How does managerial ability affect cost of equity capital?

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Summary

This research will contribute the literature of managerial ability and cost of capital. This study is the first to investigate the association between managerial ability and cost of capital to the best of our knowledge using Demerjian et al. (2012). Managerial ability is the measurement methodology which is the most commonly used method to evaluate the managerial ability in the literature. In a previous study, Mishra (2014) investigates the relation between CEO managerial ability and cost of capital by using Custodio's (2013) CEO managerial ability methodology. This method only measures the ability of CEOs based on their experience. Those who have several experiences in different departments and other sectors are regarded as generalist CEOs, while some others who have one specific experience in a department and/or sector are regarded as specialist CEOs. Mishra shows a positive relation between generalist CEOs and cost of capital; it is regarded as the dark side of managerial ability. Mishra explains this relation by the risky behaviors of generalist CEOs. Mishra argues that generalist CEOs have lots of job opportunities. They also tend not to focus on the long-term financial soundness of the corporations—aiming to increase revenues sharply in short terms to improve their reputation. We extend Mishra's analysis by employing firm fixed effect to its model. We find that the impact of general CEO managerial ability which is defined by Mishra (2014) as the dark side is not significant once the employ firm fixed effect is considered.

This analysis assesses the effect of managerial ability on cost of capital by using Demerjian's methodology. It was found that the impact of managerial ability on cost of capital shows a negative significant relation in line with expectations. More able managers lead to less cost of capital. This finding is in line with literature of the impact of managerial ability on company performance. We also employ firm fixed effects to our models and confirm the study's

findings. It is shown that the relation between institutional ownership and cost of capital is also significant. Further, there were many channels examined to identify possible causes of this negative relationship. It is expected that able managers disclose more information; they also help to reduce forecast error and eventually improve performance. The relationships between managerial ability and information disclosure, managerial ability and forecast error, as well as managerial ability and performance are significant. The channel effects are also explored by employing firm fixed effect, as mentioned previously. All the models present significant relationship.

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1 Introduction

Better managers can impact the success of a company through their decisions. The Resource-based view (RBV) theory supports this argument (Wernerfelt, 1984). According to the RBV theory, better management of internal resources is important for competitive advantage of the firms; and employment of skilled personnel is among the internal resources. The key word here is better managerial ability. What are the criteria for the success of managers and companies? Can one expect that the companies with high ability managers have lower cost of capital which is an important indicator of the success of a firm? Can high ability managers have lower cost of capital? The answer is expected to be affirmative according to RBV – if a firm has adequate resources to hire a higher ability manager, it is likely to have a lower cost of capital.

In the context of corporate governance, reducing the information asymmetry is one of the key skills of high ability managers. It is expected that high ability managers disclose more and proper information about the company. The investors prefer to invest in firms with better information disclosure practices. In line with this conjecture, the rational expectations equilibrium model of Easley and O'Hara (2004) argues that higher premium is required by uninformed investors compared to their informed peers. That is why public companies need to disclose several information for public investors. Because of this, the cost of equity capital increases in the presence of less information disclosure (Easley and O'Hara, 2004). From this point of view, one can expect that high ability managers can reduce the cost of equity capital by releasing more prevalent information.

There is a commonly used methodology to measure the managerial ability—developed by Demerjian et. al (2012). In their methodology they succeeded to differentiate the impact of

managers on firm success based on the characteristics of a company such as market share, firm size etc. Demerjian et al.'s methodology focuses on the overall managerial ability (not just CEO or CFO ability). To the best of our knowledge there is no study examining the relation between overall managerial ability (Demerjian et al., 2012) and cost of equity capital.

Mishra (2014)'s study is the closest one that examines the relation between CEO ability and cost of capital. He examines the relation between a CEO's general managerial ability and cost of equity capital by using the CEO ability measure developed by Custodio et al (2013). Custodio et.al (2013) identifies two types of CEOs – generalists and specialists, based on the extent of general skills possessed by a CEO "that are transferable across firms and industries," (p. 471). Mishra (2014) finds a positive relation between generalist CEOs and cost of equity capital. According to this study, generalist CEOs take more risks to improve the short-term revenues. This leads to deteriorating long-term financial soundness and causes high cost of equity capital. This can also be explained by agency problems of generalist CEOs. Since they can easily find jobs, they focus on short term revenues rather than long term, risks can be tolerated by generalist CEOs. This is an important finding and somehow contradictory to the proposition of RBV theory and the rational expectations equilibrium model which argue high ability managers reduce cost of equity capital.

Given the apparent contradictory results presented by Mishra (2014) and limited attention in the literature to the impact of overall managerial ability (as defined by Demerjian et al.) on cost of capital - many are motivated to examine this relation with a comprehensive sample.

In addition, information disclosure, analyst forecast, and firm performance can highlight the channels that can better explain the relation between managerial ability and cost of equity capital. Companies which disclose more information helps analysts to provide accurate forecasts.

Forecasts supported by better and more information leads to higher earnings by reducing restatements and enhancing interests of investors to these companies.

These discussions are the driving forces for our research to examine the relation between the managerial ability and cost of capital.

2 Literature Review

2.1 Managerial Ability

Managerial ability is the ability of top management team or CEO to use firm resources (capital, labor, and innovative assets) for generating revenue, profit, or firm value (Demerjian et al. 2012). The CEOs are also defined as generalists and specialist by Custodio et al (2013) based on their experience with different companies and areas. Both Demerjian et al. (2012) and Custodio et al. (2013) generated scores for managers (see appendix). These scores helped researchers to assess the impact of managers on different aspects of the companies.

The majority of the literature on managerial ability (among 120 published papers) have five most prominent topics: performance (20%), mutual funds (12.5%), capital markets (9.2%), reporting quality (8.3%), and compensation (6.7%) (Anggraini & Sholihin, 2021). However, a focus on cost of capital is very limited.

It is expected that managers affect the companies in terms of several channels. The most important one is the performance and firm value. High performance and firm value are closely linked to managerial ability (Chang et al. 2010). For specific sectors, the managerial ability has different impacts. Especially in the banking industry, in which human and managerial factors have a large impact on the performance, high managerial ability is positively related to loan

quality (Banna et al. 2018) and liquidity (Andreau et al. 2016). We can also see the similar types of impact for the important matters for the companies. It has been observed that managerial ability has a positive impact in terms of mergers and acquisitions (Cui & Leung 2020; Galavotti 2019), venture capital operations (Kaplan et al. 2012) and initial public offerings (Cox, 2017).

