

Estimating the Cost of Equity for Canadian and U.S. Firms

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- *There has been a concern among policy-makers that the cost of equity financing may be higher in Canada than in the United States, but the empirical evidence supporting this view is mixed.*
- *We improve on previous studies by implementing a forward-looking, firm-specific approach to estimating the nominal cost of equity for Canada and the United States that controls for firm characteristics, industry effects, and business cycle effects.*
- *We find that greater firm size and greater liquidity of a firm's stock are associated with a lower cost of equity, while greater firm leverage and greater dispersion in analysts' earnings forecasts are associated with a higher cost of equity. Moreover, we find that higher yields on longer-term sovereign bonds increase a firm's cost of equity.*
- *After taking firm-level and aggregate-level factors into account, the cost of equity was approximately 30 to 50 basis points higher in Canada than in the United States over the 1988–2006 period as a whole, but this differential appears to be lower in the post-1997 period.*

* The research reported in this article is summarized from a working paper written by Jonathan Witmer and the author (Witmer and Zorn 2007).

Financing costs are important for both firms and the economy, affecting investment decisions and, ultimately, economic growth. Since equity is an important component of a firm's financing structure, Canadian firms may not undertake as many projects that could potentially enhance growth if the cost of equity financing in Canada is relatively high. Considering the overall size of the equity stock in Canada, even small differences in the cost of equity financing can have a substantial impact.¹

The cost of equity, which can be defined as the return expected on a firm's common stock, represents the compensation demanded by shareholders for providing capital and assuming the risk of waiting for this return.² Thus, in addition to the risk-free return, the cost of equity incorporates an equity-risk premium—the incremental payoff from holding a risky equity security rather than a risk-free security.

There has been a concern among policy-makers that financing costs may be persistently higher in Canada than in the United States. The Capital Markets Leadership Task Force begins its 2006 report, for example, with the premise that the cost of capital in this country needs to be reduced for Canadian firms to compete effectively with those in the United States (Boritz 2006). Similarly, the report of the Task Force to Modernize Securities Legislation in Canada (2006) reinforces the notion of a “made-in-Canada” risk premium that

1. As of 31 December 2006, the market capitalization of the Toronto Stock Exchange (TSX) was just over \$2 trillion. During 2006, TSX firms raised over \$41 billion through share issues. Available on the TSX website at <<http://www.tsx.com>>.

2. The cost of equity can be expressed in real or nominal terms, depending on whether real or nominal returns per share are used in its estimation.

increases the cost of equity capital in Canada and discounts the trading price of Canadian shares.³

The empirical evidence supporting this view is mixed. Multi-country studies indicate that the costs of equity for Canada and for the United States are comparatively close on a worldwide scale. The magnitude and relative ranking of these estimates vary across studies, however. Claus and Thomas (2001), for example, calculate a cost of equity for Canada that is 20 basis points (bps) lower than that of the United States.⁴ The frequently cited results of Hail and Leuz (2006) indicate a cost of equity for Canada that is 30 bps greater than that of the United States.⁵

Policy efforts aimed at fostering a healthy environment for investment financing in Canada can be enhanced by a better understanding of the drivers of the cost of equity.

Canadian policy-makers have an interest in fostering a healthy environment for investment financing and, in the end, economic growth in Canada. Policy efforts can be enhanced by a better understanding of the drivers of the cost of equity in Canada, particularly compared with those of other countries.

This article presents estimates of the influences on the cost of equity in Canada and the United States using an updated methodology that controls for firm characteristics and aggregate-level factors. We begin with a brief review of the empirical literature. Next, we summarize the key factors that affect the cost of equity. We then present a comparison of Canadian and U.S. firms. Finally, the contributions of key factors to the cost of equity for Canadian and U.S. firms are quantified and discussed, along with implications for policy-makers.

