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Abstract

This paper calculates an implied cost of equity for 19 developed countries from 1991 to 2006. During this period, there has been a decline in the cost of equity of about 10-15 bps per year, which can be partially attributed to declining government yields and declining inflation. Analyst forecast inaccuracy, a proxy for firm-level earnings opacity, is positively related to the cost of equity. If this variable captures differences in disclosure across firms, then improvements in disclosure regulation may benefit firms by lowering their cost of equity. I also include country-level variables that measure disclosure requirements, director liability, and the ability for shareholders to sue directors. Higher levels of these measures are associated with a lower cost of equity. Previous studies [e.g., Hail and Leuz (2006a)] have found a similar relation, but my study is unique in that it uses a different measure of investor protection, which may better reflect regulatory differences across countries, and it shows this relation holds for developed countries. After controlling for the characteristics of firms that analysts choose to cover in each country, differences in the properties of analyst forecasts across countries, and differences in accounting standards across countries, Canada's cost of equity is statistically different from a handful of countries and is about 20 to 40 bps higher than that of the United States. Lowering Canadian firms' cost of equity by this amount would have large economic benefits given the size of Canada's capital markets.

JEL classification: G30, G38
Bank classification: Financial markets; International topics

Résumé

L'auteur calcule le coût implicite des capitaux propres dans 19 pays développés de 1991 à 2006. Durant cette période, le coût des capitaux propres a diminué d'environ 10 à 15 points de base par année, en partie sous l'effet de la baisse des rendements sur les obligations d'État et du recul de l'inflation. Les erreurs de prévision des analystes, une variable d'approximation à l'égard de l'opacité entourant les profits des sociétés, sont en relation positive avec le coût des capitaux propres. Si cette variable rend bien compte des disparités dans la communication de l'information financière des firmes, il serait alors possible que l'amélioration de la réglementation en la matière bénéficie aux entreprises en induisant une réduction du coût des capitaux propres. L'auteur intègre en outre des variables nationales afin de quantifier les exigences relatives à la communication financière, la responsabilité des conseils d'administration et la latitude des actionnaires à poursuivre ces derniers. Le coût des capitaux propres est relativement bas lorsque ces variables sont élevées. Des études antérieures [p. ex., Hail et Leuz (2006a)] avaient établi un lien analogue,

mais l’étude de l’auteur se distingue à double titre : elle exploite une mesure différente de la protection des investisseurs, laquelle révèle peut-être mieux l’écart entre les réglementations nationales, et elle montre que ce lien vaut pour les pays développés. Une fois que sont prises en compte les caractéristiques des sociétés que les analystes choisissent de traiter dans chaque pays, ainsi que les différences entre les propriétés des prévisions formulées d’un pays à l’autre et entre les normes comptables nationales, il apparaît que le coût des capitaux propres au Canada diffère statistiquement de celui de certains pays et dépasse de quelque 20 à 40 points de base celui que supportent les entreprises américaines. Diminuer dans cet ordre de grandeur le coût des capitaux propres des firmes canadienne apporterait des avantages économiques importants vu la taille des marchés financiers au Canada.

Classification JEL : G30, G38
Classification de la Banque : Marchés financiers; Questions internationales

1. Introduction

There has been recent interest in identifying ways to reduce Canadian firms' cost of equity financing, since this would enable them to become more competitive in today's global capital markets and should ultimately increase Canadian economic growth. For the most part, the focus has been on comparing Canadian firms' cost of equity to that of the United States.[1] However, other jurisdictions, like the United Kingdom, have become an attractive destination for foreign firms to raise capital, and this could imply the United Kingdom has a lower cost of equity than in the United States. Therefore, in this paper, I calculate the implied cost of equity for non-financial firms across 19 developed countries to determine the characteristics that affect the cost of equity and to provide a broader range of benchmarks for which to compare Canada's cost of equity. I also identify a set of firm-level and country-level factors that affect the cost of equity.

I measure the implied cost of equity - the discount rate that equates the discounted value of analyst forecasts of firms' future earnings to the current stock price - using four different variations of the dividend discount model. A handful of previous studies have examined the implied cost of equity across developed and developing countries, but their focus is not on examining country-level estimates of the cost of equity. Indeed, very few studies actually provide country-level cost of equity estimates. Instead, these studies find that firms that face stronger legal institutions, the enforcement of insider trading, and more extensive disclosure, have a lower cost of equity. However, differences in accounting rules, and in the selection of firms that analysts cover, could impact the cost of equity across firms, countries, and time. This study accounts for these latter differences by focusing only on developed countries, where the differences in the strength of legal institutions and enforcement are less, and uses more independent variables reflecting accounting and analyst forecast differences that may have an effect on cost of equity estimates.

After measuring the implied cost of equity for 19 developed countries from 1991 to 2006, I find a decline in the cost of equity of about 15 bps per year on average across these 19 jurisdictions, which can be mostly attributed to declining government yields and declining inflation. When measuring a real cost of equity, and controlling for this decline in real

[1] See, for example, the Capital Markets Leadership Task Force Report (2006), the Task Force to Modernize Securities Regulation in Canada (2006), and Witmer and Zorn (2007).

government yields, this rate of decline is much smaller. There is also a small, positive relation between the real cost of equity and real government bond yields, illustrating the impact that fiscal and monetary policy may have on the real cost of equity.

Several variables are shown to be related to the cost of equity. Most notably, analyst forecast inaccuracy, a potential proxy for firm-level earnings opacity, is positively related to the cost of equity. If this variable captures differences in disclosure across firms, then improvements in disclosure regulation would benefit firms by lowering their cost of equity.

After controlling for the characteristics of firms that analysts choose to cover in each country, differences in the properties of analyst forecasts across countries, and differences in accounting standards across countries, Canada's cost of equity is statistically different from a handful of countries and the magnitudes of these differences are economically significant. For example, in several specifications the cost of equity for the United States is below that of Canada by a statistically significant 20 to 40 bps. Reducing market frictions in Canada and lowering Canadian firm's cost of equity by this amount would have large economic benefits given the size of Canada's capital markets.

Country-level differences in the cost of equity may be related to country-level factors such as securities regulation, enforcement, measurement error, or other variables not controlled for. Therefore, in lieu of the country dummy variables, I include country-level measures of disclosure requirements, director liability, and the ability for shareholders to sue directors. Higher levels of these measures are associated with a lower cost of equity. Previous studies [e.g., Hail and Leuz (2006a)] have found a similar relation, but my study is unique in that it uses a different measure of investor protection, which may better reflect regulatory differences across developed countries, and it shows that this relation does in fact hold for developed countries, whereas results from previous studies using other variables may have been driven by large differences between developed and developing countries.

The rest of the paper is organized as follows. In Section 2, I briefly review earlier studies that have calculated a cost of equity at an international level. Section 3 describes the dataset while Section 4 empirically examines the cost of equity and its drivers for international firms. I explore the robustness of the results in Section 5 and conclude in Section 6.

2. International Studies on the Implied Cost of Equity

Most recent research on international implied cost of equity has concentrated on relating a country's implied cost of equity to country-level institutional variables, such as legal institutions, enforcement of insider trading, disclosure, and corporate governance. These country cost of equity estimates are either measured as the median or mean of firm-level cost of equity estimates, or are calculated using aggregate stock index data.

2.1. Cost of Equity Estimates derived from Firm-level Data:

Hail and Leuz (2006a) estimate a country median of the firm-level cost of equity (measured in local currency) using four different models for 40 countries from 1992-2001. After controlling for several firm and country factors, they find that countries with weak legal institutions have a higher cost of equity than those with stronger institutions. However, they include both developing and developed countries in their sample, and it is plausible to think that the relation between the cost of equity and legal institutions is stronger for developing countries. First, developed countries are more integrated with global capital markets, making it easier for firms from these countries to opt-in to the regulation of other countries via a cross-listing, so differences in a country's legal institutions would be more likely to have an impact on a firm's cost of equity in developing countries. Second, the effect of legal institutions on the cost of equity may be non-linear, in that the effect of improving very weak legal institutions may be stronger than the effect of improving strong legal institutions. This also would suggest a stronger effect in developing countries since developing countries score lower on the measures used by Hail and Leuz (2006a).

Claus and Thomas (2001) also generate country cost of equity estimates using firm-level data for a handful of countries. The purpose of their paper is to show that their implied cost of equity methodology may be able to generate lower estimates of equity risk premia, compared with equity premia estimates generated from historic returns data. Their study focuses mostly on the United States, but they also provide cost of equity estimates using their methodology for five other countries to validate their U.S. results.

There are two studies on the international implied cost of equity that relate a firm-level cost of equity to firm-level variables. Francis, Khurana, and Pereira (2005) estimate a firm's implied

cost of equity using the Easton (2004) methodology. They examine the relation between a firm's cost of equity and its voluntary disclosure levels, which is measured as the difference between the firm's CIFAR score (a measure of disclosure in the firm's annual reports) and the minimum CIFAR score in the firm's country. Unfortunately, the authors only have CIFAR scores for the 1991 and 1993 fiscal years, and their sample contains only 274 firms. Nonetheless, they find that "firms in industries with greater external financing needs have higher voluntary disclosure levels, and that an expanded disclosure policy for these firms leads to a lower cost of both debt and equity capital." A second paper by Hail and Leuz (2006b) studies the impact of a U.S. cross-listing on foreign firms' cost of equity. They find that cross-listing on a U.S. exchange is associated with an economically significant decrease in the cost of equity, and that this decrease is more pronounced in firms from countries with weaker legal institutions.

2.2. Cost of Equity Estimates derived from Stock Index Data:

Studies in this category measure the country's cost of equity by applying the Gordon dividend growth model to data from the country's major stock index. Under the Gordon model, the country cost of equity is calculated as the sum of the stock index's dividend yield and the growth rate in its dividends, which is typically measured using the index's historical dividend growth rate. Bhattacharya and Daouk (2002) look at a specific security law across 103 countries, namely, insider trading. After controlling for several other variables, they show that a country's cost of equity, measured using stock index data, is not affected by the introduction of insider trading laws; however, there is a decrease in the cost of equity after the first prosecution of insider trading. Unfortunately, most developed countries examined here have had their first insider trading prosecution prior to the beginning of the sample period, so this variable is not used in the analysis. For example, they identify Canada's first insider trading prosecution as occurring in 1976.

Other studies using stock index data have also found that the country cost of equity estimate decreases with both increased disclosure and better quality disclosure. For example, Bhattacharya, Daouk, and Welker (2003) measure a country cost of equity using stock index data and find a positive relation between earnings opacity and implied cost of equity, showing that countries with poorer disclosure have a higher cost of equity. Daouk, Lee, and Ng (2006) construct a capital market governance variable for each country that incorporates the

enforcement of insider trading laws, earnings opacity, and short-selling restrictions within that country. They estimate the cost of equity for 22 different countries using stock index data and conclude that improvements in capital market governance are associated with an economically significant decrease in the cost of equity after controlling for other factors.

