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Determining Factors and their Impacts on the Ratings of Companies and Countries

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ABSTRACT

In the face of the latest world financial crises, the ratings released by the regulatory agencies have gained distinction in the financial market. This paper proposes models to predict the future ratings of companies and countries. The analysis was carried out using quarterly data from 2010 to 2018 from companies in Brazil, South Africa, Germany, Argentina, Australia, Canada, Chile, China, Colombia, South Korea, the United States, France, Italy, Japan, Mexico, Peru, the United Kingdom, Russia, and India. The sample's number of companies and countries is limited to the availability of rating information and the other model information. We use the panel-ordered logit model for classifying the rating and the other economic and financial variables as an independent. The results show that the financial and economic variables are essential to predict the rating of financial and non-financial companies in Brazil as well as the sovereign rating of the sample countries. The predictive capacity of the models reached values close to 80%, emphasizing the forecasts of large banks with 94% accuracy. For the country sample, the results are close to 80% accuracy. With the results of the research, improvement in the financial and economic indicators and the increase in the predictive capacity of the market agents for the prior determination of future ratings of financial companies are expected.

Keywords: Rating; risk; informational asymmetry.

JEL Classification: C53, G21, G32

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INTRODUCTION

The finance literature suggests the ratings represent a powerful source of practical information for analyzing the company creditworthiness, revealed to the market from qualitative and quantitative analyses disclosed by specialized agencies (Murcia, Murcia, Borba, 2014).

Jorion (2009) highlights that the rating is used by financial institutions in the credit analysis in thresholds of interest rate definition, in the decision-making of investments in debt securities acting as a protection mechanism to investors, in defining transparency and corporate governance rules, among other possibilities of use.

Damasceno, Artes & Minardi (2008) evaluate that the importance of rating systems has been growing, mainly due to regulatory matters. Therefore, understanding what determines the rating is helpful in building internal systems like those of agencies and knowing what can influence the spread of debt securities credit.

In the empirical literature brought by scientific researchers, the ratings have been studied since Altman's (1968) initial works in which the use of accounting indicators to differentiate solvent companies from insolvent ones stand out. Such studies have advanced not only in international literature but also in the national one. Two great lines are diagnosed: studies of the rating determining factors and works on rating relevance.

Nevertheless, the recurrent crises Brazil has been facing have brought about new control tools to the global financial markets where the ratings have been gaining importance, mainly in developing countries. We can notice the importance of such analysis, in the case of the banks, since when we know the variables which impact the rating, the investment and financing decisions are eased according to the reinterpretation carried out by Domeneghetti & Lima (2019). Regarding non-financial companies, Silveira, Lima & Fonseca's (2017) study presents a forecast model using financial variables.

From this information and papers analyzed in the theoretical benchmark of the research, a gap was observed between economic and financial variables to predict rating. This paper aims to jointly investigate the rating forecast for financial and non-financial companies and countries. The objective of the joint analysis is to allow the information user to analyze all the groups. In this respect, the following research question is presented: Can the economic and financial variables predict the behavior of future rating of companies and countries disclosed by risk-rating agencies?

The justification for looking into this question goes through the reevaluation of the indicators of the economic and financial variables used for building the rating forecasting models. Thus, when diagnosing that such variables can forecast better risk rating performance, the investors, managers and regulators can make decisions with greater informational content besides having the financial and economic variables.

The analysis of this research was carried out with 2010-2018 quarterly data for Brazilian companies and countries. The companies were separated into financial and non-financial because of the difference in some variables between these groups. For the countries, were considered: Brazil, South Africa, Germany, Argentina, Australia, Canada, Chile, China, Colombia, South Korea, the United States, France, Italy, Japan, Mexico, Peru, the United Kingdom, Russia and India. The sample's number of companies and countries is limited to the availability of rating information and the other model information. We use the panel-ordered logit model to classify the rating and the

other economic and financial variables as an independent.

The results show that the selected financial and economic variables are essential to predicting the ratings of financial and non-financial companies in Brazil and the sovereign ratings of the sample countries, contributing to the literature revealing new relevant variables. The predictive capacity of the models has reached values close to 80%, with an emphasis on the forecasts of large banks with 94% accuracy. For the non-financial companies, the results point to rates of risk-rating determination close to 90%. For the country sample, the results are close to 80% accuracy. The results are essential since they present important variables for determining the rating, allowing managers, investors, and regulators to use this information to assess future rating and make assertive investments. Moreover, the research emerges as a benchmark of financial and economic indicators used in the rating forecasting of companies and countries.

