0]	[9.1]	[33.3]	[17.4]
Share buy-back	0	6	3	5
	[0.0]	[18.2]	[11.1]	[7.2]
Both	4	3	11	1
	[8.9]	[9.1]	[40.7]	[1.4]
No payout	14	21	4	51
	[31.1]	[63.6]	[14.8]	[73.9]
Total	45	33	27	69
	[100]		[100]	[100]

Nested logit (Table 5): 88 correct (51%)

<u>Predicted</u>	<u>Actual</u>			
	Div	SBB	Both	No payout
Dividend	17	1	9	8
	[37.8]	[3.0]	[33.3]	[11.6]
SBB	1	5	2	1
	[2.2]	[15.2]	[7.4]	[1.4]
Both	8	7	10	5
	[17.8]	[21.2]	[37.0]	[5.8]
No payout	19	20	6	56
	[42.2]	[60.6]	[22.2]	[81.2]
Total	45	33	27	69
	[100]	[100]	[100]	[100]

Panel B

	<u>Multinomial logit</u>	<u>Nested logit</u>
Percentage predicted correctly	55%	51%
Likelihood	177.8	191.8
AIC criterion	152.8	172.9
Schwarz criterion	149.8	170.6
Number of parameters	26	21

Table 6: continued

Panel A contains comparisons between actual and predicted outcomes for four different logit models. Percentages are between brackets. Panel B includes statistics to compare the fit of the multinomial and nested logit models. The data are collected using 191 usable responses from a questionnaire amongst non-financial firms listed on the Toronto Stock Exchange.

Appendix A: The tax treatment of dividends and capital gains under Canadian taxation

The treatment of dividends and capital gains in the Canadian tax law can best be illustrated using an example from Davis and Pinches (1997). They show the calculation of the after-tax dividends and capital gains for an Ontario investor who receives \$ 10,000 in either dividends or capital gains.

Tax treatment of dividends:

Dividends received	\$ 10,000
Add: Gross-up at 25%	2,500

Taxable dividend	12,500
Federal income tax (0.26 * 12,500)	3,250
Less: Dividend tax credit (0.1333 * 12,500)	1,667

Federal tax payable	1,583
Add: Ontario tax (0.58 * 1,583)	918

Total tax	2,501
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Dividends after taxes = $10,000 - 2,501 = 7,499$

Effective tax rate on dividends (total tax/dividends received) = 25.01%

Tax treatment of capital gains:

Capital gains received	\$ 10,000
Federal income tax (0.26 * 0.75 * 10,000)	1,950
Add: Ontario tax (0.58 * 1,950)	1,131

Total tax	3,081
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Dividends after taxes = $10,000 - 3,081 = 6,919$

Effective tax rate on dividends (total tax/dividends received) = 30.81%

Appendix B: The questionnaire

Remark: In this questionnaire we want to focus exclusively on cash dividends, thus excluding stock dividends. For this reason we want to ask you to read the term dividend as cash dividend.

Remark: Share buy-back programs include tender offers to all the firm's shareholders, the purchase of stock in the secondary market, and the agreement to buy stock from one or a small group of the firm's major investors.

