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**Cost of Capital Estimation in Practice: An
Explorative Study on Bangladeshi Companies**

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Abstract

This study investigates cost of capital estimation practices of companies in Bangladesh. CEO/CFO background and company size effect on practices in cost of capital estimation have also been explored. Structured questionnaire survey was conducted on 50 companies from different industries in Bangladesh selected on the basis of access to information. Frequency distribution and cross-tab analysis were done. Results reveal that majority of the companies estimate cost of capital. Unlike past studies where use of CAPM is prevalent, this study reveal historical average return as the most commonly method of estimating cost of equity. Most recent lending rate from banks is the commonly used proxy of cost of debt. Majority companies adjust cost of debt for tax. Use of WACC is prevalent but most companies use book value debt and equity in WACC. Majority companies adjust cost of capital for inflation, exchange rate and interest rate risk whereas only few adjusts for term structure risk and risk of financial distress. CEO/CFO tenure demonstrates strong association with the use of market value debt in WACC.

1. Introduction

Cost of capital is the expected return on a portfolio of a company's all existing securities. (Brealey et al., 2008). In other words, it is considered as the opportunity cost of investing in the next best alternative consisting of the same risk characteristics. Hence, from the company perspective it is the appropriate discount rate for a firm's average-risk projects. The need for estimation of a company's cost of capital primarily stems from the fact that it is a crucial input to various financial models particularly those involved with valuation, capital budgeting, capital structure optimization and such. From an investor's point of view, a company creating value in excess of its cost of capital is creating economic value and thus a worthy investment. Development in corporate finance theories in areas of asset pricing, market efficiency, portfolio management and others have provided converging recommendations for estimating cost of capital (Bruner et. al., 1998). However, the theories have left many choices for practitioners. For example, theories have presented several asset pricing models e.g. CAPM, FF's three factor model, dividend discount model etc. Text books have discussed the underlying assumptions and pros & cons of these theories but have not been conclusive in identifying any model as the best model. Empirical researchers across economies have not only identified theory practice gap but also have asserted spectrum of variance among practitioners (Bruner et. al., 1998; Anand, 2002; Turong et al., 2008; Jacobs and Shivdasani, 2012; Mbabazize and Daniel, 2014). Empirical research also revealed that practices in relation to cost of capital estimation may change over time depending on the changes in external (e.g. economic downturn like 2008 financial melt-down) and internal factors (e.g. changes in stakeholders' engagement, company structure etc.).

A look for empirical research on cost of capital estimation practices in Bangladesh revealed an acute dearth. Previous studies such as Hussain and Chakraborty, 2010 survey of 24 commercial banks exhibited a strong relation between stock returns of banks and their cost of capital. In Hussain and Chakraborty's (2010) study, the importance of an efficient sourcing of capital is underscored but the derivation of its costing is unanswered. However, a look into cost of capital estimation and its practices are essential for a number of reasons. Ultimately, the estimation of cost of capital directly influence the type and volume of investments being carried out by a company and determine the financial success of companies across industries. Hence, a deliberation to understand where the Bangladeshi companies' practices stand with respect to benchmark standards set by their

peers in the developed countries is worth exploring. The researchers thereby undertook this study to explore the cost of capital estimation practices of the companies in Bangladesh.

1.1. Objectives of the Study

The broad objective of this study is to learn about the cost of capital estimation practices of the companies in Bangladesh. To fulfill this purpose the following specific objectives are outlined:

- To identify whether the companies in Bangladesh estimate their cost of capital
- To gain insight into to how companies that engage in cost of capital estimation, estimate the cost of various sources of fund i.e., equity and debt.
- To explore the method of aggregating cost of capital when there are different sources of fund.
- To investigate whether the companies take taxes into consideration in estimating their cost of capital
- To reveal if the estimated cost of capital is revised for different project-specific/ firm-specific/ economy-wide risk factors.
- To identify whether there is any influence of specific factors such as CEO/CFO background (education, tenure and age) and company size (measured by annual sales revenue) on the cost of capital estimation practices.

1.2. Research Question

The main research question of this study is as follows-

- How do the companies in Bangladesh estimate cost of capital?
- How do the companies estimate the cost of different sources of fund (e.g. equity and debt)?
- How do the companies aggregate the cost of equity and debt into cost of capital?
- Do the companies revise their estimation of cost of capital with changes in various risk factors?
- What common risk factors are taken into account?
- Do the companies take tax into consideration when estimating cost of capital?