There are also studies examining the managerial ability in the scope of capital markets. The information disclosure is crucial for the companies. In this respect it has been observed that high managerial ability leads to a better information environment, and this causes higher analyst following and lower forecast error of analysts (Baik et al. 2018). The relation between higher managerial ability and information disclosure has been analyzed in other studies as well. Higher managerial ability has positive effects on decreasing information asymmetry (Petkevich & Prevost, 2018) and this has a significant impact on the reputation of companies. In terms of reputation, credit ratings are the reflection of views of major credit rating agencies on companies. In this respect, the impact of managerial ability on credit risk was also assessed and it has been found that higher managerial ability increases credit ratings (Bonsall IV et al. 2017, Cornaggia et al. 2017). These findings are all related to information disclosure. As stated in the introduction, there are also a few studies identifying negative impacts of high managerial ability such as Mishra's (2014) finding of higher cost of capital for companies with high ability generalist CEOs. Higher risk taking of generalist CEOs has been observed by Yung & Chen (2018).

There are also studies on the impact of higher managerial abilities on the reporting quality and this is a part of information disclosure. Higher reporting quality has been generated by higher ability managers and more accurate estimates caused higher accruals quality, higher earnings and fewer restatements (Demerjian et al. 2013). The same positive impact has been

observed in short time differences for earnings announcement and audit report, timeliness, and low late ratios in SEC filings (Abernathy et al. 2018).

2.2 Cost of Equity Capital

The impact of cost of capital on investments depends on the cost of debt and cost of equity capital. If the cost of debt is high, the investments will be low. However, for the cost of equity capital, it depends on the calculation method of the cost of capital (Frank et al. 2016). Frank et al. finds empirically that investments are increasing due to a rise in the cost of equity capital if it is calculated by using a capital asset pricing model which depends only on historical values. However, the investments are decreasing due to an increase in the cost of equity capital if it is calculated by implied cost of capital methodology which takes into consideration future estimates.

The literature has several studies reviewing the impact of other factors on the cost of equity capital. In terms of the relation between managerial ability and cost of equity capital, the information disclosure is an important effect since the high ability managers can disclose more information and this might decrease the cost of equity capital. It has been found that risk disclosure is negatively related to the cost of equity capital (Nahar et al. 2016). However, the relation between overall disclosure and the cost of equity capital has a negative relation only if there are fewer analysts following (Botosan, 1997). The information asymmetry also increases the cost of equity capital (Hughes et al. 2007 and Armstrong et al. 2011). Johnstone (2016) shows that the content in terms of bad or good news is important on the relation between the information disclosure and cost of capital. In the same context, Garel et al. (2019) argue that US companies with less readable 10-K filings have a higher cost of equity capital. This relation is

shown as U-shaped in UK firms by Athanasakou et al. (2020). Related to this discussion, Rijba et al. (2021) shows that greater textual complexity causes a higher cost of capital. In addition, they argue that the tone of 10-K filings affects the relation between readability and cost of capital; there is a greater effect of annual report complexity on cost of equity when the tone is more negative or more ambiguous.

Romilda et al. (2014) finds a negative relation between corporate governance index and cost of equity capital. Political connections also matter for the cost of equity capital. The cost of equity capital is also low for politically connected firms (Boubakri et al. 2012). The social network capital of managers reduces the cost of equity (Ferris et al. 2017).

Tax avoidance by creating more cash flows also leads to a decrease in the cost of equity (Shevlin et al. 2016). The presence, number and voting size of large shareholders also reduce the cost of equity (Attig et al, 2008).

Mishra (2014) examines the relation between managerial ability and cost of equity capital and finds that companies with generalist CEOs have higher cost of equity capital than the companies with specialist CEOs. This seems to be a contradictory finding to the general assumption that successful managers mean successful companies with lower cost of capital since generalist CEOs could be regarded as more successful than specialist CEOs. This contradictory view against general assumption is explained by Mishra with more risk-taking behavior of generalist CEOs in contrast to specialist CEOs. Generalist CEOs have better options than specialist CEOs in terms of finding jobs and hence they tend to take more risk to earn higher compensation.

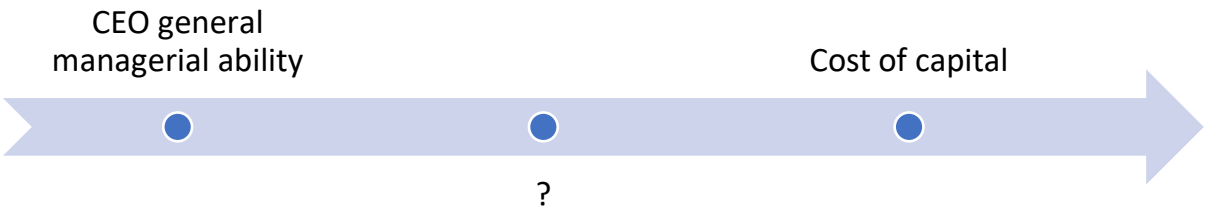
3 Hypothesis

Considering these discussions, we present a set of hypotheses.

CEO general managerial ability and cost of equity capital

Hypothesis 1: higher general ability of managers leads to lower cost of equity capital.

Mishra argues that generalist CEOs are expected to take more risks and cause more cost of capital. He explains this relation by short-term revenue focus of the generalist CEOs depending on agency theory. Generalist CEOs tend to find more jobs due to their experience in different departments and companies. Therefore, they focus on short term revenues. However, according to RBV theory, the results presented by Mishra seem puzzling. Therefore, we would like to revisit this research question with a newer dataset and improved methodology. To test this hypothesis, we first employ the same model used by Mishra with the sample. Then, since Mishra did not employ firm fixed effect regression, in another model we will employ fixed effect regression. By employing firm fixed effect regression, we would like to better understand the impact of variables that vary over time. This helps us to have a more robust assessment of Mishra's hypothesis (Figure.1).