- 1 During the last 3 years the stock of my firm has been undervalued for a long time. (1-7, strongly disagree - strongly agree)
- 2 The internal funds, which are available now and which will become available in the future, are more than sufficient to finance all future profitable projects. (1-7, strongly disagree - strongly agree)
- 3 Compared to other non-financial firms listed on the TSE, the management of my firm is much more aware of the firm's activities than outsiders are. (1-7, strongly disagree - strongly agree)
- 4 Compared to other non-financial firms listed on the TSE, the number of shares that the management owns in the firm as a percentage of the total number of shares is: (1-7, very small - very large)
- 5 Compared to other non-financial firms listed on the TSE, the number of executive stock options/warrants that the management owns in the firm as a percentage of the total number of outstanding shares is: (1-7, very small - very large)
- 6 In my firm a project is accepted if it is useful in the management's opinion, even if it is expected that this will cause a reduction in the stock price. (1-7, strongly disagree - strongly agree)
- 7 We avoid cutting capital expenditures if this creates a less pleasant working atmosphere. (1-7, strongly disagree - strongly agree)
- 8 My firm possesses much cash and other liquid assets for which there is no clear purpose yet. (1-7, strongly disagree - strongly agree)
- 9 Compared to other firms on the TSE, the average flotation costs for public equity issues are high. (1-7, strongly disagree - strongly agree)
- 10 Due to *income tax reasons* my private shareholders have a preference for receiving dividends over selling shares. (1-7, strongly disagree - strongly agree)
- 11 Due to *tax reasons* our institutional shareholders have a preference for receiving dividends over selling shares. (1-7, strongly disagree - strongly agree)
- 12 Due to *income tax reasons* our private shareholders like us to regularly buy back shares in a share buy-back program. (1-7, strongly disagree - strongly agree)
- 13 Due to *tax reasons* our institutional shareholders like us to regularly buy back shares in a share buy-back program. (1-7, strongly disagree - strongly agree)
- 14 Apart from taxes and transaction costs, my private shareholders perceive income in the form of dividends more attractive than income in the form of capital gains. (1-7, strongly disagree - strongly agree)
- 15 Apart from taxes and transaction costs, my institutional shareholders perceive income in the form of dividends more attractive than income in the form of capital gains. (1-7, strongly disagree - strongly agree)
- 16 My private shareholders prefer to consume from dividends over consuming from capital gains. (1-7, strongly disagree - strongly agree)
- 17 The transaction costs for selling stocks in order to cash in capital gains are high for my shareholders. (1-7, strongly disagree - strongly agree)
- 18 Some shareholders of my firm are better aware of the firm's activities than others, because of their large stakes in the firm. (1-7, strongly disagree - strongly agree)
- 19 Some shareholders of my firm are better aware of the firm's activities than others, because they make more efforts to be informed about the firm's activities. (1-7, strongly disagree - strongly agree)

Remark: In some questions a reference is made to the financial year 1997. This is the financial year ending on December 31, 1997. If your firm has a broken financial year, please give the answer for the financial year that ends in 1997

- 20 What were the total Dividends Per Share, based on regular dividends, that your firm paid over the financial year 1997? (in Can \$)
- 21 How many share buy-back programs did your firm carry out during the last 3 financial years ? (1=none, 2=one, ..., 6=five, 7=more than five)

How well are the following groups of shareholders represented amongst the shareholders of your firm compared with other firms on the TSE? If you don't have any idea at all about the relative size of a certain group of shareholders, you can leave the answer blank.

- 22 Private persons who are retired (blank or 1-7, very well represented - not represented at all)
- 23 Public corporations (blank or 1-7, very well represented - not represented at all)
- 24 Private persons and institutions that you would characterize as small investors (blank or 1-7, very well represented - not represented at all)

Appendix C: Results of the multinomial logit regressions on dividend and share buy-back policies of Canadian firms¹⁵

	<u>Dividend (no SBB)</u>		<u>Share buy-back (no div.)</u>	
Intercept	-0.812	(-3.31)**	-1.368	(-4.76)**
Free cash flow	0.349	(1.61)	0.368	(1.95)
Underpricing			0.135	(0.70)
Transaction costs firm	-0.779	(-3.05)**	0.466	(2.16)*
Asym.info mgt. versus outsiders	-0.332	(-1.65)	-0.227	(-1.20)
Asym.info amongst outsiders	-0.130	(-0.64)	-0.356	(-1.96)*
Overinvestment	-0.386	(-1.67)	-0.392	(-1.88)
Managerial shareholdings	0.087	(0.41)	-0.014	(-0.09)
Managerial option plans	-0.443	(-2.02)*	0.135	(0.72)
Tax preference for dividends	0.579	(2.26)*		
Behavioral pref. for dividends	0.813	(2.80)**		
Tax preference for SBB			0.628	(3.17)**
Transaction costs pref. for payout	0.031	(0.14)		
Clientele, retired persons	0.305	(1.20)		
Clientele, public corporations	0.063	(0.27)		
Clientele, small investors	-0.269	(-1.05)		

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This table presents the results of the multinomial logit regressions in which dividend payments and share buy-backs are related to their direct and indirect determinants. The data are collected using 191 usable responses from a questionnaire amongst non-financial firms listed on the Toronto Stock Exchange. In the table the coefficients and the *t*-values (in parentheses) are reported. The symbol ‘**’ denotes that the estimate is significant at the 1% level ($t > 2.57$). The symbol ‘*’ denotes 5% significance level ($t > 1.96$).

¹⁵ See note 15.