LITERATURE REVIEW

This section highlights the papers on which this research is based, stressing its importance in the sequence of research on reevaluating the rating determinants in companies and countries. The use of financial and economic variables as rating determinants seeks to fill in a research gap among the results of the ratings disclosed by the regulatory agencies and the risk perception left by the companies and countries through their institutional indicators and the information asymmetry existing in the companies.

Therefore, it is worth highlighting the research by Baker & Mansi (2002), which indicates the importance of risk grades for selecting assets. However, it is not the only source of information used by the market. Nevertheless, these studies are not applied just to companies, but also to countries, as presented in Cantor & Packer's (1996) paper. Such a fact legitimates the importance of the correct rating assessment for the decision of portfolio allocation.

Determinants of Ratings

In the national and international literature, different methodologies are proposed for the assessment and forecast of ratings of financial and non-financial companies as presented in the papers of Horrigan (1966); Katz (1974); Pinches & Singleton (1978); Jorion, Shi & Zhang (2009); Doumpos et al. (2015); Damasceno, Artes & Minardi (2008); Brito, Assaf Neto & Corrar (2009); Amorim, Lima & Murcia (2012); Soares, Coutinho & Camargo (2012); Fernandino, Takamatsu & Lamounier (2014). These researches present predictive variables and models for the rating assessment of financial and non-financial companies.

Silveira, Lima & Fonseca (2017) assessed the determinants of credit ratings in non-financial Brazilian companies from 2010 to 2015. The differential of the paper was to cover, in literature, the use of variables which highlight risk factors, such as market risk, liquidity risk, credit risk and operational risk, different from the literature papers which work with variables with accounting information, regardless the risk factors. They have concluded that the proxies used for the organization size, indebtedness, profitability, and capital cost impacted the credit ratings of Brazilian companies in a statistically significant way.

Lima, et al. (2018) demonstrated it is possible to identify the determinants of credit ratings in publicly traded Brazilian banks from 2006 to 2015. For this purpose, they used an ordered logit model, considering an unbalanced panel of financial indicators. The results have indicated that the variables regarding performance, liquidity, asset adequacy/quality and size had a statistically significant impact on the rating level of banks.

Worsening in credit ratings has been seen and can be explained by the downturn of the economic activity observed in Brazil during the analysis period.

Domeneghetti & Lima (2019) proceeded with this research with the period from 2006 to the 2nd semester of 2017 with new qualitative variables inserted in the revalidation as differentials, such as the Basel index, origin of capital, nature (either public or private) of which just the global capital index was not significant at 1%. Conflicting signs and significance between the models with and without dummies were found in credit losses on revenue from financial intermediation and voluntary fitting. For the others, the results were reinstated in the literature. A detail which is also observed is the alignment of bank credit rating with that of the country by agencies due to the recrudescence of the financial economic crisis, factor which can lead to more significant difficulties for the banks to fit the ongoing Basel III timetable, whose complete implementation forecast is in 2019.

Regarding the sovereign rating, Cantor & Packer (1996) presented that the governments have a demand for classifications since this eases access to the international capital market, both to the government and its citizens. The authors noticed that most of the variety is due to a small number of macroeconomic variables, especially GDP per capita, inflation rate and external debt. Moreover, it is important to discuss different articles in the literature that present contributions on predictive variables and sovereign rate forecasting methods, such as Haque, Marke & Mathieson (1998), Afonso, Gomes, & Rother (2007), Carvalho (2007), Kim & Wu (2008), Módolo & Rodrigues (2010). Nevertheless, they have also identified the effect of the level of economic development and the geographic location, suggesting that several things may influence rating definition.

In this respect, previous studies use some variables to predict the rating. This study aims to contribute to literature assessing the rating determinants for the Brazilian companies and sovereign rating as the differential of inclusion of new economic and financial variables for the cases observed. In this sense, this paper sought to answer the following research question: Can the economic and financial variables predict the behavior of future rating of companies and countries disclosed by risk-rating agencies?

This research question aims to guide the hypothesis that economic and financial variables predict the behavior of future ratings. Next, the research methodology will show the variables and models used to answer the research problem.