3. The report cites the findings of Hail and Leuz (2006) and King and Segal (2003, 2006).

4. They estimate that Canada's cost of equity is 10.8 per cent over the period 1985–98, compared with 11 per cent for the United States.

5. Hail and Leuz estimate a cost of equity for Canada of 10.5 per cent over the period 1992–2000, versus 10.2 per cent for the United States.

Estimating the Cost of Equity

Only a handful of studies over the past 15 years have estimated a cost of equity for Canada, and the results vary. The studies not only disagree on the size of Canada's cost of equity, with estimates ranging from 5.4 per cent to 10.8 per cent, but they also disagree on how Canada compares with the United States. Some estimate a slightly higher cost of equity in Canada; some estimate that Canada's cost of equity may be 3 per cent lower.⁶

Why has the empirical literature failed to provide solid conclusions? One likely reason is that only recently has a true forward-looking, firm-specific approach to estimating the cost of equity been applied to Canada. Because sufficient firm-level data were not available before the mid-1990s, most estimates are based on realized, market-level returns on stocks and sovereign bonds. Typically, the methodology used in these studies estimates a constant equity-risk premium based on the differences in nominal returns earned on equities and bonds during a lengthy period of time (often 50 years or more). Because of historically lower stock market returns and higher bond yields in Canada relative to the United States, these studies have tended to find a lower equity-risk premium for Canada. Although risk-free rates have tended to be slightly higher in Canada, the result is often a lower cost of equity for Canada relative to the United States.⁷ However, the period over which this market-level risk premium is calculated can lead to very different cost-of-equity results.

In addition, research to date has not been focused on making a thorough comparison between Canada and the United States. Rather, the cost of equity has often been estimated as a preliminary step to answering other questions (such as whether differences in a country's legal environment have an impact on the cost of equity). These country cost-of-equity estimates typically do not account for firm-specific characteristics and aggregate-level factors that could affect the cost of equity. Differences across these studies could therefore be attributed to the different characteristics of individual firms in each sample. In addition, variations in the estimates might be exacerbated by using a relatively small sample of firms in Canada compared with the United States.

6. See Witmer and Zorn (2007) for a discussion of the empirical literature.

7. See, for example, Booth (2001); Jorion and Goetzmann (2000); and Hannah (2000).

Lastly, although the cost of equity is, by definition, linked to the risk-free rate, it may also be insightful to consider the interest rate environment and how this affects the financing costs of individual firms in Canada.

Using information from stock prices and stock analysts' forecasts of firm earnings, we estimate a nominal cost of equity for Canadian and U.S. firms, then compare these estimates.

We address all of these issues by employing a methodology that uses information from stock prices and stock analysts' forecasts of firm earnings to estimate a nominal cost of equity for each firm.⁸ Our cost-of-equity estimates are intuitively appealing because they reflect expected future returns to shareholders: in this approach, the cost of equity is the rate of return that sets the current stock price equal to the present value of expected future cash flows to shareholders. We compare these estimates for Canadian and U.S. firms over the 1988–2006 period, first at a broad level, and then controlling for firm characteristics, industry effects, and business cycle effects in a panel regression analysis. As an additional step, we examine the impact of longer-term sovereign bond yields (a proxy for the risk-free rate) on these cost-of-equity estimates.

What Drives the Cost of Equity?

A firm's cost of equity can be affected by several factors, which can be classified both at a firm level and at a broader level. Generally, the more these variables increase the perceived riskiness or uncertainty of future returns to shareholders, the more shareholders will demand to be compensated for this risk, and the higher will be the firm's cost of equity. Because our analysis incorporates these variables, it is important to establish their expected effect on a firm's cost of equity in order to help interpret our results:

- *Firm size:* Since there is usually more information regarding the management and potential earnings of larger firms, the uncertainty regarding the future returns of

8. See Witmer and Zorn (2007) for details on our methodology, including potential shortcomings.

such firms is reduced. Thus, we would expect a firm's cost of equity to be negatively related to its size.