- Do CEO/CFO background (education, tenure and age) and company size (in terms of annual sales) have any influence cost of capital estimation practices?

1.3. Research Methodology

This paper is based on exploratory research using survey data.

Survey Instrument

The survey instrument has been built upon the questionnaire developed by Graham and Harvey (2001). Pilot testing of the questionnaire was conducted on three companies to ensure that the questions were comprehensible to the respondents. Some adjustments of the survey instrument (rephrasing) were carried out in light of the feedback received from the pilot survey respondents. Reliability analysis results show Cronbach Alpha values of 0.93, which is close to 1, hence considered reliable (DeVellis, 2012).

The Sample

The questionnaire was given in person to finance managers of 56 companies across various industries. 50 filled in questionnaires were attained. The companies were chosen from the major industries of the country on the basis of the accessibility of information and available contacts of the researcher.

See Table1.

Survey Method

The data used in this paper was collected as a part of an assignment by MBA students enrolled in an introductory finance course at the Institute of Business Administration, University of Dhaka. The students were asked to choose a company from any major industry in Bangladesh and establish a contact person in the finance department. Students were permitted to use their own network, the researcher's contact as well as access the alumni database for this purpose. Once such a company and contact person was initiated by the students, the researcher sent a formal letter to the concerned person requesting the students to get an overview of the financial management activities of the company in order to relate the theories being learnt in class to real-world practices. The students carried out monthly meetings. At the end of the 4-month semester, the students handed in the survey questionnaire provided by the researcher/instructor to the finance

manager (Yasmin, 2015). The commendable response rate of 89% was attained because of the relationship developed over the semester between the finance managers and the students. To ensure reliability of the responses, the researcher had randomly contacted the managers over phone after the collection of the filled in questionnaires.

Data Analysis Tool and Technique

Data collected from the survey were analyzed using the statistical analysis software SPSS 16.0. Descriptive analysis was done to present the survey results. Chi-square test under Cross-Tab analysis has been conducted to reveal the relationship of CEO/CFO background (i.e., education, age and tenure) and company size (in terms of annual revenue) with the cost of capital estimation practices.

2. Literature Review

To delve deep into understanding cost of capital and its estimation it is essential to recognize the very fact that companies amass their capital from more than one source, primarily debt and equity. So, any study on cost capital estimation requires an investigation into how the different costs i.e. cost of equity and cost of debt are calculated/estimated. Nevertheless, empirical research asserts that in many instances cost of equity is considered as cost of capital. For instance, Mbabazize and Daniel (2014) study on 30 companies in Rwanda found that 57.1% of the respondents use cost of equity as the discount rate in evaluating projects. None of the firms were found to be using the cost of debt. However, 75% of the firms were reported to be using both equity and debt to finance their projects. In contrast to the above study Westwick and Shohet's (1976) had highlighted that in UK, the most popular method for estimating discount rate/cost of capital for use in investment appraisal decisions was to employ the company's bank overdraft rate which is kind of cost of debt. Arnold and Hatzopoulos (2000) study asserts that 23% of their respondent small firms use the interest rate payable on debt as cost of capital although majority of these firms had both debt and equity financing.

2.1. Estimation of Cost of Equity

Corporate finance text books present dividend discount model of Gordon and Shapiro (1956), Capital Asset Pricing Model (CAPM) of Sharpe (1964) and Lintner (1965), multi-factor model arbitrage pricing theory (APT) of