2.3. Summary of Previous Studies:

In most of these previous studies, the explanatory variables of interest are either discrete or dummy variables. Canada's enforcement index scores are, in several cases, the highest of all the countries in their analysis, which is contrary to the perception by some that Canada has difficulties in its prosecution of insider trading.[2] Hail and Leuz (2006a) find that higher levels of these scores are related to a lower cost of equity, but since Canada is the highest of all countries in several of these scores, there may be little room for improving cost of equity in Canada by improving this score. Another concern is that the theory underlying the measurement of the implied cost of equity measures has assumed U.S. accounting rules and standards. Chen, Jorgensen, and Yoo (2004) question whether these assumptions are valid in an international context. Specifically, implied cost of equity estimates derived from Residual Income Valuation Models (RIV) assume the clean surplus accounting relation. The authors examine seven developed countries and show that the European countries in their sample have more of a "dirty surplus" relation. Moreover, they find that RIV models underperform other implied cost of equity measures in European countries, while the opposite holds true for the United States, Canada, Australia, and Japan. This suggests that accounting rules could have an impact on the level of cost of equity across countries, so I include variables to account for some of these differences.

Few of the international studies on the implied cost of equity provide country cost of equity estimates and, moreover, the cost of equity estimates by country vary across studies, given that these studies cover a different time period, include a different sample of firms in their analysis, and calculate the cost of equity using different methods and in different currencies (i.e., local currency vs. a USD basis). The implied cost of equity estimates from three prior studies are displayed in Figure 1 and the only definitive conclusion across countries is that Japan has either

[2] For example, Bhattacharya comments that "Canada is a first-world country with second-world capital markets and third-world enforcement." Source: "Ontario Securities Commission Pathetic Expert Say", Toronto Star, December 1, 2007.

the lowest or second lowest cost of equity in all three studies. The study by Daouk, Lee, and Ng, which examines the longest time period, has a large variation in cost of equity across countries (ranging from 5.4% to 14.2%). Their study estimates the cost of equity using stock index data, which is heavily weighted to the largest firms in each country, and uses the Gordon Dividend Growth Model, which is very dependent on the estimate of the long-term growth rate in dividends.

Aside from Japan, the country cost of equity estimates for the other two studies, which use firm-level data to generate the country cost of equity, are relatively close with most estimates in the 10-11% range; however, one cannot determine from the data provided whether these country estimates are statistically different from one another. Moreover, the intent of these studies was not to determine whether there are cost of equity differences across countries – these cost of equity estimates are just a summary of the data in each of the studies. Therefore, the estimates available in these current studies should not be used to compare across countries since they do not account for differences in firm or country characteristics.

2.4. Contribution to the literature:

This paper makes three contributions to this literature. First, I include additional firm-level variables and use a Fixed Effects analysis to examine the impact of these variables on the cost of equity at a firm level, and I examine how the relation between the implied cost of equity and these firm-level variables differ across countries. Previous studies either use a country-level panel dataset[3], or use a firm-level dataset within the United States. The benefit of this study is that it takes advantage of within country and within firm variation in the variables to estimate their relation with the cost of equity.

I include additional firm-level variables to account for differences in accounting frameworks across firms (e.g., Historical Cost Accounting vs. Modified Historical Cost and IASB vs. Home country Accounting Standards) and differences in analyst optimism (e.g., analysts are more optimistic for firms that are not profitable). Also, Bhattacharrya, Daouk, and Welker (2003) suggest that "... future research could develop techniques to assess earnings opacity at the

[3] For example, Hail and Leuz (2006a) measure a country's cost of equity as the median of the firm-level cost of equity in each year, then regress this country cost of equity on the (country-year) median of other firm-level variables, as well as several country-level institutional variables.

individual firm level, and then test for links between earnings opacity and equity market variables at the firm level rather than at the country level." I do so by including Analyst Forecast Inaccuracy as a proxy for firm-level earnings opacity [See Hope (2003)] and find that firms' cost of equity is higher when this proxy for earnings opacity is higher.

Second, I measure country-level effects on the cost of equity after controlling for firm-level and country-level factors that may affect the cost of equity. Moreover, I measure the cost of equity in two different ways for comparability: 1) in USD and 2) in real instead of nominal terms. In doing so, I can compare the cost of equity across countries and get a sense of the precision of the country-level cost of equity estimates (i.e., whether country-level cost of equity estimates are statistically different from one another).[4]

Third, this paper adds to this literature by including investor protection indices reflecting investor protection against self-dealing by corporate insiders [World Bank (2008), Djankov et al (2008)] and by only focusing on developed countries in order to eliminate the influence that developing countries may have on the results. These indices measure the extent of disclosure, extent of director liability, and ease of shareholder suits in each country. The authors report: "This theoretically-grounded index predicts a variety of stock market outcomes, and generally works better than the commonly used index of anti-director rights [by La Porta et al (1997)]." [5] Canada is not the best performing country according to these indices, which makes it easier to argue that improvements can be made to the cost of equity in Canada, and better reflects the widely-held belief of problems in enforcement in Canada.[6] Moreover, I purposefully focus on developed countries only, since the effects of regulation on the cost of equity in previous papers may be driven by the developing countries. Therefore, I can better determine the strength of the relation between the cost of equity and regulation in developed countries.

[4] However, the standard errors of these country-level cost of equity estimates are probably larger than reported in this paper given that there could be measurement error at the country-level (i.e., in exchange rate and inflation forecasts) that is not accounted for.

[5] Some authors have identified problems in the ADRI index. For example, Spamann (2006) finds inconsistencies in the La porta et al Index. He re-codes La Porta et al's (1998) Anti-Director Rights Index (ADRI) to be consistent across countries using the same definitions and finds that the ADRI is unlikely to be a valid measure of shareholder protection.

[6] David Dodge, in his speech to the Economic Club of Toronto on *Improving Financial System Efficiency: The Need for Action,* suggests "... there still is a perception, both in Canada and abroad, that Canadian authorities aren't consistent in their efforts to enforce the rules against insider trading and other offences, nor tough enough in rooting out and punishing fraud.", December 11, 2006.

3. Data

I estimate the implied cost of equity for individual firms in 19 countries over each year of the sample (1991-2006) using firm-level data. The implied cost of equity in this paper is calculated as the average of four implied cost of equity models, each based on the dividend discount model: r_ct [Claus and Thomas (2001)]; r_lns [Lee, Ng, and Swaminathan (2004)]; r_oj [Ohlson and Juettner-Nauroth (2000)]; and r_mpeg [Easton (2004)]. For details on the calculations underlying each of these models, please see the appendix. For a more detailed discussion, the reader is referred to Witmer and Zorn (2007).

3.1. Data Required for Cost of Equity Measures:

This study focuses on firms from developed OECD countries (GNP per capita greater than $20,000) which have at least 100 firm-year observations on the cost of equity. My sample covers OECD nonfinancial firms covered by I/B/E/S and Compustat over the period 1991-2006. The two datasets are merged together using company names, and I use the I/B/E/S forecast that is made six months before the fiscal year-end since the prior-year earnings results should be available by this time. COMPUSTAT data is for the year ending prior to the date of the I/B/E/S forecast. Also, firm-level data for a country are excluded if the cost of equity cannot be calculated for a minimum of 10% of the firms within that country, within that year.[7] This is to ensure that the observations represent a broad enough cross-section of firms within that country, and to minimize forecast bias which may arise when analysts cover only the top firms within a country. However, even after applying this filter, analyst coverage bias will still exist to the extent that analysts systematically cover firms that have higher quality information environments[8] or firms that they feel have favorable future performance [e.g., McNichols and O'Brien (1997)]. After applying this filter, I have data for firms from the 19 countries listed in Table 1.

[7] This screen mostly eliminates Japanese firms in the early 1990s, when I measure a cost of equity for only about 5% of Japanese firms in the COMPUSTAT sample.

[8] For example, Boubaker and Labegorre (2007) examine French-listed firms and find lower coverage among firms that are managed by a controlling family member. However, they also show that analysts are more likely to cover firms owned through pyramid structures or have shares with different voting rights relative to cash flow rights, suggesting that analyst coverage may be in demand when there is a higher likelihood of expropriation. For a more detailed discussion of analyst coverage bias and its potentail effect on the cost of equity, see Witmer and Zorn (2007)

The implied cost of equity is calculated using the following variables: current share price (P_0); one-year and two-year ahead earnings per share forecasts converted to U.S.D. (e_1 and e_2); payout ratio (d/e); book value per share (bv_0); and the long-term growth rate in earnings per share (g_L).

The current share price and the median earnings per share forecasts (in local currency) are from I/B/E/S, and are converted into U.S.D. by assuming a random walk so that future earnings forecasts in U.S.D. are calculated by multiplying local currency forecasts by the current exchange rate. This is also robust to different conversion methods [See Witmer and Zorn (2007)]. Each firm's book value of equity is taken from Compustat and is converted to a per share figure by dividing by the number of shares from I/B/E/S. The payout ratio, also from Compustat, is the average historic payout ratio over the previous three year period,[9] restricted to be between zero and one; otherwise, it is treated as missing. The firm's future payout ratio is assumed to equal the firm's average payout ratio over the prior three years. If the firm's payout ratio is missing for each of the prior three years, the future payout ratio is assumed to equal the country's mean payout ratio in that year. As in Claus and Thomas (2001) and Hail and Leuz (2006a, 2006b), I set the long-term growth rate in earnings per share to the expected inflation rate. Since I am meausuring a cost of equity in U.S.D., I use the U.S. expected inflation rate, taken from the IFO World Economic Survey (through Datastream), which quarterly polls economic experts about the expected future development of inflation.

3.2. Data Required for Control Variables:

In the regression analysis, I include several variables to account for differences in the characteristics of firms across countries, including firm size and leverage. As well, I also examine a set of variables that attempt to control for differences in analyst forecast properties across countries since they could bias the calculated cost of equity estimates if they themselves are biased. Therefore, in addition to year and industry dummy variables[10] (seven industry groupings based on 2 digit SIC codes), the following variables are included:

[9]The payout ratio is calculated as dividends ÷ earnings per share. Dividends are Compustat Data#26 and earnings per share are Compustat Data#58. If dividends are missing, I assume that the firm pays $0 in dividends in that year.
[10] Year dummy variables are included to control for time effects in the implied cost of capital, as well as changes in analyst coverage of firms through time. For example, there is a large increase in analyst coverage in the late 1990s around the dot-com boom.

Firm Size: ***A larger firm size should be associated with a lower cost of equity.*** It is well-documented that larger firms tend to have lower expected returns [Fama and French (1993), Banz (1981)], which could be due to the fact that larger firms are generally more liquid and tend to be more transparent and have a greater analyst following. Firm size is measured as the logarithm of the firm's book value of total assets (Compustat Data#89).

Financial Leverage: ***Greater financial leverage should be associated with a higher cost of equity.*** [11] Financial leverage is measured using the firm's debt/equity ratio (Compustat Data#106/Compustat Data#135).[12] The cost of equity of a levered firm should be higher than the cost of equity of an unlevered firm and be increasing in the firm's debt/equity ratio.

Forecast Dispersion: ***Greater forecast dispersion should be associated with a higher cost of equity.*** In this study, the cross-sectional standard deviation of analysts' earnings per share estimates (from I/B/E/S), scaled by book value per share, is used as a proxy for firm-level earnings variability [Gebhart, Lee, and Swaminathan (2001)]. However, forecast dispersion may also capture effects related to the quality of the firm's information environment [Lang and Lundholm (1996)].

Forecast Inaccuracy: ***Greater forecast inaccuracy should be associated with a higher cost of equity.*** Several studies have found that increased, better quality disclosure is associated with a lower cost of equity.[13] In this study, the absolute value of the previous year's forecast error (expected earnings per share minus actual earnings per share), scaled by book value per share, is used as a proxy for disclosure, with a lower forecast inaccuracy representing better firm-level disclosure. This measure of disclosure is motivated by the results in Hope (2003), Basu, Hwang, and Jan (1998), and Khanna, Palepu, and Chang (2000) who find that forecast accuracy is positively related to firm-level disclosures.[14]

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[11] See Modigliani and Miller (1958).