METHODOLOGY

The method used in the research development was descriptive and quantitative, characterized by a *post-facto* investigation. The following agencies informed the company and country rating: Fitch, S&P and Moody's and the gathering of data was carried out in the Thomson Eikon database from 2010 to 2018, quarterly. The data were categorized following Silveira, Lima & Fonseca (2017), as presented in Table 1. It is essential to observe that the best rating classifications are on the lowest scales.

The study sample was segmented into Brazilian financial companies, non-financial Brazilian companies and countries. The financial company sample comprises the publicly held financial institutions in Brazil from 2010 to 2018, every quarter, totaling 346 observations for 12 financial institutions. The listed non-financial company sample comprises 41 non-financial companies on quarterly basis. The total of observations for non-financial companies is 1,318.

Table 1
Categorization of the Research Dependent Variable

Moody´s	Fitch Ratings	Standard & Poor´s	Categorization
Aaa	AAA	AAA	0
Aa1	AA+	AA+	
Aa2	AA	AA	1
Aa3	AA-	AA-	
A1	A+	A+	
A2	A	A	2
A3	A-	A-	
Baa1	BBB+	BBB+	
Baa2	BBB	BBB	3
Baa3	BBB-	BBB-	
Ba1	BB+	BB+	
Ba2	BB	BB	
Ba3	BB-	BB-	4
B1	B+	B+	
B2	B	B	
B3	B-	B-	
Caa1	CCC	CCC+	
Caa2	CCC	CCC	5
Caa3	CCC	CCC-	
Ca	CCC	CC	
Ca	CCC	C	6
C	DDD	D	

Source: Elaborated by the authors (2022)

Regarding the countries, the sample comprises 19 countries: Brazil, South Africa, Germany, Argentina, Australia, Canada, Chile, China, Colombia, South Korea, the United States, France, Italy, Japan, Mexico, Peru, the United Kingdom, Russia and India, from 2010 to 2018 as well, in quarterly basis, totaling 568 observations. The sample's number of companies and countries is limited to the availability of rating information and the other model information.

For the financial companies, the variables of interest to determine rating were also chosen in accordance with literature. The expected relationship signs summarize the studies presented in the research benchmark and they indicate the expected impact of the economic and financial variables on the company rating.

Again, it is important to highlight that the rating scale presents better classifications for the lowest levels. Finally, the variables were winsorized at 99% for the data statistical adjustment. Likewise, the variables used for the models of non-financial companies and countries are presented, Tables 2, 3 and 4.

For the data assessment, the ordered logit models were used using the maximum likelihood method by Greene (2003). The construction of the model follows the structure presented by Silveira, Lima & Fonseca (2017). The models were elaborated for each one of the cases with Equation:

$$RAT_{it} = \beta \times VI_{it} + \varepsilon t$$

In which $RATit$ represents the rating for each one of the observations and VI is the set of independent variables of the models. After elaborating the models, the rating for each one of the observations was estimated and the forecasted results were compared to the results disclosed by the agencies. It is important to observe that the study sample, 2010 to 2018, was not used to elaborate the model. Thus, for the estimate of the ratings, the 2010-2017 data were evaluated quarterly, and the 2018 data were forecasted, which after this stage were compared to the results that the agencies had already disclosed.

As presented by Silveira, Lima & Fonseca (2017), simultaneity between the rating and the model variables is not expected since the ratings are set at the end of the financial year, after the conclusion of the company performance and the macroeconomic factors. The models were assessed according to the literature emphasising heteroskedasticity and serial autocorrelation. The model proposed adopted methodology for correcting Heteroskedasticity and the serial autocorrelation was not observed. The research results are presented after the description of the method.