Managerial ability and cost of equity capital:

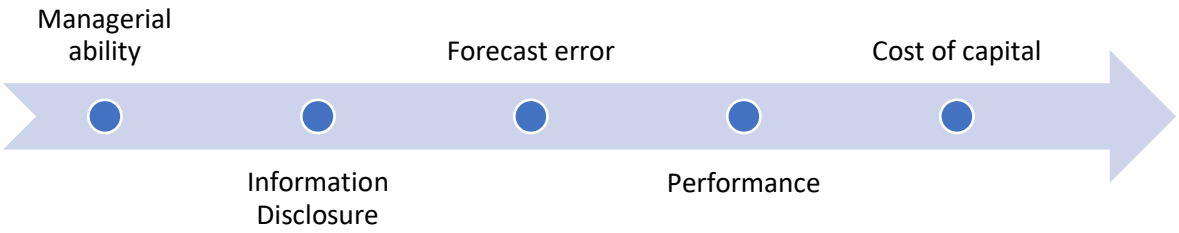
Hypothesis 2: higher ability of managers leads to lower cost of equity capital.

This hypothesis is in line with the assumptions of RBV theory and rational expectations equilibrium model. Able managers manage the internal resources more effectively. Therefore, it

is expected that the cost of equity of capital with able managers is lower compared to those which are not managed well. We chose Demerjian's managerial ability score since this method covers overall all managerial impacts and it is the most commonly used methodology in the literature of managerial ability. The companies with high managerial ability scores are expected to utilize internal resources in a more efficient way and make better decisions. Therefore, high ability managers reduce the cost of equity capital (Figure 2).

Channel Effects

Figure.3 illustrates the channel effects we examine on the relation between managerial ability and cost of capital.



Hypothesis 3: Managerial ability improves information disclosure.

Based on the findings of the previous studies managerial ability has a significant impact on information disclosure. High ability managers are expected to improve the information disclosure and also the quality of information disclosure. The improvement of information

disclosure may result in low cost of equity capital. The information disclosure is expected to have a channel effect on the relation between managerial ability and cost of equity capital.

Hypothesis 4: Managerial ability reduces forecast error.

High ability managers by improving the information disclosure and the quality of reports helps analysts to provide more accurate forecasts. Therefore, it is expected that able managers reduce forecast error and this will have a channel effect on the relation between managerial ability and cost of equity capital.

Hypothesis 5: Managerial ability improves performance.

There are lots of studies examining the impact of managerial ability on firm performance. We would also like to assess this relation with our sample. We expect that able managers with their better utilization of internal resources will improve the firm performance. This relation can also be defined as a channel effect on the relation between managerial ability and cost of equity capital.

Additional analysis with institutional ownership:

Hypothesis 6: higher institutional ownership leads to less cost of equity capital.

We also investigate the impact of institutional ownership on the cost of equity capital. Higher institutional ownership is linked with more information disclosure (Boone&White, 2015). Therefore, this is expected to decrease average risk premium (figure 4).

4 Data and methodology:

4.1 Data:

This study includes the earning per share forecasts of all companies by different analysts between 1992 to 2018 from I/B/E/S[1] database to compute ICC. For the firm-level fundamental accounting data, we use the CRSP[2] /Compustat Merged database. The managerial ability data is accessed from the website of Demerjian between 1990 to 2018[3]. The Generalist and Specialist CEOs database is gathered from Professor Custodio between 1992 to 2016.

We coded and performed all data for this research on STATA software. Our coding starts with 4.25 million annual and quarterly earnings forecasts from the I/B/E/S database for a company from 1992 to 2020. In line with previous studies, the companies which have less than three forecast analysts, have negative EPS for the upcoming year and the year after, have more than 200% long term EPS growth forecast and less than 200% long term EPS decline forecasts have been dropped. This left us 49,037 observations.

We merge the I/B/E/S dataset with the Compustat-Crsp merged file. The number of observations declined to 32,858 after the merge since not all companies had EPS on both files.

[1] Institutional Brokers Estimate System

[2] The Center for Research in Security Prices

[3] The scores are available at Peter Demerjian's website at University of Washington

Table.1: Panel dataset for analysis

Table 1 represents the final panel data for the analysis. The number of companies each year from 1994 to 2018 with the average of each variable in research are represented in the table. On average, our study covers 1,111 companies each year. The average risk premium increased after 2008-9.

		mean			
Year	Number of Companies	Average risk premium	MA Score rank	General Ability Score	Forecast Error
1994	1,051	0.015	0.564044	-0.53148	0.01427
1995	1,103	0.019	0.5577135	-0.47874	0.01604
1996	1,273	0.024	0.5505789	-0.43738	0.01399
1997	1,409	0.020	0.5442096	-0.39833	0.01153
1998	1,461	0.046	0.5451062	-0.35606	0.03770
1999	1,390	0.048	0.5513019	-0.31327	0.02358
2000	1,268	0.044	0.5456305	-0.25050	0.07188
2001	1,172	0.052	0.5423207	-0.21062	0.03065
2002	1,185	0.058	0.5497485	-0.16763	0.05239
2003	1,268	0.039	0.5454171	-0.15642	0.00941
2004	1,351	0.028	0.5511479	-0.13301	0.00815
2005	1,363	0.035	0.547748	-0.12991	0.00818
2006	1,349	0.033	0.5457697	-0.12842	0.00865
2007	1,279	0.049	0.5567372	-0.15886	0.03363
2008	1,173	0.094	0.5516266	-0.15707	0.13632

2009	1,051	0.078	0.5482343	-0.15305	0.05288
2010	979	0.048	0.5733493	-0.11953	0.01360
2011	1,120	0.065	0.5673746	-0.10026	0.01878
2012	1,047	0.076	0.5433626	-0.07933	0.01489
2013	887	0.057	0.542166	-0.05937	0.00995
2014	797	0.056	0.5441882	-0.02582	0.01261
2015	814	0.074	0.5396541	-0.00659	0.02343
2016	773	0.070	0.5321975	0.01713	0.01555
2017	686	0.060	0.5436493	.	0.02269
2018	518	0.063	0.5267941	.	0.02568

4.2 Methodology

Although it is a crucial and commonly used value for capital budgeting and equity valuation there is still no consensus on how to calculate the cost of equity capital (Echterling et al. 2015). The cost of equity capital calculation is generally based on historical data. The capital asset pricing model is the widely used model to compute the cost of equity capital. There are also other methodologies to consider which measure the cost of capital such as residual income models – more commonly used in cost of capital studies. In these models cost of capital is defined as implied cost of capital (ICC) which is the return that equates the existing stock price to the present value (PV) of all cash flows to shareholders.