Ross (1976), and three factor model of Fama and French (1995) as the best-known ways of determining cost of equity. In empirical research CAPM is found to be the most widely used method. For example, Bruner, et al. (1998)'s study on best practices in estimating cost of capital across 27 top companies and ten leading financial advisers highlighted that CAPM has been the widely-used model for deriving the cost of equity. Another US-based study on the current trends in estimating cost of capital conducted by Association by Financial Professionals in 2011 on 300 financial analysts puts forward similar findings (Brotherson et al., 2013). A similar study carried out on 300 UK based companies taken up from Times 1000 (Arnold and Hatzopoulos, 2000) have identified CAPM to be the most commonly used model for estimating cost of equity. This study also argued that use of CAPM has increased significantly since Brigham's (1975) study. Even in case of developing or underdeveloped economies CAPM is found to be the most widely used model in recent time (Anand, 2002; Kantšukov and Loemaa, 2012). A big proportion of the companies using CAPM adjust their estimates with changes in market conditions (Bruner et al., 1998; Jacobs and Shivdasani, 2012; Brotherson et. al., 2013). Nevertheless, a small percentage of firms in different exploratory studies are found to mention APT and/or Multi-factor or three factor asset pricing models for estimating cost of equity. Anand (2002) study on companies in India assert that the second and the third most popular methods in estimating cost of equity are Gordon's dividend discount model (52.1%) and earnings yield (34.2%) respectively. Very few firms (7%) use multi-factor model. Other practical proxies of estimating cost of equity mentioned in literature include investors'/ board of directors required rate of return, average historical returns of the stocks of the company, rule of thumb or regulatory guidance from headquarters and such (Graham and Harvey, 2001; Bartholdy and Peare, 2000; Easton, 2004).

2.2. Estimation of Cost of Debt

Theory suggests that cost of debt should be the yield to maturity (YTM) of the corporate bond issued by a company. In case there is no corporate bond issued in the market, YTM of a comparable bond (with similar risk characteristics) can be taken as proxy of cost of debt (Hawawini and Viallet, 2010). But in practice current interest rate on the company's outstanding debts is considered as the nominal cost of debt (Bruner et al., 1998). Jacobs and Shivdasani (2012) study on 300 finance professionals reveals that in estimating cost of debt only 34% chose the forecasted rate on new debt

issuance; 37% consider the current average rate on outstanding debt, and 29% take the average historical rate of the company's borrowings. As mentioned before Westwick and Shohet's (1976) study on UK companies asserts that cost of debt as measured by the company's bank overdraft rate was commonly considered as cost of capital during that time. However, theory suggests that in the absence of market determined YTM forward looking estimate of interest rates on new debt issuance should be the right proxy of cost of debt (Hawawin and Viallet, 2010). Estimates need to be adjusted with changes in company fundamentals such as capital structure, and market factors that may affect credit risk profile of the company.

2.3. Aggregating Cost of Equity and Debt

Weighted Average Cost of Capital (WACC)

Modern finance theories suggest that weighted average of the cost of individual sources of capital employed should be used to get aggregate cost of capital. Conversely, weighted average cost (WACC) was not a universally popular method in past decades. Westwick and Shohet's (1976) study on UK firms found that WACC had been used by less than 10% of the companies. Even in recent days WACC is found to be used by only 14.3% of the respondent companies in a study on Rwanda, a developing economy. Nonetheless, in case of developed world there has been a remarkable shift in the subsequent two decades, as it was found in Arnold and Hatzopoulos' (2000) study that more than 50% of the respondents have adopted the use of WACC as the appropriate cost of capital.

Book-Value vs Market-Value Weight

Although theory suggests market value weights in calculating WACC, findings of empirical research are diverging. Most research assert that the use of market value is prevalent and only small percentage of firms use book value in determining weights for calculating WACC; 15% in Burner, Eades et. al. (1998) and Anand (2002) and 26% in Arnold and Hatzopoulos (2000). But Truong et al. (2008) study on Australian companies depict a nearly balanced scenario; 49 percent use book value weight and 51% use market value weight.

Tax Adjustment

Interest expenses are tax deductible. Therefore, theory advocates for adjusting cost of debt in WACC for interest tax shield by multiplying cost of

debt by $(1 - \text{Marginal Tax Rate})$. In practice, majority companies do adjust cost of debt for interest tax shield. Percentage of respondents asserting to adjust their cost of debt for interest tax shield are between 60 to 70 percent (Bruner, Eades et al., 1998; Anand, 2002; Truong et al., 2008). However, Kantšukov and Loemaa (2012) study on companies in Estonia found that most of the companies do not account for interest tax shield in calculating WACC.

