

RESEARCH ARTICLE

Differences on the Cost of Equity Capital Estimation Using Analysts' Forecasts for the Brazilian Market

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Abstract

Using four academically recognized valuation models, we analyze the cost of equity capital on an implicit approach, using analysts' forecasts for the Brazilian market, in order to complete the variables on the account-based models. The hypothesis in the present paper consists on the convergence of the models, as they have the same premises and little differences on the adjustments used by their creators. However, this hypothesis does not seem to be sustainable when observing all the market, i.e. all industry sectors, in the same sample. The results show that the models can indeed converge, but in a specific industry sector, which in the present paper is the financial sector.

Keywords: *Cost of capital, Cost of equity, Finance.*

Introduction

Estimating the cost of equity capital for a company is useful for a large number of individuals, from decision maker managers to investors who want to value the company, as well as for academic purpose - research. Pratt [1] defines the cost of capital as "the expected rate of return that the market participants require in order to attract funds to a particular investment".

We attempt to estimate the cost of equity capital in an implicit way, using four valuation models. As most of the valuation models are created on the same basic principles and adjusted by their creators, it is expectable that the value found for the cost of capital converges between the models, since the differences between the models are no stronger than the basic hypothesis used. Therefore, will the analyzed models converge for the companies listed at BM& F Bovespa between 2007 and 2009?

Until now, the lack of existing forecasts in the Brazilian market that took into account longer periods of time (for example, 5 years), made the usage of these models somewhat difficult. Nowadays, however, analysts' forecasts present observations and consensus in a broader period of time. Thus, this paper has become able to be thought through and written down.

In this line of rationalization, this study focuses on analyzing the cost of equity capital for the

BM& F Bovespa listed companies and on verifying if the four chosen models, based on accountancy numbers, can be considered similar by this metric.

In order to conduct this research, we present the following hypothesis:

H1: The implicitly estimated cost of equity capital values by the chosen models converge, showing that they are similar.

This study becomes possible because in the present scenario, with the last year's (2010) growth on the financial markets and with the investment grade Brazil has received from the rating agencies, investors that are more international begin to see Brazil as an opportunity and more analysts' forecasts were made to a greater range of assets listed at BM & F Bovespa.

This new environment made this work possible by using the consensus of these analysts' forecasts as part of the inputs on the models used to estimate the cost of equity capital.

The dynamics of the economy requires credit to make operational its processes. Companies need money to keep themselves productive. In this case, the banks are responsible for the release of credits to the productive activities and companies of any sector turn to financial institutions to

obtain credit, expand themselves and invest in their activities. In short, the production process is seen as harmful to the natural environment, the economy needs to expand and the credit must be released by banks.

Given the above, the ways of granting credits to financial institutions should be linked to sustainability criteria. On the one hand, the manner of production linked to fireplace industry [1] depletes natural resources and destroys nature; on the other hand, organizations must meet the increasing demands of goods and services. In this sense, we question: how can credit entities offer credits to the needs of businesses, support the growth of the economy and, at the same time, create criteria for borrowers of money to invest in their businesses in a sustainable way, that is, respecting the natural environment? Another reflection: In relation to the release of credit, do credit institutions take into account the issue of sustainability of the business?

This research analyzes the evaluation criteria of two of the largest banks of Latin America: one of the public sphere – Banco do Brasil S.A. – and another of the private sphere – BRADESCO S.A. The specific objectives go deeper into the following purposes: i) identify the requirements established in the granting of money; ii) compare in the two entities investigated the sustainability assessment criteria at the time of release of the credit; and iii) identify the most relevant environmental aspects that are required at the time of granting financing. We have discussed the environmental management system-a panorama of the green economy, sustainable business, and responsible credit -in the theoretical framework. The scientific method used was the comparative one. The research was descriptive in nature, with a qualitative approach and we have collected the data through interviews with representatives of the banks. The information was handled by content analysis.

To begin this research, a few questions and concerns were raised. How can the banks, the driving forces of the economy, create sustainability criteria at the time of granting money? Is the natural environment a concern of all those involved in financial transactions (credits)? As we can see, the challenges to be overcome are diverse. All on the issues of sustainability require efforts. The companies that were investigated are already experiencing CSR (Corporate Social Responsibility). We want to

know, therefore, whether there is concern about environmental aspects in credit transactions.