[12] To eliminate the impact of outliers, we exclude observations above the 99th percentile for the following variables: Debt/Equity Ratio, Forecasted Growth Rate (g_S), and Forecast Dispersion.

[13] For theoretical work, see Lambert, Leuz, and Verrecchia (2006). Empirical studies examining the relation between disclosure and the cost of equity include those by Bhattacharya, Daouk, and Welker (2002); Botosan (1997); Botosan and Plumlee (2003); Berger, Chen and Li (2006); Chua, Eun, Lai (2006); Hail and Leuz (2006a), Gebhardt, Lee, and Swaminathan (2001), Gietzmann and Ireland (2005), and Gode and Mohanram (2003).

[14] However, studies by Lang and Lundholm (1996), Adrem (1999), and Eng and Teo (2000) find no statistical relation between forecast accuracy and disclosure.

Current Loss Dummy variable: ***Firms experiencing losses should be associated with a higher calculated cost of equity.*** Ang and Ciccone (2001) examine analyst forecast properties across 42 countries and find that firms with losses are associated with higher forecast error and forecast optimism across all countries. Earnings estimates for firms with losses exceed ex-post actual earnings 87% of the time on average, while earnings estimates for firms with profits exceed ex-post actual earnings 52% of the time on average. This should generate a higher future earnings yield if the stock price does not reflect this optimism of analysts; that is, the stock price reflects investors' expectations and investors adjust analysts' expectations of future earnings to account for this optimism. All else equal, a higher level of optimism for these firms will result in a higher calculated cost of equity given the positive relation between the implied cost of equity and future earnings yields and growth. The loss dummy variable takes the value of 1 if the latest fiscal year's earnings (Compustat Data#32) are negative.

Forecast Bias: ***Countries with higher analyst forecast bias may have more biased forecasts, which would result in a higher calculated implied cost of equity.*** It is well-documented that analysts typically are biased [McNichols and O'Brien (1997), O'Brien, McNichols, and Lin (2005)] and that this bias could be different across countries [Ang and Ciccone (2001)]. Given the positive relation between the implied cost of equity and future earnings and growth, a positive bias in earnings forecasts would result in a positive implied cost of equity bias [e.g., Hail and Leuz (2006a)]. In each country-year, the aggregate forecast bias is measured as the previous year's median firm forecast error (expected earnings per share minus actual earnings per share), scaled by book value per share. Although similar in construction, there is only a small positive correlation between this measure and Forecast Inaccuracy.

Accounting Dummy variables: ***Differences in accounting methods may also have an impact on the calculated cost of equity.*** Given that the implied cost of equity measures are calculated using estimates of accounting earnings, differences in accounting methods may have an impact on the cost of equity calculation. That is, firms using accounting methods that are more unconditionally conservative would, all else equal, have a lower calculated implied cost of equity. Two different accounting dummy variables are used. The first dummy variable, ACCOUNTING, takes the value of 1 if the firm uses historical cost based accounting

(Compustat Data Item AMTHD = H). The second variable, IASB, is a dummy variable indicating whether the firm uses International Accounting Standards.

These variables are meant to control for, as best as possible, differences in firm and institutional characteristics across countries. However, even after controlling for the above variables, differences in accounting, or in analyst forecast properties, may still not be fully accounted for. Therefore, the country-level effects examined later can be interpreted, or explained, as measuring these differences, as well as differences in corporate governance, legal environments, currency risk, stock market segmentation, or other factors not included in this analysis.

3.3. Description of Data:

Table 1 provides a summary for each of the control variables for the 19 countries in the dataset. The United States accounts for over half of the firm-year observations, while Canada, France, Germany, Great Britain, Australia, Netherlands, and Japan are the only other countries with at least 1000 observations. Since the sample firms are selected as a function of analyst coverage and data availability, these sample statistics may not represent actual differences in the population of firms in these countries. However, they may be useful in explaining observed differences in the sample country-level cost of equity. Nonetheless, Japan, Italy, Spain, Switzerland, and the United States have the highest median firm size, all with a book value of total assets over $500M. The median British firm is much smaller at about $275M in total assets. The median firm size in most other countries lies somewhere in this range with Canada being almost directly in the middle.

Most countries have a relatively small median firm leverage. New Zealand's median Debt/ Equity ratio of .48 is the highest of all countries in the sample. There is considerable variation in the median Forecast Dispersion across countries. The U.S. exhibits the lowest median Forecast Dispersion of .005, while other countries, like Norway, have a Forecast Dispersion that is five times this magnitude. The median Canadian firm has a Forecast Dispersion measure that is just over twice that of the United States. The table also displays the median Forecast Inaccuracy for each country in the sample. Again, the United States is lowest on this measure, whereas other countries, such as Sweden and Finland, have a high Analyst Forecast Inaccuracy. Canada' Forecast Inaccuracy lies between these extremes.

Figure 2 examines the median cost of equity by country for my sample of firms before accounting for any firm-level or country-level factors. At a top-level, it is in-line with previous studies, showing that Japan has the lowest cost of equity. The cost of equity for Canada is higher than in other developed countries like the United States, France, Germany and Great Britain, but is lower than in many Scandinavian countries. These differences could be due to institutional differences across countries as well as differences in the attributes of the sample of firms in each country.

As a first cut, Figure 3a plots the median country-year cost of equity against median country-year Forecast Dispersion and it appears that there is a strong positive association between these two variables. That is, countries with higher forecast dispersion, or disagreement amongst analysts, also have a higher cost of equity. Figure 3b repeats this analysis with cost of equity plotted against median firm size, and shows a negative relation between these variables, as expected. In Figure 3c, there is a positive relation between ten year yields and the cost of equity, although the slope of the line is less steep then expected (i.e., there is not a one-for-one increase in the cost of equity with an increase in ten year yields).

4. Empirical Analysis

Cost of equity differences across countries are estimated using a firm-level fixed effects panel regression model that controls for: firm size, as measured by the logarithm of book value of assets (BVA); financial leverage (LEV); a loss indicator dummy variable (LOSS); analyst forecast dispersion (DISP); analyst forecast bias (FBIAS), analyst forecast inaccuracy (FINACCURACY), an accounting standards indicator dummy (IASB); a time trend (t), as well as business cycle effects by including year (YEAR) dummy variables. For this regression analysis, a Hausman (1978) test suggests that the Fixed Effects model is preferable to a Random Effects. The model standard errors are clustered by firm and the full model is written below:

$$\begin{aligned} COE_{i,t} = \alpha + \sum_{t=1991}^{2006} \beta_{YEAR\_t} YEAR_i + \beta_{BVA} BVA_{i,t} + \beta_{LEV} LEV_{i,t} + \beta_{DISP} DISP_{i,t} \\ + \beta_{LOSS} LOSS_{i,t} + \beta_{FBIAS} FBIAS_{i,t} + \beta_{FINACCURACY} FINACCURACY_{i,t} \\ + \beta_{IASB} IASB_{i,t} + \mu_i + \varepsilon_{i,t} \end{aligned} \quad (1)$$

Since the fixed effects regression eliminates any time-invariant variables, in a second stage, the firm fixed effect coefficient ($\hat{\mu}_i$) is regressed against the country (COUNTRY), industry (IND), and accounting method (ACCOUNTING) dummy variables, as well as the firm averages of the time-varying independent variables [15]. Basically, this extracts the average firm fixed effect by country, after controlling for industry and accounting differences. The averages of the time-varying independent variables are included to control for correlation between these variables and the firm fixed effects.[16] The country group dummy variables indicate the company's country of incorporation (from COMPUSTAT). Countries with a small number of observations are grouped together or with similar larger countries, given that there is limited statistical power to find evidence of statistical significance in countries with few observations. Therefore, from the nineteen countries, there are eight country group dummy variables: USA, JAPAN, GREAT BRITAIN and IRELAND, NORDIC countries, AUSTRALIA and NEW ZEALAND, FRANCE, GERMANY, and OTHER EUROPEAN.[17] There is no country dummy variable for Canada since it will be used as the basis for comparison[18]:

$$\begin{aligned}\hat{\mu}_i = \omega &+ \sum_{1} \beta_{COUNTRY} COUNTRY_i + \sum_{k=1}^{K} \beta_{IND\_k} IND_{i,k} + \beta_{ACCOUNTING} \overline{ACCOUNTING}_i \\ &+ \sum_{t=1991}^{2006} \gamma_{YEAR\_t} \overline{YEAR}_i + \gamma_{BVA} \overline{BVA}_i + \gamma_{LEV} \overline{LEV}_i + \gamma_{DISP} \overline{DISP}_i + \gamma_{LOSS} \overline{LOSS}_i \\ &+ \gamma_{FBIAS} \overline{FBIAS}_i + \gamma_{FINACCURACY} \overline{FINACCURACY}_i + \gamma_{IASB} \overline{IASB}_i + v_i\end{aligned} \quad (2)$$

[15] This is based on the Krishnakumar (2003) model. The coefficients and their standard errors for the time-invariant variables are identical to those from a between effects regression. I use weighted least squares in this second stage regression to account for unbalanced panels. However, OLS is also consistent and yields similar results.

[16] There are different methods for estimating time-invariant models in a panel setting that make different assumptions about the error structure in the panel dataset. One such method for extracting time-invariant variables from a fixed effects regression does not use the averages of the time invariant variables in the second stage [e.g., Polacheck and Kim (1994), Oaxaca and Geisler (2003)]. Results excluding these time-invariant variables yield slightly larger differences between Canada and other countries such as the United States. Oaxaca and Geisler (2003) show that using a GLS estimation procedure in the second stage yields results identical to pooled OLS for the time-invariant variables. Other regression methods, such as Pooled OLS, will be presented later in the paper.

[17] NORDIC countries include Finland, Norway, Sweden, and Denmark. OTHER EUROPEAN includes Austria, Belgium, Italy, Netherlands, Spain, and Switzerland. From here on, these country group dummy variables will simply be referred to as country dummy variables.

[18] Later, these country-level variables will be replaced with country-level indices that measure factors such as investor protection in each country.

The results from the Fixed Effects regression are displayed in Table 2, Panel A, and the second stage regression results are displayed in Panel B. The first model in Table 2 regresses the cost of equity on firm size and leverage, and includes industry, year, and country dummy variables as well as a time trend. The coefficients on firm size and leverage are both significant and have the expected sign. The overall cost of equity has declined over the sample period by about 14 bps a year, as indicated by the time trend variable. In Panel B, a number of the coefficients on the country dummy variables are statistically significant. Specifically, the United States, France, and Japan both have a cost of equity that is lower than in Canada, while Australia, New Zealand, Germany, and Nordic countries have a cost of equity that is higher than in Canada. The coefficient on the USA dummy variable indicates a cost of equity in the United States that is about 40 bps lower than in Canada, which is in line with previous results [Hail and Leuz (2006a); Witmer and Zorn (2007)]. In Model (1) Japan's cost of equity is about 95 bps lower than in Canada. As Figure 1 shows, most studies typically find that Japan has a much lower cost of equity than in other countries. Differences in inflation and in government bond yields may explain part of this difference, which will be examined later. However, this difference could also be due to differences in accounting or in analyst forecast bias, especially given the fact that the analyst forecasting environment is very different in Japan in that management also provides earnings forecasts for most firms [Kato, Skinner, and Kunimura (2006)].