2.4. Risk Adjustments of Cost of Capital

Cost of capital is not a static measure. It must be adjusted with changes in risk factors. Corporate finance literature defines cost of capital as the opportunity cost of investing in a particular investment project or company. In other words, it is the investors' required rate of return (Brealey et al., 2008; Hawawin and Viallet, 2010). Risk-return theory suggest that required rate of return must change with changes in risk profile. Need for risk adjustment can be explained better from the perspective of cost of capital estimation. For example, when CAPM model is used for estimating cost of equity three factors in CAPM namely risk free rate of return, systematic risk of the company and market risk premium needs to be estimated. These estimates are likely to change with changes in interest rate, rate of inflation, exchange rate and other market and industry factors. Firm specific factors such as company's strategy, product life cycle, financial health of the company, its profitability, growth potentials and others will affect its cost of debt but also the estimate of systematic risk thereby the cost of equity (Hawawin and Viallet, 2010; Truong et al., 2008; Payne et al., 1999; Bruner et al., 1998). Hence cost of capital must be adjusted with changes in various risk factors.

Empirical research assert that cost of capital estimates are adjusted for changes in inflation, interest rate, foreign exchange risk (in case of multinationals and companies involved in foreign trade), term structure risk, risk of financial distress and others (Arnold and Hatzopoulos, 2000; McNulty, Yeh et al., 2002; Truong et al., 2008). However, such adjustments vary in terms of the number and types of risk factors taken into consideration and also the process of adjustment (McNulty et al., 2002; Kantšukov and Loema, 2012; Mbabazize and Daniel, 2014).

2.5. CFO/CEO Background, Company Size and Cost of Capital

Graham and Harvey (2001) study on companies in the US found association of CEO education (MBA/non-MBA) and firm size (annual sales) with the prevalence of CAPM in estimating cost of equity. Anand (2002) conducted a similar survey on companies in India. This study asserts size effect and CFO education effect on predominance of CAPM, market value weighted WACC, tax adjustment and adjustment of other risk factors in estimating cost of capital.

3. Findings

3.1. Estimation of Cost of Capital

The respondents were queried whether they estimate the cost of capital or not. 86% of the respondents replied that they do estimate the cost of capital and 14% replied in the negative. The companies who do not estimate their cost of capital either use non-DCF capital budgeting methods or use predefined discount rate. The predefined discount rate is either one based on some rule of thumb or a rate assigned by the corporate headquarters.

3.2. Cost of Equity Estimation

The survey tried to decipher the source or process of cost of equity estimation by the respondents. The responses were gathered over a range of possible tactics- whether the companies took average historical returns on the company's current stock, used the CAPM model with an estimate for beta, applied CAPM with other specified adjustments, took majority shareholders' required rate of return, used any regulatory guidelines or applied the dividend discount model. The results are illustrated in the table below. Some of the respondents admitted to using more than one technique. The results reflect that majority of the respondents, 47% always use the average historical returns on its common stock as the cost of equity input, 24% use the recommended rate by the majority shareholders (board members), 16% adhere to the rate prescribed by regulatory guidelines, 16% always use CAPM with some specified adjustments. See Table 2.

3.3. Cost of Debt

The respondents were similarly queried on their process of cost of debt calculation. The range of possible ways entailed taking coupon rate of existing debt obligations, using cost of debt of enlisted companies with same

credit rating, adjustment of prevailing rate for expected company fundamentals i.e., debt-to-equity ratio, liquidity, Free Cash flow, interest coverage, covenants and others or using bank's most recent quote of lending rate for the company. The most cited source in the study was the usage of bank's most recent lending rate as the cost of debt. The researchers deemed this finding to be in line with theory as a forward-looking estimate and interest rate on new debt is the relevant estimate to be applied. 74% take corporate tax into their cost of debt calculations. See Table 3.

3.4. Incidence of Weighted Average Cost of Capital

Another major interest of the study was to unearth the prevalence of WACC as the appropriate discount rate in Bangladesh. The survey highlighted that 84% of the companies do use WACC as their cost of capital/discount rate, which is the prescribed method in financial literature and best practices around the world.

However, it is noteworthy that among these companies, 53% use book value of debt, 71% use book value of equity. This diverges from financial theory and benchmark applications as market values are considered to be appropriate inputs as use of book equity values can lead to underestimating cost of capital by 2 to 3% (Jacobs and Shivdasani, 2012).

3.5. Risk Adjustment of Discount Rate

The paper also delves into understanding whether alterations in the discount rate is made by the respondents on the basis of factors such as unexpected changes in inflation, interest rates, exchange rates, shifts between spread in long-term and short-term interest rates and financial distress.