We use four most commonly used methodologies for the ICC calculation. Claus & Thomas (2001) as ICC_CT, Easton (2004) as ICC_ES, Gebhart et al. (2001) as ICC_GLS and Ohlson and Juettner-Nauroth (2005) as ICC_OJ calculate ICC depending on the analyst forecasts for

earnings per share. Mishra (2014) calculates average risk premium using ICC_GLS, ICC_ES and ICC_Ct. We calculate the arithmetic average of the differences of these four ICC calculations from risk free rate (10-year US Treasury bond yield) to compute risk premium RPM_AVG. Analyst forecasts for earnings per share are derived from IBES database. We use Stata for ICC calculations.

We select our control variables following previous literature:
Long-Term Debt/Total Assets (Book Leverage), the natural log of total assets ($ million), book value of equity divided by market value of equity (BVMV), beta, dispersion of analyst forecasts and long-term growth in forecasted earnings (growFE).

To examine hypothesis (1), the association between CEO general managerial ability and average risk premium calculated by Mishra, we propose the ordinary least square (OLS) regression model by employing firm fixed effect on a firm-year level in Equation (*1*):

$$\begin{aligned} average\ risk\ premium(Mishra) \\ = Alpha + Beta1 * general\ CEO\ ability + Beta2 * Total\ asset \\ + Beta3 * growFE + Beta4 * BVMV + Beta5 * Leverage + Beta6 \\ * Bog_{index} + Beta7 * forecast\ error + Beta8 * Beta \\ + firm\ fixed\ effects \end{aligned} \quad (1)$$

The Equation (1) includes several control variables. Total asset represents the total asset of the firm. GrowFE is the long-term EPS growth forecast. BVMW is book value to market value. Leverage is the ratio of long-term debt to total assets. Bog index is the index for annual report readability. Market beta from the CRSP database is to control the systemic risk of a firm. Forecast error for each company is the difference between analysts' consensus forecasts and the company's actual earnings announcement, scaled by the fiscal year-end share price.

To answer hypothesis (2), the association between managerial ability and cost of equity capital, we employ the ordinary least square (OLS) regression model on a firm-year level in Equation (2):

$$\begin{aligned} average\ risk\ premium \\ = Alpha + Beta1 * MA_{score_{2018}} + Beta2 * Total\ asset + Beta3 \\ * growFE + Beta4 * BVMV + Beta5 * Leverage + Beta6 \\ * Bog_{index} + Beta7 * forecast\ error + Beta8 * Beta \\ + firm\ fixed\ effects \end{aligned} \quad (2)$$

4.3 Channel effect of information disclosure, forecast error and performance on the relation between managerial ability and cost equity capital

In more competitive market environments companies disclose more information than the companies in less competitive market environments (Darrough & Stoughton, 1990). However, there are conflicting views on the effect of company disclosure on the cost of equity capital. Some argues that information disclosure does not have an effect cost of capital (Bertomeu, 2015; Caskey et al., 2015). Dye and Hughes (2018) argues that information disclosure influences the investors' perception, and more disclosure leads to less cost of capital.

There are studies which argue high managerial ability leads to more information disclosure with higher analyst following (Baik et al. 2018) and less information asymmetry (Petkevich & Prevost, 2018). It can be expected that the high ability managers disclose more information even in less competitive markets and this behaviour could reduce average risk premium. Therefore, information disclosure (Bog_index) can have a channel effect on the relation between managerial ability and the average risk premium.

$$\begin{aligned} Bog_{index} = Alpha + Beta1 * MA_{score_{2018}} + Beta2 * Total\ asset + Beta3 \\ * growFE + Beta4 * BVMV + Beta5 * Leverage + Beta6 \\ * forecast\ error + Beta7 * Beta + firm\ fixed\ effects \end{aligned} \quad (3)$$

Equation (3) represents the association between managerial ability and information disclosure. The Bog index is a measure for the readability of annual 10-K filings of the listed companies. A higher level of the Bog index represents lower document readability (Hasan, 2020).

We also examine the relation between managerial ability and forecast error.

$$Forecast\ error = Alpha + Beta1 * MA_{score_{2018}} + Beta2 * Total\ asset + Beta3 * growFE + Beta4 * BVMV + Beta5 * Leverage + Beta6 * Bog_{index} + Beta7 * Beta + firm\ fixed\ effects \quad (4)$$

Equation (4) represents the association between managerial ability and forecast error.

Lastly, we examine the relation between managerial ability and performance (earnings). It is expected that able managers increase earnings and this leads to lower average risk premium.

$$ROA\_Ebitda = Alpha + Beta1 * MA\_score\_2018 + Beta2 * Total\ asset + Beta3 * growFE + Beta4 * BVMV + Beta5 * Leverage + Beta6 * Bog\_index + firm\ fixed\ effects \quad (5)$$

Equation (5) represents the association between managerial ability and earnings.

4.4 Additional analysis between institutional ownership and cost of capital

To answer hypothesis (6), the association between institutional ownership and cost of equity capital, we employ the ordinary least square (OLS) regression model on a firm-year level in Equation (6):

$$average\ risk\ premium = Alpha + Beta1 * MA_{score_{2018}} + Beta2 * Isntitutional\ ownership + Beta3 * Total\ asset + Beta4 * growFE + Beta5 * BVMV + Beta6 * Leverage + Beta7 * Bog_{index} + Beta8 * forecast\ error + Beta9 * Beta + firm\ fixed\ effects \quad (6)$$

High institutional ownership leads to more information disclosure (Boone & White, 2015). Therefore, it is expected that high institutional ownership reduces the cost of capital.

5 Results and Findings

Table.2 represents the descriptive statistics of our research with the number of observations, minimum, maximum, mean, and standard deviation measures. We use IBES database to calculate average risk premium, total asset, long-term earnings growth forecast, book value to market value, forecast error, ebitda, and long-term debt to asset. Managerial ability, general CEO managerial ability, bog_index and institutional ownership variables are calculated from other datasets.