Theoretical Framework

A Brief Note on Cost of Equity Capital in the Literature

Despite the fact that it is not directly observable, the cost of equity capital is the discount rate used for the market to discount future cash flows to get the actual stock price.

As Botosan e Plumlee [2] state, “Managers, investors, and researchers have a compelling interest in identifying a reliable empirical proxy for firm-specific cost of equity capital (r). In theory, deducing r is possible if the market’s future cash flow forecast and current stock price are observable.” A completely accepted formula for this does not exist. For Guay, Kothari and Shu [3]:

To obtain alternative, potentially superior measures of the cost of capital, a string of papers, including Gebhardt, Lee and Swaminathan [4], Claus and Thomas [5] have turned to an ‘implied-cost-of-capital’ approach. These studies begin by assuming a valuation model based on discounted cash flows, such as the residual income model.

They then use analysts’ short- and long-term earnings forecasts as proxies for the market’s expectation of future earnings. Finally, they solve for the implied discount rate that equates the present value of the expected future payoffs (residual earnings or dividends) to the current stock price.

By applying these ideas in the Brazilian market scenario, in this paper, we evaluate four methods, which are suggested in the literature, to deducing firm-specific r . They are, as follows: Claus and Thomas [5], Gebhardt, Lee and Swaminathan [4], Easton [6] and Ohlson and Juettner-Nauroth [7].

The cost of capital is also impacted by good corporate governance practices, in the sense that these practices can reduce the informational asymmetries and the risk evaluated for the investor that wants to invest on the company. In other words, the market needs relevant information about the financial future of the company and its current situation to give informational basis for the companies’ investment projects as remarked by Alencar [8], “The information availability reduces the investors’ uncertainty degree about the futures cash flows reducing, on this way, the companies risk and the cost of equity.”

It is possible to see that there is a trade-off between a smaller caption interest rate (cost of capital) and a smaller disclosure level. This is important because, in most of the economy's sectors, the existing high competition level makes a smaller caption interest rate important on the same way that the disclosure level for what it is showed to the competitors.

Thus, it is also worth pointing out that increasingly the banking institutions conceive sustainability issues beyond environmental risks. Accordingly, the banks have sought new business opportunities through new products such as specific lines of credit with socio-environmental scope and benefits. Among them, one can highlight micro-finances, socio-environmental financing and socially responsible investment funds as for example ethical funds, environmental technology funds, eco-efficiency funds and sustainable investment funds.

In summary this article shows the theme of sustainable development in a succinct way. One can thus clearly note that new requirements are perceived in the conduct of the organizations particularly in this study, financial institutions. The research of sustainable business also revealed its importance in society when it broadens the operations of the companies, not only in the economic bias, but also in the bias of the natural environment. Finally, responsible credit with criteria that respect nature. Now the analyses of the information that was obtained in this investigation will be made.

Methodology

In order to analyze if the models have a similar result for the Brazilian market, the BM & F

Bovespa listed companies that are in the analysts' forecasts Thomson-Reuters database was used. All these inputs are necessary as Guay, Kothari and Shu [3] mentioned:

The implied cost of capital approach relies on analysts' short- and long-term earnings forecasts as proxies for the market's expectation of future earnings, and solves for the implied discount rate that equates the present value of the expected future payoffs to the current stock price.

Four distinct models were used in this paper to calculate the cost of equity capital on an implied way for the years 2007, 2008 and 2009: Claus and Thomas (CT), Gebhardt, Lee and Swaminathan (GLES), Ohlson and Juettner-Nauroth (OJ) and modified PEG (PEG).

The sample used on this study was based on the companies listed on BM & F Bovespa and that have analysts' forecasts consensus on the Thomson-Reuters database during the years 2007, 2008 and 2009. Then it was reduced because of missing data on the database that could cause a problem on the behavior analysis.

Due to the sample's size and their normality, it was used ANOVA (Analysis of Variance) as the statistic tool to interpret the collected database and verify the hypothesis - that the different models bring a similar cost of equity capital.