In Model (2), Analyst Forecast Dispersion is added to the regression and it has a large, positive effect on the cost of equity for firms. The effect of the size variable is less pronounced (and is not statistically significant), given that larger firms tend to have lower Forecast Dispersion. This variable has a minor impact on the coefficients of the country dummy variables. In Model (1), U.S. firms had a 41 bps lower cost of equity, while in Model (2) this difference is 16 bps and is not statistically significant.

Model (3) adds Analyst Forecast Inaccuracy as a proxy for firm-level disclosure and this variable has a statistically significant, positive impact on the cost of equity. Analyst Forecast Inaccuracy may capture both voluntary and involuntary aspects of firm disclosure. This variable may suffer from endogeneity in that firms may need or want to disclose more information when they are raising external capital, and firms that are raising external capital may be the ones that

have a lower cost of equity. Regardless, these results suggest that enabling analysts to make more accurate forecasts through improved disclosure regulation may contribute to a lower cost of equity for firms.

The fourth model includes variables that account for differences in accounting and analyst forecast properties across countries. The Loss Dummy coefficient is positive and statistically significant, indicating that firms with losses have a cost of equity that is 163 bps above profitable firms. Again, this variable is meant to control for analyst forecast optimism, given that analysts are overly optimistic on the future earnings of loss firms across most countries. The coefficient on Forecast Bias is not statistically significant. Finally, the IASB dummy variable is positive and is statistically significant. Therefore, firms using this accounting standard seem to have a slightly higher calculated cost of equity. However, with the exception of the Forecast Inaccuracy variable, these three variables do not have much of an effect on the magnitude or significance of the other coefficients in this regression. Forecast Inaccuracy changes because this variable is correlated with the Loss Dummy variable.

4.1. Controlling for Risk-free Rates:

Cross-country differences in the cost of equity can also be impacted by cross-country differences in risk-free rates, so the above analysis is repeated to account for differences in risk-free rates across countries. For this analysis, instead of converting cash flows to U.S. dollars to calculate a U.S.D. cost of equity, a real cost of equity is calculated. First, forecasted local currency earnings per share are converted into real terms by deflating by the expected inflation rate (from the IFO World Economic Survey) in each country. Then, a real cost of equity is calculated, assuming zero percent long-term growth in real earnings per share.[19]

Some studies equate the equity risk premium with the real cost of equity [e.g., Jorion and Goetzmann (2000)], so in this sense the real cost of equity here may be closely related to the equity risk premium. However, I also include local country government Real Ten Year Yields as an explanatory variable, which are measured by subtracting the expected inflation in local currency from the nominal ten year yields. The coefficient on the Real Ten Year Yield variable

[19] This is consistent with earlier calculations of a nominal USD cost of equity, which assumed long-term growth as the rate of US inflation. Results are similar if a nominal cost of equity is calculated in local currency (assuming long-term growth equals expected inflation in that country), and then converting it into a real cost of equity by subtracting expected inflation.

is positive and statistically significant. However, its coefficient is only about 0.2 to .25, much smaller than one. This could be the case if the cost of equity estimates are noisy, if the equity risk premium is not constant, or if underlying government bond yields themselves contain a time-varying risk premium.

The other results here are broadly similar to what was reported earlier, given that the coefficients on the control variables have only changed slightly. Although the time trend is still negative and statistically significant, its coefficient is about one-third the size of the time trend coefficients examined Table 2, suggesting that most of the decline in the nominal cost of equity can be attributed to declining government yields and inflation. After including government yields, the Japan country dummy is much less negative. In all models examined in Table 3, the U.S. dummy variable is statistically significant and negative, so that U.S. firms have a lower cost of equity than that of Canadian firms.

4.2. Examining country-level Regulation Variables:

Previous studies have concentrated on relating the cost of equity to country-level variables reflecting different aspects of regulation and disclosure across developed and developing countries. As discussed earlier, the effects found in these papers may be driven by large differences between developed and developing countries, in which case it may be difficult to relate it to the regulation in developed countries. Moreover, Canada is the best performing country along many measures used in these studies, which makes it difficult to prescribe enhanced regulatory measures to improve the cost of equity in Canada, and may not reflect the widely-held belief of problems in enforcement in Canada. This paper adds to this literature by including different measures reflecting investor protection against self-dealing by corporate insiders [Djankov et al (2008)] and by only focusing on developed countries in order to eliminate the influence that developing countries may have on the results.

I use the World Bank's (2008) Investor Protection Indices, which are adapted from Djankov et al (2008). These indices are based on a hypothetical transaction between two companies in which the owner has controlling stakes, and measures the extent of disclosure, extent of director liability, and ease of shareholder suits in relation to the transaction. Each of these indices is measured on a scale of 0 to 10 (with 10 representing more disclosure, more director liability, or more ability for shareholders to sue), and are also averaged to develop an overall Investor

Protection Index. On the overall Investor Protection Index, Canada scores an 8.3 whereas the maximum score among our sample of countries is 9.7. On the Disclosure Index, Canada scores an 8 while other countries (such as Great Britain France, and New Zealand) score 10, so there is room for Canada to improve on this measure. Similarly, Canada scores an 8 on the Shareholder Lawsuits Index, whereas the maximum score for our sample of countries on this score is 10. As a first cut, Figure 4 shows the relation between the country median cost of equity and the Investor Protection Index. Overall, there seems to be a slight negative relation between this index and the real cost of equity. However, there are some outliers, which could be due to firm characteristics or other factors affecting the country median cost of equity.

Therefore, I test whether countries that score higher on these measures have a lower cost of equity. To do so, I repeat the two stage Fixed Effects regression from earlier. In the first stage, I run the same regression as in the last column in Table 3, Panel A. Then, in a second stage regression, I regress the firm Fixed Effects on the Investor Protection Measures as well as industry and accounting controls and the firm averages of the time-varying independent variables:

$$\begin{aligned}\hat{\mu}_i = \omega + \beta_{PROTECTION} PROTECTION + \sum_{k=1}^{K} \beta_{IND\_k} IND_{i,k} + \beta_{ACCOUNTING} \overline{ACCOUNTING}_i \\ + \sum_{t=1991}^{2006} \gamma_{YEAR\_t} \overline{YEAR}_i + \gamma_{BVA} \overline{BVA}_i + \gamma_{LEV} \overline{LEV}_i + \gamma_{DISP} \overline{DISP}_i \\ + \gamma_{LOSS} \overline{LOSS}_i + \gamma_{FBIAS} \overline{FBIAS}_i + \gamma_{FINACCURACY} \overline{FINACCURACY}_i + \gamma_{IASB} \overline{IASB}_i + v_i\end{aligned} \quad (3)$$

The results for four regressions (one on each of the individual Indices) are presented in Table 4. All of the coefficients on the Indices are negative and statistically significant indicating more extensive investor protection measures are associated with a lower cost of equity. The Investor Protection measure, for instance, shows a 12 bps drop in the cost of equity associated with each unit increase in this measure. If Canada were to increase its performance along this index to match the top-performing country along this measure, it could represent a potential decrease of about 20 bps in the cost of equity.

5. Robustness Tests

I perform three different sets of robustness checks. First, I run fixed effects within each country to examine how the relation between the cost of equity and the firm-level variables differ across countries. Some variables, such as leverage, the loss dummy, and forecast dispersion, are relatively consistent in the sign and statistical significance level of their coefficients across countries. However, there are some differences in the relation between the cost of equity and other firm-level variables across countries. Second, I estimate the country dummy variables using different econometric methods for dealing with time-invariant variables within a dataset. The country dummy variables in these models are similar in magnitude and / or statistical significance in a majority of these other models, so their results appear to be relatively robust to different econometric specifications. Third, I check the sensitivity of the effect of the country level institutional variables on the cost of equity by performing regressions using the country-year medians of all variables, instead of performing the analysis at a firm level, and the results are similar to what was reported earlier.

5.1. Country Level Fixed Effects Regressions:

The panel regression setup used up to this point has assumed common coefficients across all countries. This may particularly be a problem given that U.S. firms comprise more than half of the sample. To verify whether coefficients may vary across countries, I run fixed effects regressions within each of the country groups using the real cost of equity measure. Although this does not formally test whether coefficients are significantly different from each other, it does determine whether the coefficients have the correct sign within each country.[20]

For Canada, all of the coefficients have the same sign as the fixed effects regressions with countries pooled together (See Table 5). The forecast dispersion effect is much weaker in Canada than in the pooled regressions. The coefficient on firm financial leverage is positive across all country groupings, and is statistically significant in five of the nine groups. The same holds for the forecast dispersion coefficient: it is positive in all but one country and statistically significant in five of the nine countries. Size is only negative and statistically significant in the United States and Canada and has a negative coefficient in only four of the nine groupings. It is positive and significant in four country groups. However, this effect may be attributable to a

[20] Most coefficients are statistically different from each other across countries when using a single equation and interacting the country coefficients with each of the variables.

smaller sample size, as well as correlations between size and other variables such as forecast dispersion.[21] The Real 10Yr Government Yields coefficient for Canada is 0.195, similar to the result with all countries pooled together. This coefficient is positive in eight of the nine groups, being statistically significant in seven of the groups.

5.2. Other Econometric Methods:

A number of econometric methods have been used in the literature to measure the impact of time invariant variables (e.g., the country dummy variables) in a panel setting. These methods make different assumptions about the structure of the regression error terms (and in particular the relation between the unobservable firm fixed effects and the other explanatory variables). I test two other econometric methods that can be used to measure the effects of time invariant variables in a panel setting: 1) Fama-Mcbeth (1973) regressions, and 2) Pooled OLS regressions.

5.2.1. Fama-Mcbeth Regressions:

I run Fama-Mcbeth regressions, which produce unbiased standard errors in the presence of a time effect, although the inclusion of year dummy variables in the earlier analysis may also adjust properly for a time effect [Petersen (2007)]. In the Fama Macbeth (1973) approach, I first run 15 cross-sectional regressions, one for each year in the sample:

$$\begin{aligned} COE_{i,t} = \omega + \sum_{1} \beta_{COUNTRY,t} COUNTRY_i + \sum_{k=1}^{K} \beta_{IND\_k,t} IND_{i,k} + \beta_{BVA,t} BVA_{i,t} + \beta_{YIELD} YIELD_{i,t} \\ + \beta_{LEV,t} LEV_{i,t} + \beta_{DISP,t} DISP_{i,t} + \beta_{LOSS,t} LOSS_{i,t} + \beta_{FGROWTH,t} FGROWTH_{i,t} \\ + \beta_{ACCOUNTING,t} ACCOUNTING_{i,t} + \varepsilon_{i,t} \end{aligned} \quad (4)$$

The Fama-Mcbeth coefficient estimate is the average of the 15 cross-sectional coefficient estimates. For example, the Fama-Mcbeth estimate of the leverage coefficient would be:

$$\hat{\beta}_{LEV,FM} = \sum_{t=1991}^{2006} \beta_{LEV,t} \quad (5)$$

[21] Also, in a random effects estimation the size coefficient is negative across all countries, consistent with larger firms having a lower cost of equity.

The Fama-Mcbeth results are reported in the third column of Table 6. With the exception of Forecast Bias, all of the coefficients on the control variables have the expected sign and four are statistically significant. As well, most are similar in magnitude to the results from random effects and fixed effects estimation. However, the coefficient on the Real 10Yr Government Yield is 0.21 in the Fixed Effects estimation, and is 0.09 (and not statistically significant) in the Fama-Mcbeth estimation. This indicates that, over time, an increase in the firm's local Real 10Yr Government Yield by 100 bps would be associated with an increase in its real cost of equity of 21 bps. Conversely, in the cross-section, the relation between Real 10Yr Government Yields and the cost of equity is weaker.