- *Financial leverage:* Given that payments to debt holders have priority, an increase in debt (or greater financial leverage) and fixed interest costs will make returns to equity holders more sensitive to changes in earnings (i.e., more risky). Thus, we would expect greater financial leverage to increase a firm's cost of equity.
- *Corporate taxes:* Corporate taxes have an indirect effect on the cost of equity by reducing the impact of financial leverage. Since interest payments on debt are tax deductible, corporate taxes reduce the effective cost of debt. So where corporate taxes are levied, leverage provides a riskless tax shield, such that the overall risk of the firm is lower for the same amount of financial leverage. Through this link with financial leverage, we would expect the cost of equity to be negatively related to corporate taxes.
- *Stock liquidity:* Investors require extra compensation to cover the costs of buying and selling a security. These transactions costs tend to be lower for more frequently traded or more liquid stocks.⁹ Thus, we expect firms with greater stock liquidity to have a lower required return and, hence, a lower cost of equity.
- *Forecast dispersion:* Investor uncertainty regarding future returns could grow with the variability and reduced accuracy of analysts' earnings forecasts for a firm. Thus, we would expect greater disagreement or dispersion in analysts' forecasts to increase the cost of equity.

In addition to these firm-specific characteristics,¹⁰ other factors affect the cost of equity at a broader level:

9. Securities regulation and competition between trading platforms or exchanges have an impact on average stock liquidity as well.

10. Although not included in our analysis, ownership structure may also affect a firm's cost of equity. King and Santor (2007) find that Canadian firms with dual-class shares have a lower equity valuation than those firms with non-dual-class shares. Given the inverse relationship between a firm's cost of equity and its share price, this implies a higher cost of equity for firms that use dual-class shares.

- *Industry factors:* Certain cost-of-equity drivers will be common across firms in the same industrial group. For example, industries such as mining will have a high proportion of fixed costs. This higher operating leverage will cause profits to be more sensitive to changes in revenue, thus increasing the riskiness of returns to the firms' shareholders and the cost of equity in these industries. We attempt to capture industry-wide effects on the cost of equity by including industry dummy variables in our analysis.
- *Economic conditions:* Studies have shown that expected returns for equity markets tend to be countercyclical; i.e., they are lower under strong economic conditions and higher under weak economic conditions. Thus, we expect business cycle effects on the cost of equity as well and include dummy variables for each year in our sample period to account for this.

Differences in the cost of equity across firms can also be affected by such variables as the degree of financial market segmentation, unexpected movements in exchange rates, inflation uncertainty, differences in personal taxes, and different legal and regulatory environments, including enforcement. Because our focus is on firm-level drivers of the cost of equity that can easily be represented, we do not address these other factors. (Although other studies have examined the relationship of some of these factors with the cost of equity, none has comprehensively included all of these variables.) An analysis of some of these other effects is planned in future work, however, and this might shed further light on the cost of equity for Canadian firms.

Empirical Results

Canada-U.S. comparison

Given the factors affecting the cost of equity, it is interesting to first compare Canadian and U.S. firm characteristics. Taking a sample of firms over the period 1988 to 2006,¹¹ tests are performed to determine whether there are differences between the Canadian and U.S.

11. Our sample contains Canadian and U.S. non-financial firms covered by the Institutional Brokers Estimate System (I/B/E/S) and Compustat. After merging the two datasets, we have 3,419 Canadian and 31,005 U.S. observations.

median for the five identified firm characteristics (Table 1). The tests indicate that, compared with U.S. firms, Canadian firms in our sample are smaller, have a lower effective tax rate, a higher amount of debt in their capital structure, a lower stock turnover (a proxy for stock liquidity), and a higher dispersion of forecasts among analysts. When the cost of equity is estimated for each firm and year, we find that the median cost of equity is 11.5 per cent for Canadian firms, compared with 10.9 per cent for U.S. firms over the 1988–2006 period.¹² Given the differences in firm characteristics, it is not surprising that the median cost-of-equity estimate for firms in the Canadian sample is higher than that for firms in the U.S. sample.¹³ As such, it is important to control for these firm-level differences in order to make a relevant comparison across countries.