Table 2
Financial Company Variables

Variable	Acronym	Formula	Expected relationship[a]
Loans/Deposits Index	DI	$\frac{\text{Credit Operations}}{\text{Deposits}}$	+
Leverage	LEV	$\frac{\text{Total Assets}}{\text{Net Equity}}$	+
Voluntary Fitting	VOLFITT	$\frac{\text{Availability}}{\text{Sight Deposits}}$	+
Net Margin	NETMARG	$\frac{\text{Net Income}}{\text{Rev. of Financial Brokering}}$	–
Capital Structure	CAPSTRUC	$\frac{\text{ELP} + \text{NE}}{\text{Total Assets}}$	+
Immediate Liquidity	IMMEDLIQ	$\frac{\text{Disp.} + \text{Aplic. Internfinanc.}}{\text{Sight Deposits}}$	+
Interests of Liabilities	INTLIA	$\frac{\text{Fin. Brokering Cost}}{\text{Total Liabilities}}$	+
Expansion Limit	EXPLIM	$\frac{\text{NP} - \text{Earnings}}{\text{Assets}}$	+
Corporate Governance Level	GOV	Governance Level in B3	–

Source: Elaborated by the authors (2022)

Table 3
Non-financial Company Variables

Risk Type	Variable	Acronym	Formula	Expected Relationship[a]
Market Risks	Burdensome Indebtedness on the PL market value	MARKRISK	$\frac{\text{Liabilities}}{\text{NE}}$	+
Operational Risk	Return on Investment	ROI	$\frac{\text{NOPAT}}{\text{Investiment}}$	–
	Operational Leverage Level	OLL	$\frac{\Delta \text{ Operating Income}}{\Delta \text{Sales}}$	+
Liquidity Risk	Company Size	SIZE	ln (Assets)	–
	Financial Leverage Level	FLL	$\frac{\Delta \text{ Net Income}}{\Delta \text{ Operating Income}}$	+
Credit Risk	Ability to pay debts	Liab/EBITDA	$\frac{\text{Liabilities}}{\text{EBITDA}}$	+
	Investment Level	INVESTLEVEL	1 with Investment Level 0 without Investment Level	–
	Country Risk	EMBI	ln(EMBI+)	+

Source: Elaborated by the authors (2022)

Table 4
Country Variables

Variable	Acronym	Formula	Expected Relationship[a]
BRICS	BRICS	1 if it belongs to BRICS 0 if it does not belong to BRICS	+
Investment Level	INVESTLEVEL	1 with Investment Level 0 without Investment Level	–
Gross Debt/GDP	CGD/GDP	$\frac{\text{Country Gross Debt}}{\text{GDP}}$	–
Exchange Rate	EXCHANGE	$\frac{\text{Local Currency}}{\text{Dollar}}$	+
Unemployment Rate	UNEMPL	% Unemployment Rate	–
Annualized quarterly GDP	GDPQUART	Quarterly GDP Variation	–
Competitiveness	COMPET	Competitiveness Ranking Pro Value Index	+
Interest Rate	INTEREST	Interest Rate Level	–

Source: Elaborated by the authors (2022)

RESULT AND DISCUSSION

The study results are organized according to the following structure: Data descriptive analysis and Results of the models for the financial and non-financial companies and countries.

In Table 5, the ratings of the financial and non-financial companies and countries of the sample are presented. It is important to highlight that the number of observed data is different from the sample of the models, which will be given afterwards, a fact justified by the lack of data on the model explanatory variables.

The financial and non-financial company data point to greater data concentration of both samples for intermediate levels of ratings, 3 and 4. For extreme values, there is less data concentration. For countries, it is possible to observe the concentration in higher ratings grade (lower in the scale) with a fewer number of data close to the maximum values of the scale (worse rating quality). It is also possible to observe enough variability in all the samples for the construction of the models.

Table 5
Rating Data Distribution

Rating	Financial Companies	Non-Financial Companies	Countries
1	.	.	197
2	35	33	107
3	104	405	203
4	191	755	19
5	16	122	28
6	.	3	14
Total	346	1,318	568

Source: Authors Estimation (2022)

Moreover, to analyze the research data, descriptive statistics of the continuous variables used in the models are presented in Tables 6, 7 and 8.

The results showed the variability of the sample, indicating the importance of the variable assessment for the correct rating determination. It is also important to highlight that the correlation between the explanatory variables of the models was checked using a correlation matrix and VIF

test and problems between the variables of the models were not seen.

Regarding the financial companies, 39.31% of the banks are large and 60.69% are medium-sized. Also, in the sample, 40.46% of the observations are of financial companies without corporate governance level, 33.53% are rated as Level I, 16.18% as Level II and 9.83% as Level 3. In Table 6, the results of the model for the financial companies are presented.