In the Fama-Mcbeth set-up, the standard errors of the country dummy variables are much higher. This may be partially due to the fact that the sample of firms within each country is changing over time, and so that years when there is a small sample of firms within a country are given the same weight as years when there is a much larger sample. This impacts the country coefficients because when analyst coverage is less broad, it is likely that they focus on the better firms that have a lower cost of equity. Therefore, the Fama-Mcbeth (2003) estimates may exacerbate the analyst coverage bias, and produce less reliable results relative to the other methods. Also, country dummy variable standard errors are larger due to changing sample composition and only two country dummy coefficients are statistically significant: the USA dummy coefficient and the Japan dummy coefficient. Notwithstanding the above, these two estimates provide some validation to the USA and Japan coefficients from the Fixed Effects estimation since they are both similar to these earlier estimates in size and statistical significance.

5.2.2. Pooled OLS:

I also run a Pooled OLS analysis to examine the time invariant variables. Oaxaca and Geisler (2003) show that the time invariant coefficients from Pooled OLS are identical to the coefficients from a two stage Fixed Effects Model, where GLS is used in the second stage to adjust for heteroskedasticity in the diagonal and off-diagonal elements of the variance/covariance matrix (I performed the earlier second stage regression using GLS to account for heteroskedasticity in the diagonal elements, and also included means of the time-varying variables). Again, standard errors are adjusted to account for clustering by firm:

$$
\begin{aligned}
COE_{i,t} = \omega + \sum_{1} \beta_{COUNTRY} COUNTRY_i + \sum_{k=1}^{K} \beta_{IND\_k} IND_{i,k} + \sum_{t=1991}^{2006} \beta_{YEAR\_t} YEAR_i \\
+ \beta_{BVA} BVA_{i,t} + \beta_{LEV} LEV_{i,t} + \beta_{DISP} DISP_{i,t} + \beta_{LOSS} LOSS_{i,t} + \beta_{FINACC} FINACC_{i,t} \\
+ \beta_{FBIAS} FBIAS_{i,t} + \beta_{ACCOUNTING} ACCOUNTING_{i,t} + \beta_{IASB} IASB_{i,t} + \beta_{YIELD} YIELD_{i,t} + \varepsilon_{i,t}
\end{aligned}
\tag{6}
$$

The results from this method are encouraging since the country-level dummy variables are similar to my original specification, in that these estimates are little changed (5-15 bps) and have similar significance to the original results. Overall, the results across the models are generally consistent with the earlier results in Table 3. Across the different econometric methods, both the USA and Japan dummy coefficients are statistically significant and negative in all three models. The France coefficient is negative in all three models, with statistical significance in two models. Conversely, the Nordic dummy variable is positive in all models and is statistically significant in two of the three models. For other countries, there is sparse evidence in favour of a statistically significant difference, partially because of a smaller sample size relative to the United States.

5.3. Country Median Regressions:

Previous studies examining the effect of country-level institutional variables on the cost of equity [e.g., Hail and Leuz (2006a)] argue for using country medians of all variables to eliminate the influence of one country (i.e., the United States) on the regression results. Therefore, I run OLS regressions involving country-year medians of all variables. As a result of using a country-level analysis, firm-specific noise is removed and hence the r-squareds in these regressions are much larger, ranging from .44 to .46 (See Table 7). However, the drawback to this approach is that the sample size is much smaller (N < 250), and information from the cross-sectional variation within countries is not utilized.

Although the size coefficient is negative, it is not statistically significant in most models. However, countries with a higher level of analyst forecast dispersion have a higher cost of equity, as evidenced by this coefficient. Moreover, the magnitude of this variable is more than two times larger than in previous regressions. The coefficient on government yields is statistically significant and is similar to what was reported in previous regressions. Forecast Inaccuracy, a proxy for Disclosure, has a statistically significant, positive coefficient that is much larger than what was reported earlier. Again, if more extensive disclosure requirements can help

earnings forecasts become more accurate, then they may also help in reducing the cost of equity. Models (2) through (5) include each of the individual Shareholder Protection Indices. Three out of four are negative, and the Disclosure Index is statistically significant, which also shows that more extensive disclosure requirements are associated with a lower cost of equity.

6. Conclusion

From a high level, Canada's cost of equity is slightly higher than the median of the cost of equity of the 19 countries examined in this paper; it is higher than in countries such as the United States, Japan, and Great Britain, and lower than in countries like Norway, Finland, and Sweden. However, these top-level cost of equity estimates are influenced by factors such as the characteristics of firms that analysts choose to cover in each country, differences in the properties of analyst forecasts across countries, and differences in accounting standards across these countries. After employing a regression analysis to account for these factors, Canada's cost of equity is statistically significantly different from a handful of countries. Firms from the United States have a cost of equity that is about 20 to 40 bps lower than that of Canadian firms in most models, and lowering Canadian firm's cost of equity by this amount would have large economic benefits given the size of Canada's capital markets. However, even after controlling for the above factors, differences in accounting, or in analyst forecast properties, may still not be fully accounted for. Therefore, the country-level effects can be interpreted, or explained, as measuring these unmodeled differences, as well as differences in corporate governance, legal environments, currency risk, stock market segmentation, or other factors not included in this analysis.

There is a statistically significant, positive relation between analyst forecast inaccuracy and the cost of equity. Analyst forecast inaccuracy should be a proxy for the market's ability to forecast firm-level earnings, and if improved transparency or accounting disclosure regulation can improve this ability, it may also result in a lower firm-level cost of equity.

The good news is that the nominal cost of equity has declined over time by about 10 to 15 bps per year since the beginning of the sample period. This decline can be mostly attributed to the reduction in government yields and inflation, since the decline in the cost of equity is much

smaller when examining the real cost of equity with real government yields as a right hand side variable.

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Figure 1: Previous work on Cost of Equity. This graph summarizes results from 3 previous studies that have provided cost of equity estimates at a country level. The Claus and Thomas (2001) study utilizes their cost of equity methodology, and they report the cost of equity in local currency Hail and Leuz (2006a) estimate the cost of equity using an average of four methods and also report results in local currency. Daouk, Lee, and Ng (2006) measure the cost of equity using the Gordon Growth Model applied to index level prices and dividends.

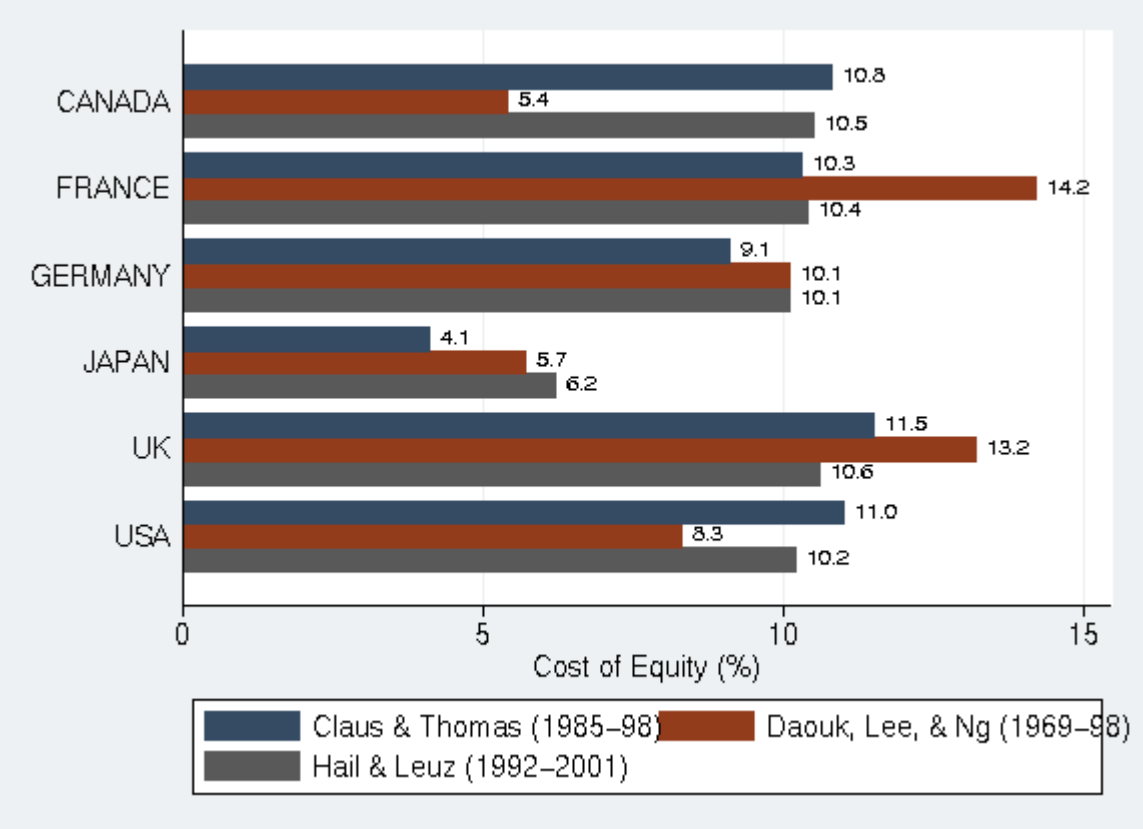


Figure 2: Cost of Equity by Country. This graph displays the mean of the USD nominal cost of equity for each country in the sample.