The mean average risk premium is 0.05, similar to previous studies (Mishra, 2014).

Table 2. Descriptive Statistics

Table 2 represents descriptive statistics of main variables in this research. Average risk premium (RPM_AVG) is the measure to evaluate the cost of capital. The measures related to managerial ability include managerial ability score (MA Score) and CEO general managerial ability score. Bog index as the measure of annual report readability, EBITDA and institutional ownership provide insight about the firm's internal environment.

Variable	Obs	Mean	Std. Dev.	Min	Max
Average risk premium	27,767	0.05	0.06	-0.05	0.84
MA_Score_2018	102.070	0.55	0.28	0.1	1
CEO General Managerial Ability	33,362	-0.18	0.93	-1.65	6.73
Total Asset	145,721	9,640.05	82,990.29	0.00	3,771,200
Long-term earnings growth forecast	28,053	0.16	0.08	0.02	0.47
Book value to market value	145,113	1.42	348.27	-5814.90	1,325,126.1
Forecast Error	69,614	0.03	0.47	0.00	60.84
EBITDA	141,031	0.03	1.47	-134.24	226.31
Ins_ownership	110,773	0.44	0.36	0.00	25.57
Bog Index	91,403	83.98	7.70	47.00	211.00
Long-term debt to asset	145,279	0.18	0.27	0.00	39.60
Dispersion	69,595	0.26	0.68	0.003	4.86
Beta	131,038	1.03	0.85	-15.37	10.32

Table 3 represents the correlation between main variables in analysis and the significance of their pairwise t-test at one, five, and ten percent. In line with expectations, all the main variables have a significant pairwise correlation. Average risk premium has a negative correlation with managerial score and positive correlation with general managerial ability.

Table.3: Correlation Matrix

Pairwise correlation matrix of the main variables is represented in Table.3. Average risk premium, managerial score, general managerial ability, total assets, long-term earnings growth forecast, book value to market value, forecast error, EBITDA, institutional ownership, annual report readability and financial leverage are correlated against each other.

Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Average risk premium (1)	1.000										
MA_Score_2018 (2)	-0.107***	1.000									
General Managerial Ability (3)	0.066***	0.045***	1.000								
Total Asset (4)	0.060***	0.195***	0.097***	1.000							
Long-term earnings growth forecast (5)	-0.142***	0.108***	-0.149***	-0.103***	1.000						
Book value to market value (6)	0.362***	-0.002	-0.015***	0.003	-0.131***	1.000					
Forecast Error (7)	0.221***	-0.032***	0.008	0.004	0.015**	-0.087***	1.000				
EBITDA (8)	-0.208***	0.077***	0.018***	0.002	0.053***	0.000	-0.075***	1.000			
Ins_ownershi	-	0.017*	0.133*	0.014*	-	-	-	0.017*	1.000		

p (9)	0.026***	**	**	**	0.016***	0.007**	0.042***	**			
Bog Index(10)	0.095***	0.027***	0.135***	0.054***	0.014**	0.013**	0.007*	-0.032***	0.237***	1.000	
Long-term debt to asset (11)	0.164***	-0.129***	0.112***	-0.010***	-0.186***	-0.002	0.022***	-0.018***	0.107***	0.060***	1.000

**** p<0.01, ** p<0.05, * p<0.1*

5.1 General managerial ability and cost of capital

Table 4 represents the replication of Mishra's (2014) model for the relation between general managerial ability and cost of capital. Model 1 is the one used by Mishra. Annual report readability is added to the Model 2 as a new variable. In addition to annual report readability Model 3 also includes forecast error. In line with the findings of Mishra (2014) cost of capital has a positive relation with general managerial ability at 5% significance for all three models. We confirm Mishra's findings with our sample. These models do not take into consideration of firm fixed effect.

Table.4: Relationship between CEO general managerial ability and cost of capital

Table 4 provides the relationship between cost of capital (average risk premium) as the dependent variable and CEO general managerial ability (GAI) as the independent variable. All three models present the ordinary least square (OLS) regression. All models show a significant positive relationship (coefficients = 0.000853, 0.000893, and 0.000830 respectively) between cost of capital and general managerial ability. The models also control for various firm-related variables. Robust standard errors clustered by firms are in parentheses. *, **, *** denote a two-tailed p-value of <0.10, 0.05, and 0.01, respectively. Definition of variables and their calculation methods are provided in Appendix A.

Table.4: CEO general managerial ability and cost of capital (replication of Mishra's model)

VARIABLES	(1) Average risk premium (Mishra)	(2) Average risk premium (Mishra)	(3) Average risk premium (Mishra)
GAI	0.000853*	0.000893*	0.000830*
	(0.000401)	(0.000435)	(0.000418)
Total_asset	0.0000000168	0.0000000108	0.0000000206
	(0.0000000123)	(0.0000000130)	(0.0000000123)
Long-term earnings growth forecast	-0.0555***	-0.0515***	-0.0619***
	(0.00652)	(0.00706)	(0.00691)
Book value to market value	0.0610***	0.0610***	0.0531***
	(0.00201)	(0.00214)	(0.00208)
Beta	0.00581***	0.00549***	0.00383***
	(0.000673)	(0.000720)	(0.000657)
Leverage	0.0500***	0.0500***	0.0439***
	(0.00331)	(0.00349)	(0.00324)
Bog index		0.0000981	0.0000691
		(0.0000613)	(0.0000576)
Forecast error			0.122**
			(0.0410)
Dispersion			0.0215***
			(0.00157)
Constant	-0.0386***	-0.0478***	-0.0385***
	(0.00350)	(0.00582)	(0.00558)
N	15242	12859	12834
R^2	0.386	0.385	0.437
adj. R^2	0.383	0.381	0.433

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

5.2 General managerial ability and cost of capital under firm fixed effect regression (H1)

Table 5 presents the regression analysis of Mishra (2014) including firm fixed effect with 'areg' command. Model 1 is the one used by Mishra. Annual report readability is added to the Model 2 as a new variable. In addition to annual report readability, Model 3 also includes forecast error. The relationship between general managerial ability and cost of capital does not have any significance once we employ firm fixed effect regression. This result is in line with our expectation that the relation between the managerial ability and cost of capital should not be negative. We also acknowledge that because managers usually work for the same firm for some time, the part of GAI effect will be transferred to the firm fixed effect regression. Therefore, this may be the reason why the GAI effect is significant in Table-4 but not in Table-5.