Table 6
Descriptive Statistics of Continuous Variables Used in the Models for Financial Companies

Variable	Obs.	Average	Standard Deviation	Minimum	Maximum
DI	346	2.682729	.9907219	.81301	5.40538
LEV	346	11.35892	3.544485	5.2838	19.8197
VOLFITT	346	.6597184	1.182259	.069012	8.57818
NETMARG	346	.0948171	.0684092	-.154397	.226072
CAPSTRUC	346	.5829142	.1365343	.290341	.859279
IMMEDLIQ	346	.7217403	.4083436	.062233	1.69335
INTLIA	346	.0655325	.0409483	.011883	.205548
EXPLIM	346	.0736476	.066972	-.155822	.283276

Source: Authors Estimation (2022)

Table 7
Descriptive Statistics of Continuous Variables Used in the Models for Non-Financial Companies

Variable	Obs.	Average	Standard Deviation	Minimum	Maximum
MARKRISK	1,363	6.4160	21.978	-2.053	133.38
ROI	1,367	8.5698	8.9401	-9.000	55.27
Li/EBITDA	1,340	0.5908	3.2124	-0.019	26.37
FLL	1,366	1.5827	4.9679	-21.70	30.34
OLL	1,360	1.9804	2.0445	-7.940	10.70
SIZE	1,363	16.077	2.3749	3.601	20.50
EMBI	1,394	5.5062	0.2898	4.9921	6.1965

Source: Authors Estimation (2022)

Table 8
Descriptive Statistics of Continuous Variables Used in the Models for Countries

Variable	Obs.	Average	Standard Deviation	Minimum	Maximum
CGD/GDP	568	5.303799	38.78901	0.095	337.57
EXCHANGE	568	228.9019	587.7805	0.694248	3174.5
INTEREST	568	0.04475	0.053571	0	0.4
COMPET	568	37.33451	25.79072	1	106
UNEMPL	568	0.073522	0.049548	0.024	0.277
GDPQUART	568	0.030468	0.041871	-0.1639	0.212169

Source: Authors Estimation (2022)

Regarding the non-financial companies, the sample comprises 34.98% of the data of companies with investment grade and 65.02% of companies without investment grade. The results of the non-financial company model are shown in Table 7.

Regarding the countries, 26.41% of the sample are data from BRICS countries which 89.26% are data of countries with investment grade while 10.74% are for countries without investment grade. These data are important to assess the model predictive capacity for each one of the groups.The models' results are presented in Tables 9, 10 and 11. The financial-company model made use of 332 observations with 63.14% adjusted R-squared. Regarding the non-financial companies, the model used 1,234 observations with a 70.00% adjusted R-squared. For the countries, 568 data with 67.81% adjusted R-squared were used. The models used the robust methodology for Heteroskedasticity and did not present serial autocorrelation.

Table 9

Results of the Financial-Company Model

Dependent Variable: Rating	Coefficient	Standard Deviation	P- Value
Large Bank	-4.879	0.6751	0
DI	0.8695	0.4288	0.043
LEV	0.5649	0.1070	0
VOLFITT	1.1672	0.3783	0.002
NETMARG	-9.608	4.679	0.04
CAPSTRUC	12.721	3.6276	0
IMMEDLIQ	0.6944	0.896	0.438
INTLIA	18.54	5.7344	0.001
EXPLIM	9.1078	6.7243	0.176
GOV	-1.651	0.3471	0

Source: Authors Estimation (2022)

According to Table 9, the results indicate a significant impact on the explanatory variables of the model, except for the capital structure and expansion limit to the financial-company model, with a 5% maximum statistical significance. Also, controls for the periods of the sample were used. The signs of significant coefficients follow the results expected by the literature. In addition, controls for the years analyzed were used in the model. Moreover, the results are aligned with Silveira, Lima & Fonseca's (2017) study, which reinforce the importance of economic and financial variables to forecasting the financial-company rating; it is also worth highlighting the contribution of the current research with the inclusion of new variables in the model, with emphasis to the variable which assesses corporate governance level.

According to Soares, Coutinho & Camargo (2012), this is an important variable for rating forecasting for non-financial companies, which justifies the adoption of this variable for financial companies. Thus, it is essential to assess that the institutional matters are also important to forecast the future rating of financial companies.