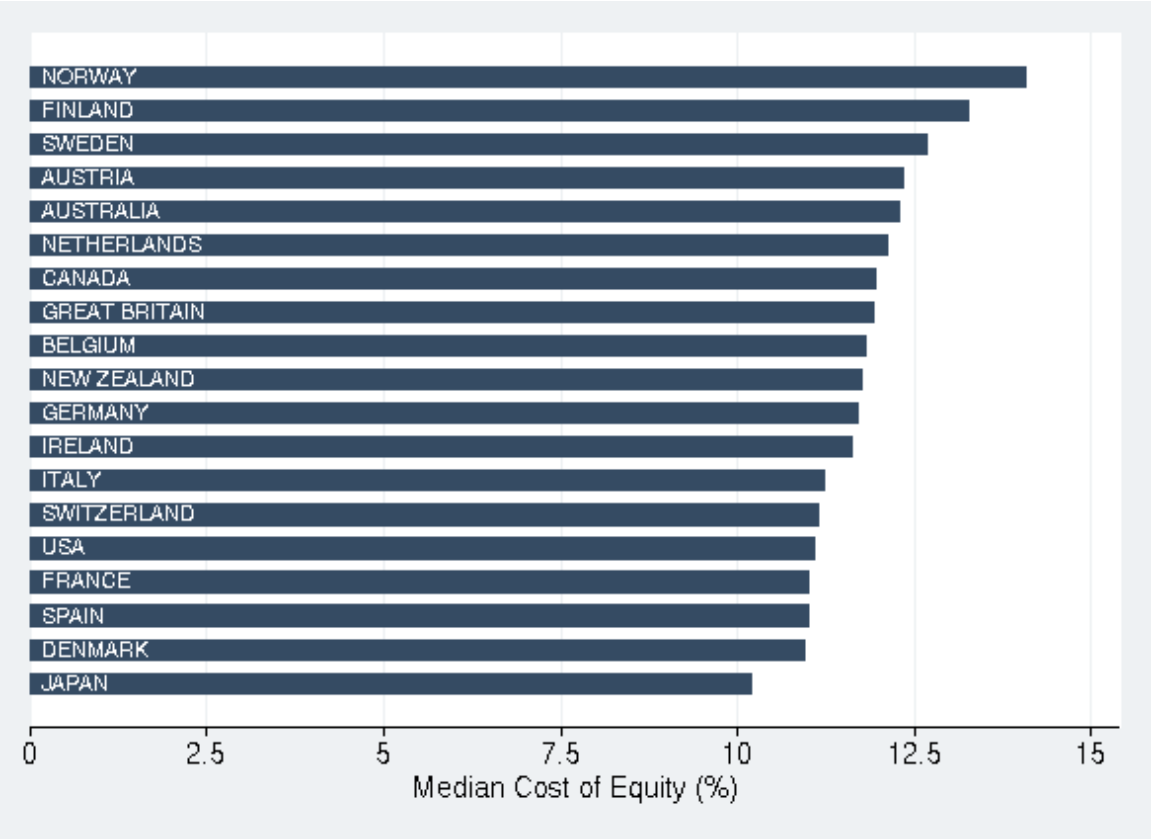
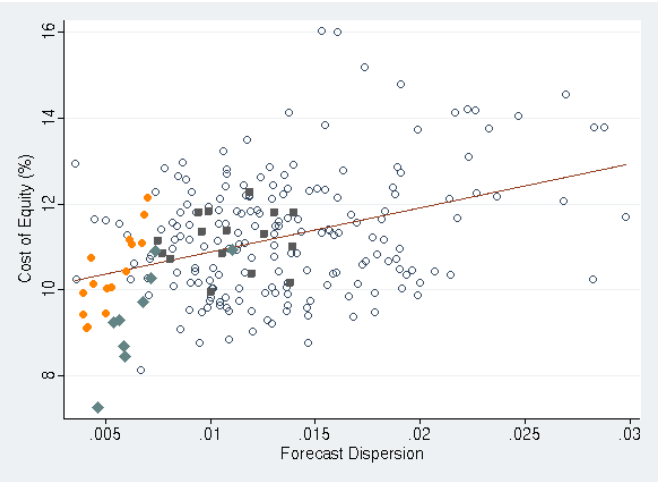
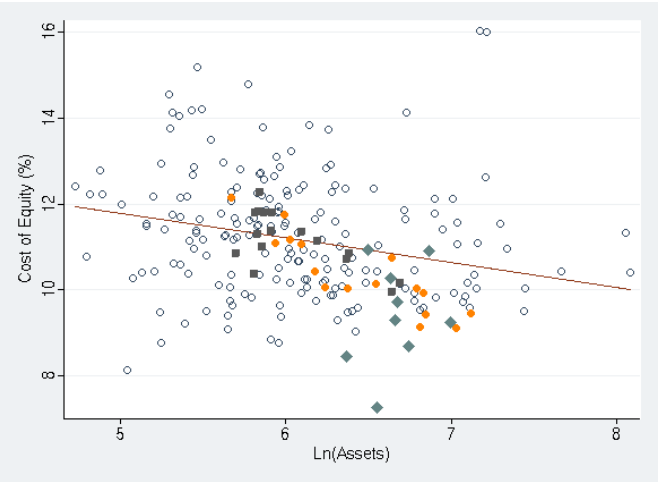


Figure 3: Scatter Plots. These graphs plot the median nominal cost of equity (by country-year) against the median forecast dispersion (3a), median firm size (3b), and the median real cost of equity against real government yields in 3c. Squares represent observations on Canada, diamonds represent observations on Japan, and solid circles represent observations on United States.





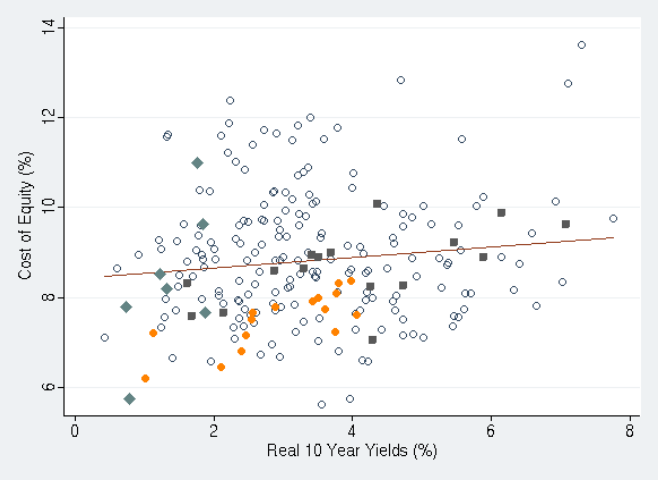


Figure 4: Real Cost of Equity vs Investor Protection. This graphs plots the median real cost of equity (by country) against the World Bank's (2008) Investor Protection Index, adapted from Djankov et al (2008). This index is based on a hypothetical transaction between two companies in which the owner has controlling stakes, and measures the extent of disclosure, extent of director liability, and ease of shareholder suits in relation to the transaction. Each of these indices is measured on a scale of 0 to 10 (with 10 representing more disclosure, more director liability, or more ability for shareholders to sue), and are averaged to develop an overall Investor Protection Index.

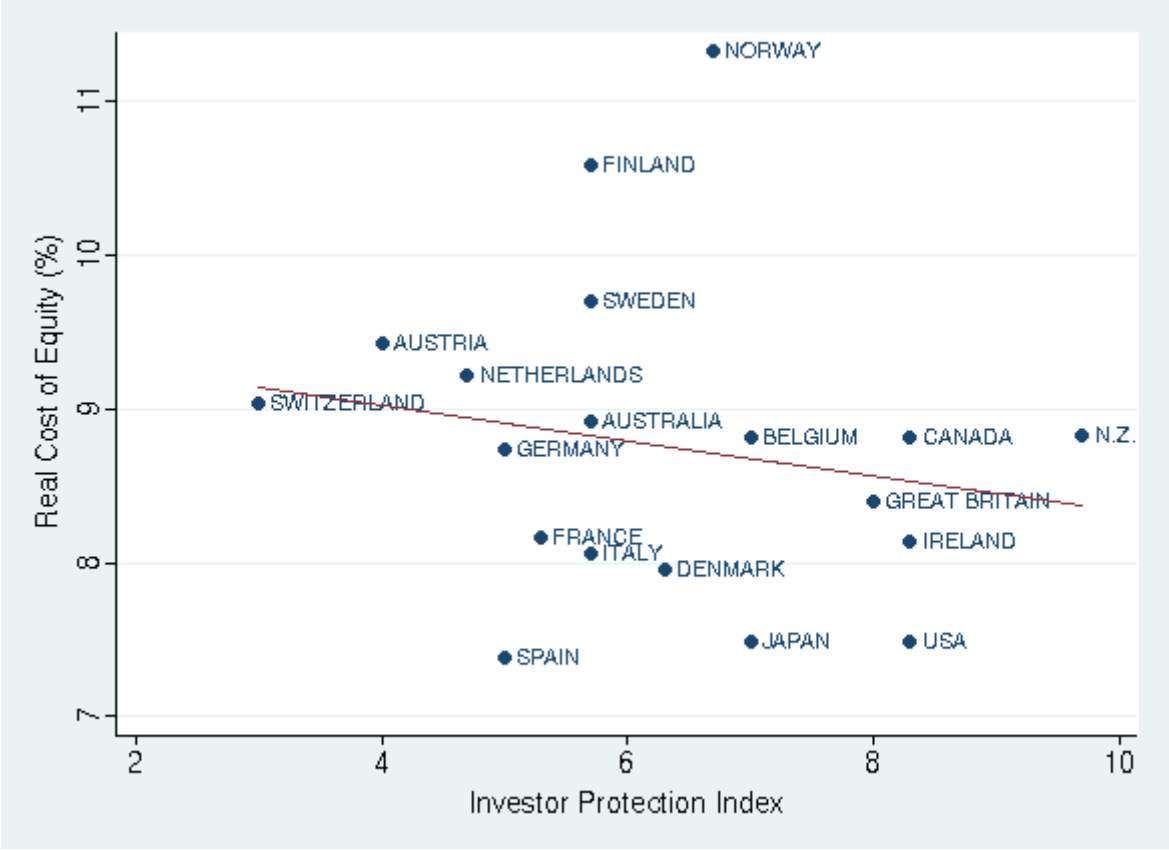


Table 1: Summary Statistics (Medians). This table presents medians for key variables for each country in our sample. N indicates the number of observations, or firm-years, by country. Total Assets is calculated using book values from Compustat and is converted into USD. Leverage is the Debt/ Equity ratio and is also calculated using book values. Forecast dispersion is the cross-sectional standard deviation of analyst earnings forecasts, scaled by book value per share. % Firms with Losses is the percentage of firms in each country in our sample with a cost of equity estimate who experienced losses in the previous fiscal year. Forecast Bias is the country average forecast error (forecasted earnings minus predicted earnings, scaled by book value per share) in the previous year. Forecast Inaccuracy is the absolute value of the analyst forecast error in the previous year.

Country	N	Total Assets ($M)	Leverage	Forecast Dispersion	% Firms with Losses	Accounting Method	Forecast Bias	Forecast Inaccuracy
AUSTRALIA	1,420	383	.38	.0096	.09	.12	.015	.029
AUSTRIA	151	452	.32	.015	.11	.99	.013	.032
BELGIUM	349	457	.35	.015	.1	.52	.019	.033
CANADA	3,057	421	.37	.011	.1	1	.00026	.03
DENMARK	526	320	.28	.011	.049	.41	-.0052	.032
FINLAND	582	350	.34	.017	.077	.47	-.0016	.045
FRANCE	1,929	499	.32	.014	.076	.69	.01	.027
GERMANY	1,385	459	.17	.014	.11	1	.0095	.036
GREAT BRITAIN	6,082	275	.22	.0086	.089	.39	.005	.037
IRELAND	308	393	.44	.0056	.078	.19	-.0046	.028
ITALY	501	631	.31	.017	.072	.13	.011	.033
JAPAN	3,651	779	.22	.0064	.11	.81	.0028	.026
NETHERLANDS	1,084	441	.31	.015	.046	.79	.013	.027
NEW ZEALAND	216	144	.48	.011	.074	.25	-.0014	.043
NORWAY	454	280	.45	.025	.16	.75	.027	.052
SPAIN	544	753	.33	.015	.029	.18	.0053	.022
SWEDEN	958	317	.3	.016	.092	.64	.0095	.044
SWITZERLAND	768	640	.28	.012	.074	.8	-.003	.031
USA	23,679	656	.35	.0051	.1	1	.0037	.026
Total	**47,644**	**532**	**.31**	**.0073**	**.096**	**.81**	**.0037**	**.029**

Table 2: Fixed Effects Regressions –COE, All Countries.

PANEL A: This panel presents results for different specifications of the following fixed effects regression involving the USD nominal cost of equity (assuming a random walk exchange rate):

$$COE_{i,t} = \alpha + \sum_{t=1991}^{2006} \beta_{YEAR\_t} YEAR_i + \beta_{BVA} BVA_{i,t} + \beta_{LEV} LEV_{i,t} + \beta_{DISP} DISP_{i,t} + \beta_{LOSS} LOSS_{i,t} + \beta_{FBIAS} FBIAS_{i,t} + \beta_{FINACCURACY} FINACCURACY_{i,t} + \beta_{IASB} IASB_{i,t} + \mu_i + \varepsilon_{i,t}$$

Absolute value of z statistics are in parentheses and are adjusted for heteroskedasticity of errors at a firm level (*significant at 10%; ** significant at 5%; *** significant at 1%).