Table 1
Sample Statistics for Canadian and U.S. Firms, 1988–2006

	Canada	United States	Median difference
Size (total assets)	US\$364.2 million	US\$446.8 million	-US\$82.7* million
Financial leverage	0.36	0.33	0.03*
Taxes	0.35	0.36	0.01*
Stock liquidity	0.30	0.94	-0.64*
Forecast dispersion	0.06	0.03	0.03*
Cost of equity	11.49	10.86	0.64*

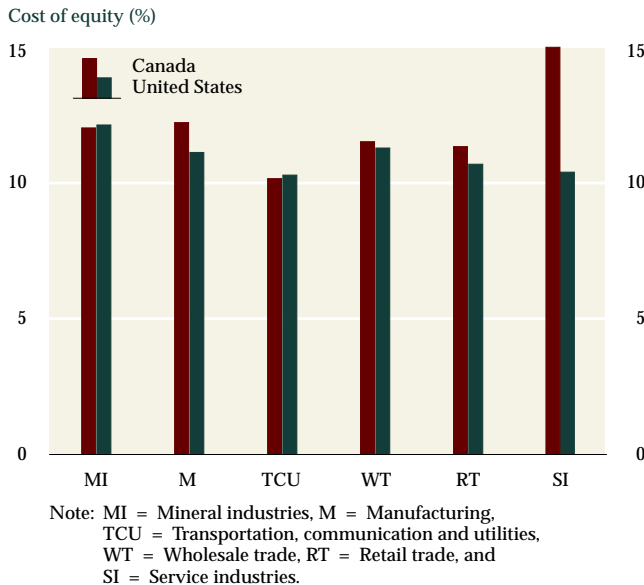
* Significant at 1 per cent

Notes: Size is calculated using book values from Compustat and is converted into U. S. dollars. Financial leverage is calculated as the ratio of long-term debt to equity using book values. Tax is the ratio of income taxes to pre-tax income and is restricted to a range between 0 and 1. Stock liquidity is proxied by turnover and is the number of shares traded in the previous year divided by the total number of shares outstanding in Compustat. Forecast dispersion is the cross-sectional standard deviation of analysts' earnings forecasts denominated in U.S. dollars. The nominal cost of equity is based on forecasted earnings from I/B/E/S and is calculated using the average of four different forward-looking models.

12. We use an average of four forward-looking models to estimate the nominal cost of equity. For more details, including robustness to different assumptions, see Witmer and Zorn (2007).

13. Our cost-of-equity estimates are likely higher than those from previous studies because our sample includes more small firms.

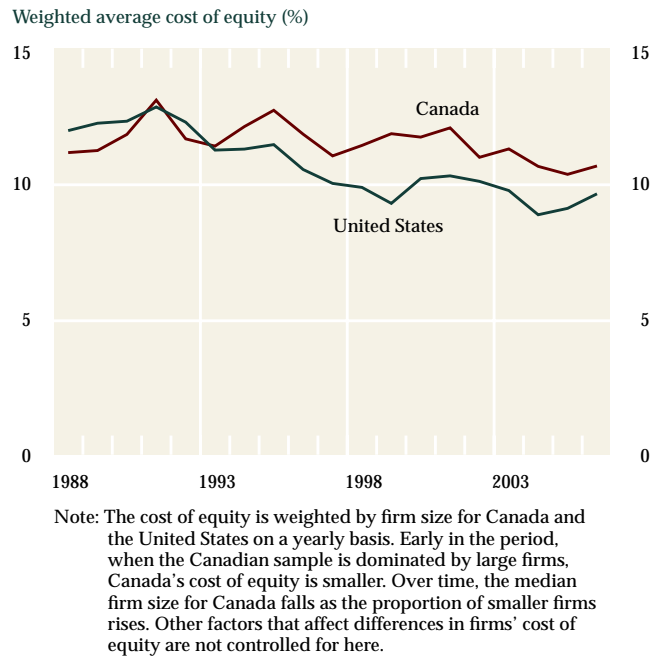
Chart 1
Median Cost of Equity by Industry, 1988–2006