Table 10

Non-Financial Company Results

Dependent Variable: Rating	Coefficient	Standard Deviation	P-Value
INVESTLEVEL	-11.94	1.4928	0
MARKRISK	0.0309	0.0083	0
ROI	-0.062	0.0250	0.012
Liab/EBITDA	-0.121	0.0547	0.027
FLL	-0.064	0.0349	0.063
OLL	-0.078	0.0876	0.369
SIZE	0.4208	0.0397	0
EMBI	0.2966	0.733	0.701

Source: Authors Estimation (2022)

In Table 10, for non-financial company model, the results indicate the impact of the model explanatory variables, with a maximum statistical significance of 10%, except for the variables: degree of operating leverage and Brazil Risk. The signs of the significant coefficients follow the results expected by the literature as presented in

the studies of Soares, Coutinho & Camargo (2012) and Silveira, Lima & Fonseca (2017).

It is important to analyze the use of the Brazil Risk variable. Despite not being significant in the individual analysis, it is necessary for the adjustment of the models and the rating forecasting. Finally, it is important to say that controls for the sectors and periods of data observation were used.

Table 11
Country Results

Dependent Variable: Rating	Coefficient	Standard Deviation	P-Value
INVESTLEVEL	-38.02	0.841	0
BRICS	1.5901	0.3210	0
CGD/GDP	0.004	0.001	0
EXCHANGE	-0.0001	0.0002	0.632
INTEREST	-6.603	3.5113	0.06
COMPET	0.1968	0.0134	0
UNEMPL	-11.91	2.1562	0
GDPQUART	-5.786	3.0845	0.061

Source: Authors Estimation (2022)

In Table 11, the country results, with 10% maximum statistical significance, indicate the relevant impact of the model variables, except for the exchange rate. The signs of the significant coefficients follow the results expected by the literature as shown in the studies of Carvalho (2007), Kim & Wu (2008), and Módolo & Rodrigues (2010). A highlighted contribution of this research is the use of the competitiveness variable since the previous researchers used macroeconomic data without using a competitiveness indicator among the countries observed.

It is also important to highlight, in the model, the USA data. Due to the tax data, exchange rate and the rating level, their inclusion in the model significantly worsens the model quality, the forecast and the coefficient sign of the independent variables. Therefore, the USA observations were withdrawn from the sample for generating the model and included just for the rating forecasting tests. Controls of the data observation periods were also used.

After estimating the models, the rating forecasts for the sample companies were generated. Tables 12, 13 and 14 show the results of the forecasts for the total samples and just for the year 2018, which was excluded from the model generation. In this case, 2018 was used as the test sample. The results indicate a high level of adjustment of the models for the total sample and the year 2018.

Regarding the financial companies, in Table 12, the results indicate accuracy for more than 80% of the sample, emphasizing the large banks with 94% of adjustment in the forecast model. For the non-financial companies, the accuracy rate is close to 90% and for the countries, the accuracy rate is also close to 80% with differences among the samples, as presented in Tables 8, 9 and 10.

Table 12
Accuracy– Financial Companies

Financial-Company Model	Total Period-2010/2018	2018
Amount of Success – All the Banks	80.00%	86.00%
Amount of Success – Large Banks	76.47%	94.00%
Amount of Success – Average-sized Banks	84.29%	82.00%

Source: Authors Estimation (2022)

Regarding the financial companies, the accuracy index of the models is similar to previous studies in literature, such as Silveira, Lima & Fonseca (2017) and Lima et all. (2018), a fact which reinforces the quality of the models presented in the research. These results reveal the importance of the models generated for the financial companies aiming to help decision-making by the investor. Thus, using the variables presented, it is possible to forecast the result of the company rating grade with a high adjustment degree. The research contribution for this sample

is the inclusion of new economic and financial variables to increase the predictive rating capacity of financial companies in Brazil and also the inclusion of the assessment of the corporate governance variable in the model.

Table 13
Accuracy – Non-Financial Companies

Non-Financial Company Model	Total Period 2010/2018	2018
Amount of Success – All the Companies	88.00%	87.88%
Amount of Success – IBRX Companies	85.71%	89.47%

Source: Authors Estimation (2022)

Regarding the non-financial companies, in Table 13, the accuracy indexes are similar to previous studies in the literature. This fact reinforces the quality of the models presented in the research. Moreover, the results are identical to those found in Soares, Coutinho & Camargo (2012) and Silveira, Lima & Fonseca (2017) study. As research differential about the studies presented, there is the inclusion of the country risk variable, which, despite not being individually significant, is important in the model predictive quality and the model total adjustment, indicating the possibility of inclusion of other economic variables for the rating forecasting models for the companies. Moreover, the model of the present research uses the separation of companies with investment degree from those without investment degree, a fact which helps the adjustment of the forecasting model.