	(1)	(2)	(3)	(4)
Ln(Assets)	-0.187	-0.012	0.039	0.010
	(3.87)***	(0.25)	(0.67)	(0.18)
Leverage	0.891	0.750	0.673	0.650
	(18.66)***	(15.39)***	(12.28)***	(12.36)***
t	-0.142	-0.150	-0.125	-0.130
	(11.33)***	(11.77)***	(9.95)***	(10.30)***
Forecast Dispersion		26.955	25.349	26.320
		(13.54)***	(10.97)***	(11.51)***
Forecast Inaccuracy			3.091	0.436
			(12.88)***	(1.58)
Loss Dummy				1.633
				(16.58)***
Forecast Bias				-0.571
				(0.31)
IASB Dummy				0.351
				(2.80)***
Constant	13.842	12.387	11.460	11.687
	(45.50)***	(38.04)***	(32.26)***	(33.34)***
Observations	47153	43209	37024	37024
Number of firms	8102	7520	6829	6829
Year Dummies	YES	YES	YES	YES
Overall R-squared	0.06	0.07	0.07	0.10
Within R-squared	0.06	0.07	0.08	0.09
Between R-squared	0.05	0.07	0.06	0.10

PANEL B: This panel presents results for different specifications of the following second stage regression involving fixed firm-level effects ($\hat{\mu}_i$) estimated in Panel A:

$$\hat{\mu}_i = \omega + \sum_{1} \beta_{COUNTRY} COUNTRY_i + \sum_{k=1}^{K} \beta_{IND\_k} IND_{i,k} + \beta_{ACCOUNTING} \overline{ACCOUNTING}_i + \sum_{t=1991}^{2006} \gamma_{YEAR\_t} \overline{YEAR}_i + \gamma_{BVA} \overline{BVA}_i + \gamma_{LEV} \overline{LEV}_i + \gamma_{DISP} \overline{DISP}_i + \gamma_{LOSS} \overline{LOSS}_i + \gamma_{FBIAS} \overline{FBIAS}_i + \gamma_{FINACCURACY} \overline{FINACCURACY}_i + \gamma_{IASB} \overline{IASB}_i + v_i$$

NORDIC countries include Finland, Norway, Sweden, and Denmark. OTHER EUROPEAN includesAustria, Belgium, Italy, Netherlands, Spain, and Switzerland.Absolute value of z statistics are in parentheses (*significant at 10%; ** significant at 5%; *** significant at 1%).

	(1)	(2)	(3)	(4)
USA	-0.415	-0.164	-0.229	-0.192
	(3.93)***	(1.56)	(2.09)**	(1.81)*
JAPAN	-0.943	-1.002	-1.091	-1.179
	(6.52)***	(6.92)***	(7.35)***	(8.12)***
GBR & IRELAND	0.091	-0.012	-0.171	0.083
	(0.75)	(0.10)	(1.34)	(0.58)
NORDIC	0.979	0.588	0.524	0.657
	(6.62)***	(3.93)***	(3.32)***	(4.03)***
AUSTRALIA & NZ	0.325	0.303	0.205	0.380
	(1.95)*	(1.83)*	(1.17)	(1.98)**
FRANCE	-0.273	-0.607	-0.640	-0.610
	(1.70)*	(3.79)***	(3.65)***	(3.40)***
GERMANY	0.439	0.117	0.342	0.256
	(2.47)**	(0.65)	(1.72)*	(1.22)
OTHER EUROPEAN	0.220	-0.095	-0.033	0.070
	(1.60)	(0.69)	(0.23)	(0.45)
Accounting Dummy				0.140
				(1.42)
Constant	3.746	4.486	4.294	3.728
	(5.25)***	(6.45)***	(10.02)***	(8.67)***
Industry Dummies	YES	YES	YES	YES
Observations	8102	7520	6829	6829
R-squared	0.19	0.21	0.22	0.23

Table 3: Fixed Effects Regressions – Real COE, All Countries.

PANEL A: This panel presents results for different specifications of the following fixed effects regression involving the real cost of equity:

$$COE_{i,t} = \alpha + \sum_{t=1991}^{2006} \beta_{YEAR\_t} YEAR_i + \beta_{BVA} BVA_{i,t} + \beta_{LEV} LEV_{i,t} + \beta_{DISP} DISP_{i,t} + \beta_{LOSS} LOSS_{i,t} + \beta_{FBIAS} FBIAS_{i,t} + \beta_{FINACCURACY} FINACCURACY_{i,t} + \beta_{IASB} IASB_{i,t} + \beta_{YIELD} YIELD_{i,t} + \mu_i + \varepsilon_{i,t}$$

Absolute value of z statistics are in parentheses and are adjusted for heteroskedasticity of errors at a firm level (*significant at 10%; ** significant at 5%; *** significant at 1%).

	(1)	(2)	(3)	(4)	(5)
Ln(Assets)	-0.100	-0.110	0.016	0.021	0.005
	(2.59)***	(2.81)***	(0.39)	(0.46)	(0.11)
Leverage	0.681	0.677	0.571	0.525	0.508
	(17.33)***	(17.31)***	(14.30)***	(11.69)***	(11.64)***
t	-0.067	-0.038	-0.041	-0.047	-0.053
	(6.60)***	(3.64)***	(3.81)***	(4.35)***	(4.86)***
Real Gov't Yields		0.209	0.218	0.203	0.209
		(9.72)***	(9.98)***	(8.74)***	(8.95)***
Forecast Dispersion			22.155	21.173	21.693
			(13.74)***	(11.27)***	(11.65)***
Forecast Inaccuracy				2.161	0.518
				(11.44)***	(2.39)**
Loss Dummy					1.005
					(13.55)***
Forecast Bias					1.051
					(0.72)
IASB Dummy					0.454
					(4.39)***
Constant	9.931	9.123	7.959	7.909	8.007
	(40.96)***	(34.83)***	(28.37)***	(25.28)***	(25.69)***
Observations	47887	46807	42875	36710	36710
Number of firms	8198	8013	7441	6761	6761
Year Dummies	YES	YES	YES	YES	YES
Overall R-squared	0.04	0.05	0.06	0.07	0.09
Within R-squared	0.05	0.05	0.07	0.07	0.08
Between R-squared	0.03	0.05	0.06	0.06	0.08

PANEL B: This panel presents results for different specifications of the following second stage regression involving fixed firm-level effects ($\hat{\mu}_i$) estimated in Panel A:

$$\hat{\mu}_i = \omega + \sum_{1} \beta_{COUNTRY} COUNTRY_i + \sum_{k=1}^{K} \beta_{IND\_k} IND_{i,k} + \beta_{ACCOUNTING} \overline{ACCOUNTING}_i$$
$$+ \sum_{t=1991}^{2006} \gamma_{YEAR\_t} \overline{YEAR}_i + \gamma_{BVA} \overline{BVA}_i + \gamma_{LEV} \overline{LEV}_i + \gamma_{DISP} \overline{DISP}_i$$
$$_i + \gamma_{LOSS} \overline{LOSS}_i + \gamma_{FBIAS} \overline{FBIAS}_i + \gamma_{FINACCURACY} \overline{FINACCURACY}_i$$
$$+ \gamma_{IASB} \overline{IASB}_i + \gamma_{YIELD} \overline{YIELD}_i + v_i$$

Absolute value of z statistics are in parentheses (*significant at 10%; ** significant at 5%; *** significant at 1%).

	(1)	(2)	(3)	(4)	(5)
USA	-0.508	-0.413	-0.250	-0.338	-0.288
	(5.75)***	(3.36)***	(2.05)**	(2.67)***	(2.31)**
JAPAN	-0.565	-0.409	-0.434	-0.591	-0.598
	(4.71)***	(2.17)**	(2.27)**	(3.01)***	(3.05)***
GBR & IRELAND	-0.026	0.040	-0.042	-0.199	-0.007
	(0.25)	(0.34)	(0.36)	(1.61)	(0.05)
NORDIC	0.928	0.973	0.750	0.709	0.746
	(7.47)***	(7.43)***	(5.62)***	(5.02)***	(5.05)***
AUSTRALIA & NZ	0.198	0.247	0.228	0.088	0.212
	(1.40)	(1.67)*	(1.54)	(0.56)	(1.22)
FRANCE	-0.112	-0.026	-0.248	-0.306	-0.303
	(0.83)	(0.18)	(1.72)*	(1.94)*	(1.86)*
GERMANY	0.360	0.406	0.212	0.441	0.310
	(2.41)**	(2.52)**	(1.29)	(2.44)**	(1.62)
OTHER EUROPEAN	0.359	0.476	0.296	0.270	0.315
	(3.10)***	(3.33)***	(2.08)**	(1.79)*	(1.97)**
Accounting Dummy					0.116
					(1.33)
Constant	3.615	4.301	5.056	4.366	3.925
	(6.08)***	(6.43)***	(7.69)***	(9.44)***	(8.26)***
Industry Dummies	YES	YES	YES	YES	YES
Observations	8198	8013	7441	6761	6761
R-squared	0.21	0.20	0.20	0.21	0.21

Table 4: Regression with Country Level Index Measures This table presents results for different specifications of the following second stage regression involving fixed firm-level effects ($\hat{u}_i$) estimated in Table 3, Panel A (Final Column):

$$\hat{u}_i = \omega + \beta_{IP\_INDEX} IP\_INDEX_i + \sum_{k=1}^{K} \beta_{IND\_k} IND_{i,k} + \beta_{ACCOUNTING} \overline{ACCOUNTING}_i + \sum_{t=1991}^{2006} \gamma_{YEAR\_t} \overline{YEAR}_i + \gamma_{BVA} \overline{BVA}_i + \gamma_{LEV} \overline{LEV}_i + \gamma_{DISP} \overline{DISP}_i + \gamma_{LOSS} \overline{LOSS}_i + \gamma_{FBIAS} \overline{FBIAS}_i + \gamma_{FINACCURACY} \overline{FINACCURACY}_i + \gamma_{IASB} \overline{IASB}_i + \gamma_{YIELD} \overline{YIELD}_i + v_i$$

Absolute value of z statistics are in parentheses (*significant at 10%; ** significant at 5%; *** significant at 1%).