Results and Discussions

The ANOVA statistical results show a huge difference between the four models on the three years as the Table 1 start showing:

Table 1: ANOVA Test Year 2007

RESUME						
Group	Count	Sum	Average	Variance		
rCT 2007	48	6,575921871	0,136998372	0,000916915		
rGLES2007	48	5,255682809	0,109493392	0,001365629		
rOJ2007	48	7,847184202	0,163483004	0,001257417		
rPEG2007	48	8,854011802	0,184458579	0,0038838		
ANOVA						
Source of variation	SQ	GI	MQ	F	P-value	F critic
Between Groups	0,152220759	3	0,050740253	27,33937407	1,02E-14	2,652646
Inside the groups	0,348916823	188	0,001855941			
Total	0,501137582	191				

Source: Authors

The 2007 data analysis allow us to identify in the years 2007, 2008 and 2009 a high value on the F – Test, which rejects the null hypothesis on the

ANOVA test showing that the average on the used models do not converge.

Table 2: ANOVA Test Year 2008

RESUME					
<i>Group</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>	
rCT2008	48	8,313535139	0,173198649	0,002239821	
rGLES2008	48	6,780052711	0,141251098	0,003107071	
rOJ2008	48	10,28633496	0,214298645	0,004454735	
rPEG2008	48	9,815459256	0,204488735	0,011459685	

Source: Authors

ANOVA

<i>Source of variation</i>	<i>SQ</i>	<i>Gl</i>	<i>MQ</i>	<i>F</i>	<i>P-value</i>	<i>F critic</i>
Between groups	0,157441227	3	0,052480409	9,873409286	4,45E-06	2,652646
Inside groups	0,999281665	188	0,005315328			
Total	1,156722892	191				

For the year 2009 (Table 3), the results are similar to those from 2007 and 2008 where the p-

value is far away from the minimum to accept the null hypothesis, 0,05 (5%).

Table 3: ANOVA Test Year 2009

RESUME					
<i>Group</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>	
rCT2009	48	5,683471506	0,118405656	0,000529665	
rGLES2009	48	4,481611451	0,093366905	0,001417625	
rOJ2009	48	7,158747399	0,149140571	0,001580202	
rPEG2009	48	7,684195244	0,160087401	0,004208067	

ANOVA

<i>Source of variation</i>	<i>SQ</i>	<i>Gl</i>	<i>MQ</i>	<i>F</i>	<i>P-value</i>	<i>F critic</i>
Between groups	0,131893215	3	0,043964405	22,73366699	1,33E-12	2,652646
Inside groups	0,363571269	188	0,00193389			
Total	0,495464484	191				

Source: Authors

Despite the fact that not all the values are representative, it is possible to identify proximity on the average for OJ and PEG models. In this

sense, these two models were analyzed together for the year 2008 (Table 4).

Table 4: ANOVA Test Year 2008 (Models OJ e PEG)

RESUME					
<i>Group</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>	
rOJ2008	48	10,28633496	0,214298645	0,004454735	
rPEG2008	48	9,815459256	0,204488735	0,011459685	

ANOVA

<i>Source of variation</i>	<i>SQ</i>	<i>gl</i>	<i>MQ</i>	<i>F</i>	<i>P-value</i>	<i>F critic</i>
Between Groups	0,002309624	1	0,002309624	0,290255533	0,59133	3,942303
Inside Groups	0,747977735	94	0,00795721			
Total	0,750287359	95				

Source: Authors

The results allow us to state that these two models, when analyzed together, are similar for the ANOVA test. However, the main intention on this work is to analyze the four models together because of the same properties and initial premises. By this, the probable causes for the differences on the cost of equity capital by the models has become the center of the discussion.

One of the possible causes for the average difference between the models is the great range

of value for the cost of equity capital inside the same model, because the capital structure and risk of the companies are different.

Trying to mitigate this, the same tests were made on one industry sector expecting that the average could be similar. The choice was made by the size of the sample, and the financial industry was the biggest.

For the year 2007, the follow results were found:

Table 5: ANOVA Test Year 2007 (Financial Sector)

RESUME					
<i>Group</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>	
rCT2007	9	1,312650899	0,1458501	0,000672867	
rGLES2007	9	1,476659155	0,164073239	0,000838566	
rOJ2007	9	1,707541939	0,189726882	0,000887352	
rPEG2007	9	1,822174821	0,202463869	0,0044249	

ANOVA

<i>Source of variation</i>	<i>SQ</i>	<i>gl</i>	<i>MQ</i>	<i>F</i>	<i>P-value</i>	<i>F critic</i>
Between groups	0,017452247	3	0,005817416	3,410131569	0,029149	2,90112
Inside groups	0,054589479	32	0,001705921			
Total	0,072041726	35				

Source: Authors

The results do not allow the acceptance of the null hypothesis affirming that the averages are similar, but it is possible to observe that the statistic F is more significant on this case and

that there is a considerable proximity between OJ and PEG and a little less with GLES. By this way, CT was excluded and another test was made.