Table.5: Relationship between cost of capital and general managerial ability under firm fixed effect

Table 5 shows the relationship between cost of capital (average risk premium) as the dependent variable and the general managerial ability (GAI) as the independent variable. All three models present OLS regression with firm fixed effect. All models show insignificant positive relationship (coefficients = 0.000616, 0.000673, and 0.000705 respectively) between cost of capital and general managerial ability. The models also control for various firm-related variables. Robust standard errors clustered by firms are in parentheses. *, **, *** denote a two-tailed p-value of <0.10, 0.05, and 0.01, respectively. Definition of variables and their calculation methods are provided in Appendix A.

VARIABLES	(1) Average risk premium (Mishra)	(2) Average risk premium (Mishra)	(3) Average risk premium (Mishra)
GAI	0.000616	0.000673	0.000705
	(0.000697)	(0.000795)	(0.000747)
Total_asset	-0.0000000197	-0.0000000252	-0.0000000213
	(0.00000003)	(0.0000000366)	(0.0000000347)
Long-term earnings growth forecast	-0.0462***	-0.0429***	-0.0473***
	(0.00923)	(0.0101)	(0.00997)
Book value to mark value	0.0695***	0.0714***	0.0628***
	(0.00278)	(0.00313)	(0.00299)
Beta	0.0000191	-0.000540	-0.00149
	(0.000826)	(0.000937)	(0.000864)
Leverage	0.0607***	0.0597***	0.0512***
	(0.00478)	(0.00527)	(0.00497)
Bog index		0.000276*	0.000200
		(0.000113)	(0.000107)
Forecast error			0.0929**
			(0.0299)
Dispersion			0.0189***
			(0.00147)
Constant	-0.0411***	-0.0665***	-0.0549***
	(0.00278)	(0.00925)	(0.00876)
Firm FE	YES	YES	YES
N	15242	12859	12834

R^2	0.599	0.595	0.624
adj. R^2	0.537	0.524	0.558

Robust standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

5.3 Cost of capital and managerial ability (H2)

Table 6 presents the regression analysis by employing firm fixed effect between the cost of capital (average risk premium -five icc model) as the dependent variable and the managerial ability (MA_Score_2018) by employing a firm fixed effect. Annual report readability (bog_index) is added to the Model 2 as a new variable. In addition to annual report readability, Model 3 also includes forecast error. All three models show a statistically negative relationship between cost of capital and managerial ability (coefficients =-0.00875 (at 1% significance level), -0.00845 (at 1% significance level) and -0.00444 (At 5% significance level), respectively).

The result shows that the high ability managers lead to lower cost of capital. This can be explained by various reasons. Their better managerial abilities help them to make better decisions, which increases investor confidence and decreases the cost of capital. The models also control for various firm-related variables. Robust standard errors clustered by firms are in parentheses. *, **, *** denote a two-tailed p-value of <0.10, 0.05, and 0.01, respectively. Definition of variables and their calculation methods are provided in Appendix A.

Table.6: Relation between cost of capital and managerial ability

VARIABLES	(1) Average risk premium (four icc model)	(2) Average risk premium (four icc model)	(3) Average risk premium (four icc model)
MA_score_2018	-0.00875***	-0.00845***	-0.00444**
	(0.00149)	(0.00170)	(0.00157)
Total_asset	0.0000000399	-0.0000000739	0.0000000101
	(0.0000000387)	(0.0000000438)	(0.0000000433)
Long-term earnings growth forecast	-0.0432***	-0.0482***	-0.0492***
	(0.00747)	(0.00881)	(0.00858)
Book value to market value	0.0732***	0.0719***	0.0670***
	(0.00216)	(0.00268)	(0.00240)
Beta	0.00268***	0.00310***	0.00165*
	(0.000723)	(0.000834)	(0.000774)
Leverage	0.0608***	0.0593***	0.0524***
	(0.00439)	(0.00507)	(0.00468)
Bog_index		0.000388***	0.000314**
		(0.000114)	(0.000109)
Forecast error			0.0438***
			(0.00821)
Dispersion			0.0203***
			(0.00124)
Constant	-0.0349***	-0.0672***	-0.0610***
	(0.00266)	(0.00917)	(0.00875)
Firm FE	YES	YES	YES
N	20034	15450	15390
R^2	0.631	0.624	0.655
adj. R^2	0.560	0.545	0.581

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

5.4 Channel effects (H3,H4,H5)

To examine the channel effects of the relationship between managerial ability and cost of capital, we choose information disclosure, forecast errors and performance as variables and employ OLS.

The companies having managers with high ability are expected to publish reports which can be easily readable. The high readability of the reports will reduce forecast errors and these companies will generate more revenue.

Table 7 presents the OLS regression results of the relationship between managerial ability as the independent variable and annual readability, analyst forecast errors, and performance as the dependent variables respectively.

Model (1) shows a significant relation between MA score and annual report readability (coefficient: -0.260). Model (2) represents the significance of the relationship between MA score and forecast error (coefficient: -0.0451). Model (3) presents the significant relation between MA score and performance (coefficient: 0.118).

Table.7. Channel Effects

VARIABLES	(1) Annual report readibility (bog_index)	(2) Forecast error	(3) ROA_Ebitda
MA_score_2018	-0.260**	-0.0451***	0.118***
	(0.0983)	(0.0112)	(0.00301)
Total_asset	0.0000328***	-0.000000336*	-0.000000318***
	(0.00000474)	(0.000000135)	(5.72e-08)
Book value to market value	0.339***	0.0470	-0.0379***
	(0.0605)	(0.0278)	(0.00190)
Leverage	2.377***	-0.000104	-0.0948***
	(0.197)	(0.0380)	(0.00653)
Forecast error	0.0165		-0.0129***
	(0.0127)		(0.00293)
Dispersion	0.147***		-0.0119***
	(0.0284)		(0.000791)
Constant	77.08***	0.0114	0.0878***
	(0.340)	(0.0128)	(0.00332)
Firm FE	YES	YES	YES
N	37274	51101	51023
R^2	0.843	0.357	0.765
adj. R^2	0.814	0.247	0.725

Standard errors in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Overall results illustrate that information disclosure, forecast error, and performance are playing significant roles as channel effects on the relationship between managerial ability and average risk premium.