It is not surprising that the median cost-of-equity estimate for firms in the Canadian sample is higher than that for firms in the U.S. sample.

Next, we break out industry and business cycle effects, presenting the cost-of-equity estimates by industry grouping (Chart 1) and by year (Chart 2). Grouping firms by their two-digit Standard Industry Classification code, it appears that Canada has a higher cost of equity in four of the six broad industry groups (although, again, we are not at this point controlling for all of the aforementioned firm characteristics). Looking at Chart 2, some general observations can be made: there is a downward trend in the cost of equity for both countries; there are similar cycles in the cost of equity for Canada and the United States; and Canada appears to have a higher cost of equity for most of the period. This reinforces the notion that the cost of equity is not static, but time varying. However, there are also differences in our sample of firms across time and countries. For example, at the beginning of the period, the Canadian sample is dominated by larger firms, but the median firm size falls over time as

Chart 2
Cost of Equity by Year, 1988–2006



the proportion of smaller firms rises. In contrast, the median firm size in the U.S. sample increases significantly over time. Because of sample differences such as this, there is a need to incorporate all of the identified factors into our analysis before making conclusions about the relative cost of equity.

Regression analysis

A regression analysis (see Box) can be used to identify the effects of the selected firm-level, industry-level, and business cycle effects on the cost of equity (COE).¹⁴ In this model, we explicitly control for firm size, as measured by the logarithm of book value of total assets (BV), financial leverage (LEV), effective corporate tax rates (TAX), the liquidity of a firm's stock (LIQ), and analysts' forecast dispersion (DISP). We control for changing economic conditions and industry effects by including year (YEAR) and industry (IND) dummy variables. The model also includes dummy variables denoting whether a firm is a U.S. firm (US) or a cross-listed Canadian firm (XLIST).

14. Again, we do not control for all possible influences on the cost of equity.

Box: Cost-of-Equity Regression

Using a panel data set, i.e., observations from many firms over many years, can present challenges for regression analysis, since the independent variables will vary both by time and by firm. This is complicated by the presence of time-invariant (dummy) variables. We overcome these difficulties by taking a two-step approach. In the first stage, a fixed-effects model is run using the time-varying independent variables:

$$COE_{i,t} = \alpha + \beta_{XLIST} XLIST_{i,t} + \sum_{t=1989}^{2006} \beta_{YEAR_t} YEAR_{i,t} + \beta_{BV} BV_{i,t} + \beta_{LEV} LEV_{i,t} + \beta_{TAX} TAX_{i,t} + \beta_{LIQ} LIQ_{i,t} + \beta_{DISP} DISP_{i,t} + u_i + \varepsilon_{i,t}.$$

In the second stage, a weighted least-squares model is run, which regresses the firm fixed-effect coefficient (u_i) from the first-stage regression on the time-invariant independent variables (the U.S. and industry dummy variables), as well as the firm averages of the time-varying independent variables

(to control for correlation between these variables and the firm fixed effects):

$$\hat{u}_i = \omega + \beta_{US} US_i + \sum_{k=1}^K \beta_{IND-k} \overline{IND}_{i,k} + \gamma_{XLIST} \overline{XLIST}_i + \sum_{t=1989}^{2006} \gamma_{YEAR_t} \overline{YEAR}_i + \gamma_{BV} \overline{BV}_i + \gamma_{LEV} \overline{LEV}_i + \gamma_{TAX} \overline{TAX}_i + \gamma_{LIQ} \overline{LIQ}_{i,t} + \gamma_{DISP} \overline{DISP}_{i,t} + v_i.$$

This set-up assumes common coefficients for all of the firms, both Canadian and U.S., in our sample and does not account for possible non-linear effects of our variables on the cost of equity.