Table 6: ANOVA Test Year 2007 without CT variable (Financial Sector)

RESUME					
<i>Group</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>	
rGLES2007	9	1,476659155	0,164073239	0,000838566	
rOJ2007	9	1,707541939	0,189726882	0,000887352	
rPEG2007	9	1,822174821	0,202463869	0,0044249	

ANOVA

<i>Source of variation</i>	<i>SQ</i>	<i>Gl</i>	<i>MQ</i>	<i>F</i>	<i>P-value</i>	<i>F critic</i>
Between groups	0,006882542	2	0,003441271	1,678445496	0,207842	3,402826
Inside groups	0,049206545	24	0,002050273			
Total	0,056089087	26				

Source: Authors

The ANOVA statistic in this case shows that the models GLES, OJ and PEG have the same average for 2007 on the financial industry sector as it was on the null hypothesis.

For the year 2008, the averages are similar even for the CT model as follows:

Table 7: ANOVA Test Year 2008 (Financial Sector)**RESUME**

<i>Group</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>
rCT2008	9	1,489207805	0,165467534	0,001860504
rGLES2008	9	1,680986005	0,186776223	0,002117913
rOJ2008	9	1,872961354	0,208106817	0,002973941
rPEG2008	9	1,668106399	0,185345155	0,005135398

ANOVA

<i>Source of variation</i>	<i>SQ</i>	<i>Ld</i>	<i>MQ</i>	<i>F</i>	<i>P-value</i>	<i>F critic</i>
Between groups	0,008195454	3	0,002731818	0,903995082	0,449992	2,90112
Inside groups	0,096702048	32	0,003021939			
Total	0,104897502	35				

Source: Authors

The p-value is very conclusive for the acceptance of the null hypothesis that the averages of the cost of equity capital are similar on 2008.

As for the results of 2009, they are similar to 2007 where the CT model differs a little from the results when compared to the others.

Table 8: ANOVA Test Year 2009 without CT variable (Financial Sector)**RESUME**

<i>Group</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>
rGLES2009	9	1,236334814	0,137370535	0,000448034
rOJ2009	9	1,324990602	0,147221178	0,000575
rPEG2009	9	1,298769783	0,144307754	0,001257409

ANOVA

<i>Source of variation</i>	<i>SQ</i>	<i>Ld</i>	<i>MQ</i>	<i>F</i>	<i>P-value</i>	<i>F critic</i>
Between groups	0,000460945	2	0,000230472	0,303194167	0,741243	3,402826
Inside groups	0,018243543	24	0,000760148			
Total	0,018704487	26				

The P-value and the statistic F allow us to infer that the averages found for the models are similar, as shown on the resume table.

When we analyze all the results for the three years altogether, it is possible to see that OJ and PEG are closer for the complete sample and GLES, OJ and PEG are closer for the specific group of financial industries sector [9-15].

Final Thoughts

The present work attempted to analyze the cost of equity capital of the listed companies on BM & F Bovespa with an implicit approach, focusing on four account based valuation models by using analysts' forecasts. The first results do not show the expected convergence as the null hypothesis was rejected by the tests. However, since it was possible to identify proximity between two models (OJ and PEG), they were tested together and accepted the null hypothesis that their average is similar and the models converge. Therefore, one

industry sector was chosen because of the sample size, financial industry, and tested. As the first test for 2007 was statistically non-significant, the CT model was excluded because it was the farthest average and the test did run again. This time the models converged. For 2008, they converge with CT and 2009, as in 2007, without CT.

As discussed on this paper and on the correlated literature, a precise estimative on the cost of equity capital is relevant for many information users. On this point, another possible conclusion is that, as the models can converge, in some cases, this means that there are no differences, or it is too small; in use one or another model on the valuation. OJ and PEG, for example, seems to be the closest models with a little difference in between.

For future studies, we suggest a bigger number of models and industry sectors to improve the

analysis and the capability of conclusions. A Differences Index table, segmented and further analyzed by industry and corporate governance levels, for instance, can also compare the models.

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In further years, the sample size will improve and it will be possible to make a more complete analysis.