Table 14
Accuracy– Countries

Country Model	Total Period - 2010/2018	2018
Amount of Success - All the Countries	84.00%	78.00%
Amount of Success- Investment Degree	88.00%	86.00%
Amount of Success - Developing	87.00%	81.00%
Amount of Success - Developing- Investment Degree	95.50%	100.00%
Amount of Success - Developed - Investment Degree	80.00%	72.00%

Source: Authors Estimation (2022)

Regarding the countries, in Table 14, the accuracy rates have good adequacy in all the samples presented, reinforcing the findings of Carvalho's (2007), Kim & Wu's (2008), and Módolo & Rodrigues' (2010) studies. The methodology allows the correct assessment for countries with or without investment degree, both for developed and developing countries. This result ratifies the use of the variables employed in this research for decision-makers. Using these variables makes it possible to anticipate future results of the sovereign rating. This is important because there was a gap between the companies and countries information availability and the rating disclosure. In that regard, stakeholders can predict the rating and make decisions. The research contribution regarding this fact is the joint analysis of companies and countries and the inclusion of different economic variables from previous studies. The highlight is the inclusion of the competitiveness variable in the investigation.

The research presents variables and models for rating forecasting of financial and non-financial companies and countries. The models show good adequacy and can allow the managers, investors and regulators to have information for decision-making. The study complements previous studies proposing alternative variables for the analysis

presenting a methodology which permits the complete analysis of the scenario, assessing financial and non-financial companies and the sovereign rating.

CONCLUSION AND RECOMMENDATION

In the face of the latest world financial crisis, the ratings disclosed by regulatory agencies have been highlighted in the financial market. Moreover, a research gap between the rating results declared by the regulatory agencies and the risk perception left by the companies via their institutional indicators and the information asymmetry existing in the companies is observed, so this research aimed to assess the rating determinants of publicly held financial Brazilian companies.

The rating classification was obtained in the agencies Fitch, S&P and Moody's, the data gathered via the Thomson Eikon database from 2010 to 2018, on a quarterly basis. The data were categorized according to Silveira, Lima & Fonseca (2017).

The financial-company sample is composed of the publicly-held financial institutions from 2010 to 2018, on a quarterly basis, totaling 346 observations for 12 financial institutions. The listed non-financial company sample comprises 41 non-financial companies in a quarterly basis. The total of observations for the non-financial companies is 1,318. Including 19 countries from Brazil, South Africa, Germany, Argentina, Australia, Canada, Chile, China, Colombia, South Korea, the United States, France, Italy, Japan, Mexico, Peru, the United Kingdom, Russia, and India, also during the period from 2010 to 2018, in quarterly basis, totaling 568 observations.

The results are aligned with and complement the previous studies. In the present research, the model for the financial companies presented adjusted R-squared of 63.14%. Regarding the non-financial companies, the adjusted R-squared was 70.00% and for the countries, the adjusted R-squared was 67.81%. We highlight the use of the corporate governance variable in the financial-company model, the country risk variable for the non-financial company model and the competitiveness variable for the country model.

The predictive capacity of the models reached values close to 80%, with emphasis on the large bank forecasts having 94% of accuracy. For the non-financial companies, the results point to determination rates of risk classification close to 90%. For the country sample, the results are close to 80% of accuracy.

As a research contribution, the methodology allows the correct assessment of countries and their investment degree for developed and developing countries. This result ratifies the use of the variables employed in this research for decision-makers. Using these variables makes it possible to anticipate future results of the sovereign rating, for the investors to make decisions, and for the companies and countries to observe if internal decisions to improve some financial variables are favorable for the future rating. This point is important for the research because using more variables to predict rating will fill pervious gap.

These research findings reinforce the importance of the models generated for the financial companies aiming to help decision making by the investor and, thus, through the variables presented, a forecast of the rating grade result of the company with a high adjustment degree. As a suggestion for the future researcher, this study indicates using other variables in the models and includes different countries to increase the scope.

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