	(1)	(2)	(3)	(4)
Disclosure	-0.100			
	(5.78)***			
Director Liability		-0.035		
		(2.65)***		
Shareholder Lawsuits			-0.059	
			(2.47)**	
Investor Protection				-0.117
				(4.89)***
Accounting Dummy	-0.173	0.021	-0.000	0.022
	(2.56)**	(0.29)	(0.01)	(0.33)
Constant	3.641	3.314	3.585	3.947
	(9.07)***	(8.23)***	(7.97)***	(9.16)***
Observations	6761	6761	6761	6761
R-squared	0.20	0.20	0.20	0.20

Table 5: Fixed Effects Regressions by Country. This table presents results for country-level fixed effects regressions involving the real cost of equity, and the second stage regresses the firm fixed effects on means of the time-varying variables as well as the time invariant variables. Absolute value of t statistics are in parentheses and are adjusted for heteroskedasticity of errors at a firm level (* significant at 10%; ** significant at 5%; *** significant at 1%).

$$COE_{i,t} = \alpha + \beta_{BVA} BVA_{i,t} + \beta_{LEV} LEV_{i,t} + \beta_{LOSS} LOSS_{i,t} + \beta_{DISP} DISP_{i,t} + \beta_{YIELD} YIELD_{i,t} + \beta_{FINACCURACY} FINACCURACY_{i,t} + \beta_{IASB} IASB_{i,t} + \mu_i + \varepsilon_{i,t}$$

	CANADA	USA	GBR & IRELAND	FRANCE	GERMANY	NORDIC	OTHER EUROPE	JAPAN	AUSTRALIA & NEW ZEALAND
Ln(Assets)	-0.312	-0.108	0.038	0.792	1.494	0.854	1.311	-0.068	-0.196
	(1.77)*	(2.76)***	(0.35)	(3.91)***	(3.89)***	(3.74)***	(5.87)***	(0.24)	(0.88)
Leverage	1.007	0.539	0.336	0.116	0.411	1.003	0.209	-0.181	1.270
	(4.16)***	(10.08)***	(2.47)**	(0.59)	(1.04)	(4.09)***	(1.03)	(0.75)	(3.68)***
Real 10Yr Govt Yield	0.195	0.141	-0.130	0.274	0.127	0.291	0.284	1.460	0.212
	(3.41)***	(6.16)***	(3.22)***	(3.12)***	(0.80)	(4.49)***	(4.21)***	(12.16)***	(3.46)***
Forecast Dispersion	7.035	35.710	16.430	9.324	7.218	13.399	13.474	63.773	-2.203
	(1.05)	(10.74)***	(3.91)***	(1.38)	(0.79)	(3.02)***	(2.88)***	(8.49)***	(0.30)
Forecast Inaccuracy	0.631	0.494	0.692	2.826	1.402	0.432	0.389	-0.818	-0.219
	(0.62)	(1.67)*	(1.27)	(2.34)**	(0.98)	(0.51)	(0.45)	(0.69)	(0.26)
Loss Dummy	0.992	1.056	0.791	1.012	1.389	1.902	1.811	0.531	0.356
	(3.12)***	(11.03)***	(3.58)***	(2.53)**	(3.13)***	(5.28)***	(4.57)***	(2.21)**	(0.96)
IASB Dummy	0.000	0.000	-0.429	0.252	-0.182	-0.261	-0.102	0.000	0.081
	(.)	(.)	(2.49)**	(0.91)	(0.58)	(1.29)	(0.44)	(.)	(0.13)
Constant	9.795	8.050	8.922	1.658	-1.416	2.934	-0.528	5.870	9.367
	(7.93)***	(26.73)***	(12.06)***	(1.02)	(0.52)	(1.98)**	(0.34)	(2.94)***	(6.57)***
Observations	2223	19559	4319	1288	871	1810	2338	3077	1225
Number of firms	444	2992	817	279	253	385	469	890	232
Overall R-squared	0.05	0.12	0.02	0.00	0.03	0.01	0.01	0.11	0.03
Within R-squared	0.06	0.07	0.05	0.09	0.09	0.10	0.09	0.15	0.05
Between R-squared	0.05	0.15	0.00	0.01	0.05	0.00	0.01	0.06	0.02

Table 6: Panel Regressions – All Countries Real COE. This table presents results using different econometric methods. The first column, Fixed Effects, re-presents the results from the last column of the previous table (coefficients from both stages in the regression are displayed for brevity and comparison purposes). Absolute value of t statistics are in parentheses and are adjusted for heteroskedasticity of errors at a firm level. The second column presents coefficients from Fama-Mcbeth (1973) regressions, which are the average of coefficients for 15 cross-sectional regressions (one for each year):

$$\begin{aligned} COE_{i,t} = \omega + \sum_{1} \beta_{COUNTRY,t} COUNTRY_i + \sum_{k=1}^{K} \beta_{IND\_k,t} IND_{i,k} + \beta_{BVA,t} BVA_{i,t} \\ + \beta_{YIELD} YIELD_{i,t} + \beta_{LEV,t} LEV_{i,t} + \beta_{DISP,t} DISP_{i,t} + \beta_{LOSS,t} LOSS_{i,t} + \\ + \beta_{FGROWTH,t} FGROWTH_{i,t} + \beta_{ACCOUNTING,t} ACCOUNTING_{i,t} + \varepsilon_{i,t} \end{aligned}$$

Finally, the results of a Pooled OLS regression are displayed in the last column.

$$\begin{aligned} COE_{i,t} = \omega + \sum_{1} \beta_{COUNTRY} COUNTRY_i + \sum_{k=1}^{K} \beta_{IND\_k} IND_{i,k} + \sum_{t=1991}^{2006} \beta_{YEAR\_t} YEAR_i \\ + \beta_{BVA} BVA_{i,t} + \beta_{LEV} LEV_{i,t} + \beta_{DISP} DISP_{i,t} + \beta_{LOSS} LOSS_{i,t} + \beta_{FINACC} FINACC_{i,t} \\ + \beta_{FBIAS} FBIAS_{i,t} + \beta_{ACCOUNTING} ACCOUNTING_{i,t} + \beta_{IASB} IASB_{i,t} \\ + \beta_{YIELD} YIELD_{i,t} + \varepsilon_{i,t} \end{aligned}$$

Again, standard errors are adjusted for heteroskedasticity of errors at a firm level (*significant at 10%; ** significant at 5%; *** significant at 1%).

Table 6: Panel Regressions – All Countries Real COE (Continued).

	Fixed Effects	Fama-Mcbeth	Pooled OLS
Ln(Assets)	0.005	-0.264	-0.299
	(0.11)	(7.33)***	(18.57)***
Leverage	0.508	0.643	0.575
	(11.64)***	(8.18)***	(14.49)***
t	-0.053		-0.069
	(4.86)***		(6.73)***
Real Gov't Yields	0.209	0.085	0.163
	(8.95)***	(0.64)	(6.69)***
Forecast Dispersion	21.693	27.626	23.494
	(11.65)***	(7.03)***	(12.95)***
Forecast Inaccuracy	0.518	0.187	0.348
	(2.39)**	(0.83)	(1.52)
Loss Dummy	1.005	1.547	1.442
	(13.55)***	(17.54)***	(18.81)***
Forecast Bias	1.051	-2.733	-0.139
	(0.72)	(0.32)	(0.09)
IASB Dummy	0.454	-0.391	0.423
	(4.39)***	(0.87)	(3.73)***
Accounting Dummy	0.116	0.007	0.002
	(1.33)	(0.08)	(0.02)
USA	-0.288	-0.339	-0.232
	(2.31)**	(1.74)	(1.91)*
JAPAN	-0.598	-0.537	-0.578
	(3.05)***	(2.02)*	(3.92)***
GBR & IRELAND	-0.007	-0.075	-0.016
	(0.05)	(0.41)	(0.11)
NORDIC	0.746	0.248	0.633
	(5.05)***	(1.07)	(3.78)***
AUSTRALIA & NZ	0.212	0.278	0.082
	(1.22)	(1.26)	(0.41)
FRANCE	-0.303	-0.060	-0.407
	(1.86)*	(0.26)	(2.43)**
GERMANY	0.310	-0.074	0.182
	(1.62)	(0.34)	(0.94)
OTHER EUROPEAN	0.315	0.073	0.217
	(1.97)**	(0.23)	(1.34)
Year Dummies	YES	YES	YES
Industry Dummies	YES	YES	YES
Observations	36710	36710	36710

Table 7: Country Median Regressions. This table reports the results of an OLS regression of the country-year median real cost of equity against the country-year medians of other explanatory variables. Robust t statistics are in parentheses (* significant at 10%; ** significant at 5%; *** significant at 1%)

	(1)	(2)	(3)	(4)	(5)
Ln(Assets)	-0.132	-0.239	-0.125	-0.121	-0.197
	(0.65)	(1.25)	(0.64)	(0.56)	(1.03)
Leverage	2.274	2.470	2.426	2.209	2.614
	(3.04)***	(2.82)**	(2.57)**	(2.41)**	(2.79)**
Real Gov't Yields	0.175	0.204	0.173	0.175	0.187
	(2.53)**	(3.20)***	(2.70)**	(2.48)**	(2.84)**
Forecast Dispersion	63.927	53.523	57.951	65.970	50.622
	(2.83)**	(2.40)**	(2.56)**	(2.40)**	(2.26)**
Forecast Inaccuracy	22.082	21.304	22.704	21.894	22.674
	(2.94)***	(2.85)**	(3.15)***	(2.89)***	(3.00)***
Loss Dummy	1.785	2.043	1.949	1.740	2.113
	(1.55)	(1.74)*	(1.75)*	(1.53)	(1.92)*
Forecast Bias	-5.730	-4.932	-5.641	-5.691	-5.418
	(1.13)	(0.97)	(1.11)	(1.13)	(1.05)
Disclosure		-0.077			
		(2.08)*			
Director Liability			-0.044		
			(0.62)		
Shareholder Lawsuits				0.014	
				(0.16)	
Investor Protection					-0.097
					(1.42)
Constant	6.422	7.487	6.606	6.279	7.333
	(5.24)***	(5.94)***	(5.61)***	(3.95)***	(5.81)***
Observations	219	219	219	219	219
R-squared	0.44	0.46	0.45	0.44	0.45

Appendix: Summary of Implied COE Calculations

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r_ct: Claus and Thomas (2001) implied COE is the value of r that solves:

$$P_0 = \frac{dp * e_1}{1+r} + \frac{dp * e_2}{(1+r)^2} + \frac{e_3(1-\frac{g_L}{roe_3})}{(1+r)^2(r-g_L)}, \text{ where } roe_3 = \frac{e_3}{bv_0 + (e_1+e_2)(1-dp)}$$

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r_lns: Lee, Ng, and Swaminathan (2004) implied COE is the value of r that solves:

$$P_0 = \frac{dp * e_1}{1+r} + \frac{dp * e_2}{(1+r)^2} + \sum_{t=3}^{15} \frac{dp_t * e_t}{(1+r)^t} + \frac{e_{16}}{r(1+r)^{15}}$$

For t > 3: $e_{t+1} = e_t(1 + g_S \frac{g_L}{g_S}^{\frac{t-2}{13}})$ and $dp_t = (1 - \frac{t-3}{13})dp + \frac{t-3}{13}(1 - \frac{g_L}{r})$

Earnings growth is faded towards the long-run earnings growth and the dividend payout ratio is faded towards the long-run dividend payout ratio by year 16.

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r_oj: Ohlson and Juettner-Nauroth (2000) implied COE is the value of r that solves:

$$P_0 = \frac{dp * e_1}{(r-g_L)} + \frac{e_1(g_S - g_L)}{r(r-g_L)}$$

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r_mpeg: Easton (2004) implied COE is the value of r that solves:

$$P_0 = \frac{dp * e_1}{r} + \frac{e_1 g_S}{r^2}$$

Variables across all models (for COE calculation in USD):

P_0	= Current market price.
e_t	= Expected future earnings per share t periods ahead. (In the CT and LNS model, $e_3 = e_2 * (1+g_S)$).
g_S	= Short-term growth rate, or $(e_2-e_1)/ e_1$
g_L	= Long-term growth rate in earnings per share, using the U.S. expected inflation rate, taken from the IFO World Economic Survey (through Datastream).
dp	= Dividend payout ratio, using the average historic payout ratio (dividends plus repurchases, divided by earnings) over the previous three years. If unavailable, the mean country payout ratio in that year is used.
bv_0	= Current book value per share.