With this approach, the resulting coefficient on the U.S. dummy variable (β_{US}) can be considered as the difference between Canadian firms' and U.S. firms' cost-of-equity financing (and, if multiplied by 100, it can then be expressed in basis points after accounting for the other regression variables).

The cost-of-equity differential between Canada and the United States over the 1988–2006 period is in the range of 30–50 bps.

Using a regression analysis that includes these firm characteristics, the results indicate that almost all of these control variables are statistically significant and have the expected relationship with the cost of equity (Table 2). For example, greater firm size is associated with a lower cost of equity; firms with more debt have a higher cost of equity; firms with higher stock liquidity have a lower cost of equity; and firms with more imprecise earnings estimates by analysts have a higher cost of equity. Once we account for all of these differences, plus the effects of industry member-

ship and business cycles, U.S. firms in our sample appear to have a lower cost of equity, by approximately 47 bps, than do the Canadian firms. After subjecting our regression results to a number of sensitivity tests,¹⁵ we conclude that for our sample of firms the cost-of-equity differential between Canada and the United States over the 1988–2006 period is in the range of 30 to 50 bps.

This analysis has improved upon previous studies by accounting for some of the differences across firms. It does not yet address, however, the possibility that differences in the risk-free rates faced by these firms could also be affecting their cost of equity. Failing to allow for different interest rate environments across countries may not lead to a fair comparison. The risk-free rate, typically represented by the longer-term sovereign bond yield, captures an important part of

15. All of our regression results are subjected to various robustness checks. In addition, results using other economic models are not significantly different from our own. See Witmer and Zorn (2007) for a discussion of these issues.

Table 2
Cost-of-Equity Regression Results, 1988–2006

	β_i	t-statistic
Constant	12.015	26.21*
Size (total assets)	-0.247	3.87*
Financial leverage	0.64	12.43*
Taxes	-0.009	3.45*
Stock liquidity	-0.101	2.69*
Forecast dispersion	8.56	13.94*
U.S. firm	-0.465	3.40*

* Significant at 1 per cent

Notes: This table presents results for a 2-stage regression involving the U.S. dollar nominal cost of equity for Canadian and U.S. firms. For convenience, we do not report values for industry, year (business cycle), and cross-listed dummy variables. Absolute values of t-statistics are adjusted for heteroscedasticity of errors at a firm level.

the macroeconomic environment faced by firms. It reflects differences in monetary and fiscal policy regimes, including their effects on inflation uncertainty.

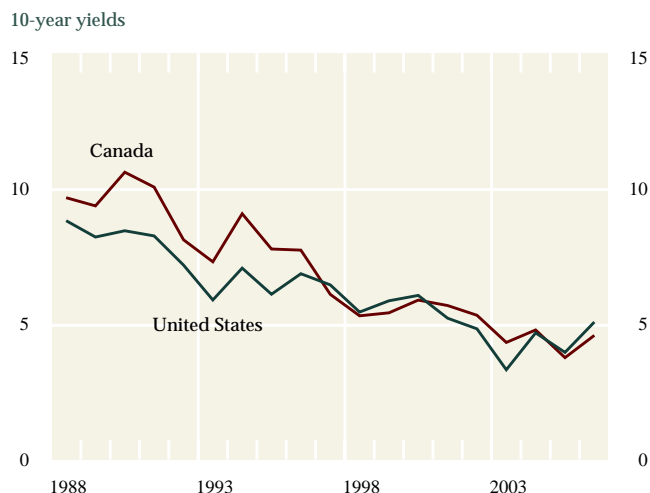
As Chart 3 shows, 10-year government bond yields declined between 1988 and 2006, roughly parallel with the decline in the cost of equity. However, there also appear to be two distinct interest rate periods. Canadian yields were much higher than U.S. yields during the first half of the sample period (1988–97), because investors demanded a higher risk premium to compensate for various factors, including high government debt levels and Quebec-related political uncertainty. Since 1997, there have been relatively small differences in yields between the two countries.