5.5 Additional analysis with the impact of institutional ownership (H7)

Table 8 represents the results of additional analysis including the institutional ownership as an independent variable. The relationship between managerial ability and cost of capital is still significant when we include institutional ownership as a new independent variable. All three models show a significant relation between institutional ownership and cost of capital (coefficients: -0.0466, -.0465 and -0.0366, respectively). Higher institutional ownership is linked with lower cost of capital.

Table.8: Additional Analysis with institutional ownership

VARIABLES	(1) Average risk premium	(2) Average risk premium	(3) Average risk premium
MA_score_2018	-0.00999***	-0.00879***	-0.00485**
	(0.00150)	(0.00169)	(0.00157)
Inst_ownership	-0.0466***	-0.0465***	-0.0366***
	(0.00362)	(0.00439)	(0.00403)
Total_asset	-0.000000294	-0.0000000657	-0.0000000361
	(0.0000000428)	(0.0000000440)	(0.0000000434)
Long-term earnings growth forecast	-0.0455***	-0.0504***	-0.0514***
	(0.00787)	(0.00880)	(0.00857)
Book value to market value	0.0700***	0.0693***	0.0651***
	(0.00223)	(0.00273)	(0.00244)
Beta	0.00243***	0.00267**	0.00139
	(0.000728)	(0.000825)	(0.000773)
Leverage	0.0598***	0.0586***	0.0521***
	(0.00442)	(0.00498)	(0.00463)
Bog_index		0.000386***	0.000318**
		(0.000114)	(0.000109)
Forecast error			0.0421***
			(0.00727)
Dispersion			0.0196***
			(0.00123)
Constant	-0.00628	-0.0375***	-0.0380***
	(0.00371)	(0.00960)	(0.00914)
Firm FE	YES	YES	YES
N	19385	15332	15273
R^2	0.637	0.630	0.658
adj. R^2	0.566	0.552	0.586

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

6 Conclusion

This study examines the relationship between managerial ability and cost of equity capital in terms of long-term earnings growth, leverage, total size, beta and institutional ownership. To the best of our knowledge, it is the first study to examine the relationship between managerial ability and cost of capital. We also reexamine the relationship between CEO general managerial ability and cost of capital with a new dataset by employing enhanced methodology. We also explored possible channels such as information disclosure, forecast error and performance.

With the firm fixed effect the current analysis does not lend support to the positive effect of GAI on the cost of equity as documented by Mishra (2014). We also find that managerial ability is negatively associated with cost of equity capital. This supports the RBV theory and our assumptions on the impact of managerial ability on cost of capital. To examine the effect of channels we explored the relation between managerial ability and forecast error. In line with the literature, we found a negative relation between managerial ability and forecast error. Able managers increase information disclosure, reduce forecast error and improve performance. Our results are in line with literature. Finally, we also examined the relation between institutional ownership and cost of capital and found that high institutional ownership reduces the cost of capital.

Our study contributes to the managerial ability literature as well as cost of equity capital. This is a novel contribution to literature.

7 Appendix

ICC Estimate of Claus and Thomas (2001)

ICC estimate of Claus and Thomas (2001) builds on the gordon growth model. They also use abnormal earnings' forecasts for their model. For the calculation of the terminal value the past 5 years growth rate is used.

$$Po = bv00 + \frac{ae1}{(1+k)} + \frac{ae2}{(1+k)^2} + \frac{ae3}{(1+k)^3} + \frac{ae4}{(1+k)^4} + \frac{ae5}{(1+k)^5} + \frac{ae5(1+g)}{(k-g)(1+k)^5} \quad (7)$$

$ae_t = e_t - k\ (bv_{t-1})$ expected abnormal earnings for year t

g refers to abnormal earnings growth past year +5

bv00 refers to book value at t0

k refers to cost of equity capital

p0 is the current market value

ICC Estimate of Easton (2004)

Easton builds his model on no arbitrage assumption. According to Easton there is no abnormal earnings (agr2) in period two and growth of abnormal earnings is zero.

$$po = \frac{p1 + dps1}{(1 + r)} \tag{8}$$

p0= current price
p1= expected price at t=1
dps1=expected dividends per share
r= expected rate of return

by adding and subtracting eps1/r the equation becomes
where eps1= eps estimate for year 1

$$po = \frac{eps1}{r} - [\frac{eps1}{r} - \frac{(p1+dps1)}{1+r}] \tag{9}$$

$$p1 = \frac{eps2}{r} - [\frac{eps2}{r} - \frac{(p2+dps2)}{1+r}] \tag{10}$$

Then abnormal earnings at term1 (agr1)

$$agr1 = eps2 + r.dps1 - (1 + r)eps1 \tag{11}$$

Then Easton extends his model and assumes agr2>0 and there is no abnormal earning growth rate which means all abnormal earnings will be equal.

agr1=agr2 =...,

From there we can find the equation:

$$p0 = \frac{[eps2 + r.dps1 - eps1]}{r^2} \tag{12}$$

ICC Estimate of GLS (2001)

Gebhardt, Lee, and Swaminathan (2001) implied cost of capital (ICC) model which is regarded as ICC_gls is a discounted residual income model. ICC in this model is defined as internal rate of return (IRR) that equates the current stock price to the present value (PV) of all cash flows to common shareholders.

It uses forecasts of earnings per share (eps1,eps2,eps3) for three years from IBES data. Beyond year 3 eps for each year till to year 12 is forecasted by using linear interpolation to the industry median ROE. Beyond year 12, eps -terminal value- is calculated as perpetuity.

$$P_t = B_t + \frac{FROE_{t+1} - r_e}{(1 + r_e)} B_t + \frac{FROE_{t+2} - r_e}{(1 + r_e)^2} B_{t+1} + TV \qquad (13)$$

Bt = book value from the most recent financial statement divided by the number of shares outstanding in the current month from I/B/E/S

r_e = the cost of equity which is ICC_GLS

FROEt+i = forecasted ROE for period t + I is computed as FEPSt+i/Bt+i−1 for the first three years, where FEPSt+i is the I/B/E/S mean forecasted EPS for year t +i and Bt+i−1 is the book value per share for year t +i −1. Beyond the third year till to year 12, FROE is forecasted by using a linear interpolation to the industry median ROE.