The results show that a high percentage of companies do alter discount rate for unexpected changes in inflation, exchange rates and interest rate. The implication is that these three factors are considered to be the most significant factors in influencing discount rate. 46% of the respondent companies do not make any adjustments for term structure risk and about 59% of them do not make any alterations for possibility of financial distress. This reflects the relative disregard of these two factors in influencing cost of capital. See Table 4.

3.6. CEO/CFO Background, Company Size and Cost of Capital

Cross-tab analysis was done to evaluate if cost of capital estimation practices are significantly associated with there is any significant association with CEO/CFO background measured in terms of level of education, age and tenure in the company and company size measured by annual sales. CEO/CFO background and sales were inserted as column variable for cross-tab analysis. The following were taken to measure practices in cost of capital estimation and were inserted as row variables for cross-tab analysis.

- Incident of estimating cost of capital.
- Mostly used method of estimating cost of equity.
- Mostly used method of estimating cost of debt.
- Incident of using WACC.
- Incident of using book or market value debt.
- Incident of using book or market value equity.
- Incident of adjusting for tax shield on interest expense.
- Incident of adjusting for risk factors i.e., inflation, exchange rate, interest rate, term-structure and financial distress.

Cross-tab statistics Chi-square (χ^2), Cramer's V and p-value represent the strength and significant of association among the column and row variables (Gartung et al., 2001). P-values less than 0.05 indicates significant association between the column and row variables at 5 percent level of significance. Higher the Chi-square value the stronger is the association between column and row variable. Cramer's V less than 0.2 in indicate weak association; $0.2 < \text{Cramer's V} < 0.3$ represent moderate association; $0.3 < \text{Cramer's V} < 0.4$ stands for strong association. But Cramer's V > 0.4 represent too strong association hence red flag or cause of concern. Such result triggers doubt perhaps the row and column variables are measuring the same thing. Cross-tab results interpreted by the above guideline are presented in Table 5.

Results indicate that only CEO/CFO tenure has significant association with the incident of estimating cost of capital, using WACC, using book/ market value debt and equity and adjusting for tax shield. Companies with longer CEO/CFO tenure (above 4 years) usually estimate their cost of capital, use WACC with market value weights of debts and

equity and do adjust cost of debt in WACC for interest tax shield. However, only the use of market value debt shows reasonably strong association. All other significant associations mentioned above are too strong to raise red flag.

CEO/CFO education, age and company size do not have any significant association with any of the cost of capital estimation practices.

4. Conclusion

This study sheds light on cost of capital estimation practices of the companies in Bangladesh. Academics can use the results as reference to delve deeper into the topic. The study could not investigate all the grey areas of cost of capital estimation. For example, it left out discussion about the choice of risk free rate, measurement of market risk premium, estimate of beta and others. However, this can be considered as a good starting point for research in this area in the context of Bangladesh. Practitioners might be interested to know the findings of the study to get an overview of cost of capital estimation practices in Bangladesh and also to identify best practice bench mark in the context. Academics teaching finance courses can use this paper to provide practical insights and to compare between local and international practices.

Results of the study are more or less in line with the results of past studies with few deviations. For example, unlike past studies where CAPM was found to be prevalent in estimating cost of equity this study reveals historical average return to be the most cited method of estimating cost of equity (Bruner et al., 1998; Arnold and Hatzopoulos, 2000; Anand, 2002; Jacobs and Shivdasani, 2012). Most recent lending rate from banks is found to be the commonly used proxy of cost of debt. Majority (74 percent) companies adjust cost of debt for tax. Use of WACC is prevalent but majority companies use book value debt and equity in WACC. Majority companies adjust cost of capital for inflation, exchange rate and interest rate risk but only few adjusts for term structure risk and risk of financial distress.

Empirical research in other countries indicate that practices are diverge in nature and varies across industry, life cycle stage, company size (sales) and growth, and background of the CEO/CFO/Finance manager. This study did not do any industry or life cycle stage comparison. But influence of CEO/CFO background and company size revealed in this study is not in line with the results of other studies (Graham and Harvey, 2001; Anand, 2002).