To examine the relation between bond yields and the cost of equity in our sample, we re-do our regression analysis in two different ways. First, we reformulate our regression equation to include nominal 10-year government bond yields as a right-hand-side variable¹⁶ and find that a 100 bp increase in 10-year yields contributes to an increase of almost 20 bps in a firm's cost of equity.¹⁷ With this specification, including the same regression variables plus 10-year yields, our tests are unable to conclude definitively that there is a difference between the Canadian and U.S. cost of equity. As a second test, we split our sample into two equal periods along the lines of the two interest rate periods

16. In this model, the dependent variable is the firm's nominal cost of equity in its local currency.

17. Without year dummies, the estimated effect is closer to a 40 bp increase in a firm's cost of equity.

Chart 3
10-Year Government Bond Yields, 1988–2006



that were identified: 1988–97 and 1998–2006. When our regression analysis is repeated, we find that, for 1988–97, the estimated differential between Canadian and U.S. cost of equity is very close to the full sample result in terms of sign, size, and statistical significance. However, in the latter period when sovereign bond yields were broadly similar in the two countries, the difference between the costs of equity in the two countries is lower, by about 20 bps, and is no longer statistically significant. This suggests that differences in longer-term sovereign bond yields may be a factor in explaining differences in the cost of equity.

Conclusions

The cost of equity for a firm is affected by several factors, some of which are related to characteristics of the firm itself, while others stem from the macroeconomic environment in which it operates. We find that greater firm size and greater liquidity of a firm's stock are associated with a lower cost of equity, while greater firm financial leverage and greater dispersion in analysts' earnings forecasts are associated with a higher cost of equity. Moreover, longer-term sovereign bond yields also seem to play a role in a firm's cost of equity. After taking firm-level and aggregate-level factors into account, the cost of equity in our sample was approximately 30–50 bps higher in Canada than in the United States over the 1988–2006 period. The cost-of-equity differential appears to be lower in the post-1997

period, when sovereign bond yields were relatively similar in the two countries.

These results have policy implications. For example, since a smaller firm size adds to the financing cost of Canadian firms, promoting firm growth could have the positive effect of reducing the cost of equity. Higher forecast dispersion, or disagreement among equity analysts regarding firm earnings, is associated with a higher cost of equity. If better disclosure contributes to better forecasting of firm earnings, then improved disclosure regulation and practices in Canada might contribute to a lower cost of equity for firms. Perceived improvements to securities regulation and enforcement might also lead to greater trading and liquidity of Canadian stocks, in turn reducing the Canadian cost of equity. Finally, longer-term sovereign bond yields matter. This suggests that recent fiscal and monetary policy regimes, which have focused on pursuing a low debt-to-GDP ratio and anchoring inflation expectations to a low-inflation target, have had beneficial effects on the cost of capital for Canadian firms.

Longer-term sovereign bond yields seem to matter for a firm's cost of equity, suggesting that recent fiscal and monetary policy regimes have had beneficial effects for Canadian firms.

A sizable band of error accompanies the cost-of-equity estimates presented in this article, so a precise numerical value for Canadian cost of equity cannot be produced. In the same vein, Canada-U.S. differences are represented as an approximate value. To refine our estimates further, other methodologies could be applied and other factors could be considered, such as currency risk, inflation uncertainty, degree of market integration, personal taxes, and differences in regulatory environments. By incorporating proxies for these factors and perhaps extending our comparison to more countries, we might obtain better precision in the estimates and a broader international context for interpreting the results.

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