Bt+i = Bt+i−1 +FEPSt+i− FDPSt+i , where FDPSt+i is the forecasted dividend per share for year t +i, estimated using the current dividend payout ratio (k). Specifically, FDPSt+I is assumed as

FEPSt+i ∗ k.

Terminal value is calculated as stated below:

$$TV = \sum_{i=3}^{T-1} \frac{FROE_{t+i} - r_e}{(1 + r_e)^i} B_t + \frac{FROE_{t+T} - r_e}{r_e(1 + r_e)^{T-1}} B_{t+T-1} \quad (14)$$

ICC Estimate of OJ (2005)

The Ohlson – Juettner-Nauroth model uses stock's intrinsic value for its abnormal earnings growth model. The value of next forecasted earnings plus the present value of the expected stream of future abnormal earnings growth (EPST+t – EPST+t–1 – r(EPST+t–1 – DivT+t–1) is capitalized to measure the abnormal change in earnings if these earnings invested at the rate of r (EPST+t–1 – DivT+t–1). Forecasted earnings for each of the upcoming two years, dividend and long term growth forecasts are used for the calculation of stock's intrinsic value. The OJ model defines short-term growth rate (g2) to decay asymptotically to the long-term growth rate, at a decay rate equal to the long-term growth rate.

Forecasts of book value or dividend forecasts after the first year are not used on the OJ model.

short term growth rate g2=$\frac{EPS(t+2)-EPS(t+1)}{EPS(t+1)}$ y= 1+g **A**=$\frac{1}{2}((y-1)+\frac{Div(T+1)}{P(T)})$

$$ICC\_OJ = A + \sqrt{A^2 + \frac{EPSF_{T+1}}{P_T}(g_2 - g_n)} \quad (15)$$

7.1 Managerial ability calculation

Demerjian et al. (2012) created the managerial ability score with a two-step process. Their non-parametric model is called Data Envelopment Analysis (DEA) which they estimate Firm Efficiency. It is the efficiency of how a firm generates revenues with its current resources and they compared similar firms in the same industry. They optimized the following model to find the optimal weights for the seven variables. 1 is the highest efficiency and 0 is the lowest.

$$\frac{sales}{y_1 COGS + y_2 SG\&A + y_3 PP\&E + y_4 OPL + y_5 R\&D + y_6 GD + y_7 OTI} \quad (16)$$

COGS: the cost of goods sold, SG&A:sales, general, and administrative,

PP&E: property, plant, and equipment, OPL:net operating lease,

R&D: research and development GD: purchased goodwill, and OTI:other intangible assets.

Equation 13 gives the efficiency measure but it includes the managerial ability. A Tobit regression is used for extracting the managerial ability.

$$Efficiency = \beta_0 + \beta_1 LN(TA) + \beta_2 MS + \beta_3 PFCF + \beta_6 FCD + \beta_4 LN(AGE) + \beta_5 BSC + Years + \varepsilon \quad (17)$$

The residual value from Equation (14) is the managerial score (MA-Score).

TA: total assets, MS: the market share of a company within its industry,

PFCF: dummy variable that equals 1 when the firm has positive free cash flow,

FCD: another dummy variable that equals 1 when a firm has foreign operations,

Age: firm's age, BSC: the concentration of business segments, and Year: year dummy.

7.2 General managerial ability of CEO (Custodio et al. 2013)

Custodio et al. (2013) calculates general managerial ability of a CEO by considering five factors:

X1i,t= the number of positions assumed by a CEO in his all career

X2i,t= the number of firms where a CEO worked

X3i,t= the number of industries worked

X4i,t= the CEO experience dummy to check whether this CEO worked for another company

X5i,t= the CEO conglomerate experience dummy whether this CEO worked for a multi-division firm. This CEO is expected to have experience in a more complex organization.

The index of general managerial ability (GAIi,t) is the first factor of the principal components analysis of the five proxies by given different weights for each proxies.

$$GAIi,t = 0.268\ X1i,t + 0.312\ X2i,t + 0.309\ X3i,t + 0.218\ X4i,t + 0.153\ X5i,t \quad (18)$$

The CEOs having GAI more than the median is regarded as generalists, others are regarded as specialists.

7.3 Variable definitions

RPM_AVG	The risk premium of implied cost of equity capital (arithmetic mean of differences of ICC_CT, ICC_ES, ICC_OJ and ICC_GLS from risk free rate)
RPM_AVG_Mishra	The risk premium of implied cost of equity capital (arithmetic mean of differences of ICC_CT, ICC_ES and ICC_GLS from risk free rate)
MA_Score_2018	Managerial ability score developed by P. Demerjian et al. (2012)
GAI	CEO general ability score developed by Custodio et al. (2013)
Leverage	Long-Term Debt/Total Assets
Total Asset	The natural log of total assets
BVMW	Book value of equity divided by market value of equity.
growFE	Long-term earnings growth forecast
Beta	Financial beta is gathered from CRSP database.
Forecast error	difference between the actual earning announced by the firm in each year and Consensus scaled by the end of fiscal year share price [source: I/B/E/S] $Error = (Actual - Consensus) / (end\ of\ fiscal\ year\ price)$ Actual = The actual earning announced by a company at the end of each fiscal year Consensus = Is the mean[4] of the EPS forecasts provided by different analysts for a firm each year
Bog index	A multifaceted measure of plain English readability called Bog index. A higher level of Bog index represents a lower readable document.

[4] Some studies like have used the median of analysts' forecasts for each company per year.

Dispersion	Analyst dispersion Is the Standard Deviation divided by the Consensus. [source: I/B/E/S] Standard deviation = the standard deviation of forecasts provided by analysts for each firm per year
Institutional ownership	The percentage of outstanding shares owned by institutions. We obtain Institutional data from WRDS SEC Thomas Reuter's F13 File.

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