Future research should delve deep into the untapped aspects of this study. Detail analysis of how do companies use CAPM to estimate cost of equity will be an interesting work given Bangladesh is a country plagued with stock market inefficiency, high interest rate, and non-existent of any reliable published source of beta estimate. How do companies adjust their cost of capital for different risk factors can also be a significant area for future research? Researchers can also focus on understanding why no size and CEO/CFO background effect was eminent in the context of Bangladesh.

Annexures

Table 1: Respondent Profile

Industry sector	No of companies contacted	No of companies responded
Pharmaceuticals	15	15
Cement	7	6
Ceramic	5	5
Textile and Garments	12	10
Food and Beverages	8	6
Others	9	8
Total	56	50

Table 2: Degree of Application of Cost of Equity Estimation Method

Cost of Equity Estimation Method	Frequency of Use				
	Always	Often	Sometimes	Rarely	Never
Average Historical Returns on Common Stock	47%	25%	9%	11%	8%
CAPM with an estimate of Beta	14%	31%	19%	11%	25%
CAPM with adjustments for extra risk factors	16%	16%	22%	16%	30%

Required rate of return by BOD	24%	6%	14%	5%	51%
Rate determined by regulatory guideline	16%	19%	24%	14%	27%
Dividend Discount Model and/or Earnings Multiplier Model	16%	11%	8%	19%	46%

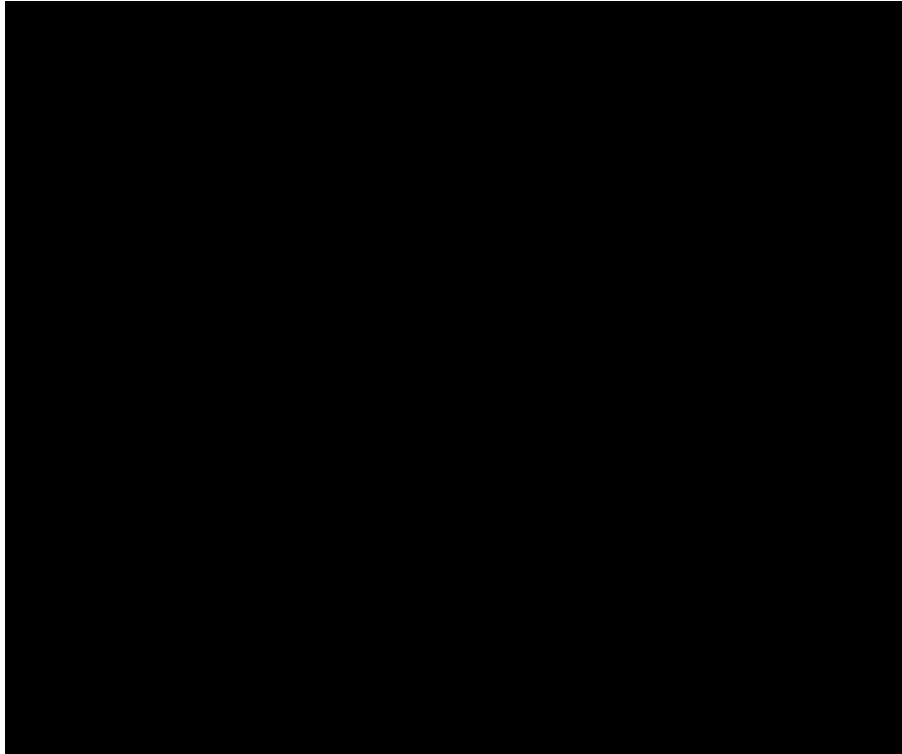
Table 3: Degree of Application of Cost of Debt Estimation Method

Cost of Debt Estimation Method	Frequency of Use				
	Always	Often	Sometimes	Rarely	Never
Interest or coupon obligation of existing debts	33%	27%	11%	5%	24%
Published cost of debt of companies with similar credit rating	16%	11%	16%	19%	38%
Adjust prevailing rate for expected company fundamentals	24%	24%	8%	30%	14%
Bank's most recent quote of lending rate	34%	11%	15%	8%	32%

Table 4: Degree of Impact on Discount Rate of Selected Risk Factors

	Yes	No
Risk of unexpected inflation	81%	19%
Foreign exchange risk	70%	30%
Unexpected change in general interest rate	69%	31%
Term structure risk (change in long term vs. short term interest rates)	54%	46%
Risk of financial distress	41%	59%

Table 5: Degree of Association and Significance of Key Variables



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