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Oderson Panosso[*]
Gleice Moreno[**]
Tarcísio Pedro da Silva[***]
Luciano Castro de Carvalho[****]

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Artículo de investigación

[*] Mestre em Administração, Professor, IFRS, Instituto Federal do Rio Grande do Sul, Farroupilha-RS, Brasil. opanosso@gmail.com
https/orcid.org/0000-0002-4438-6748

[**] Mestre em Contabilidade, Professor, UNIR, Universidade Federal de Rondônia Porto Velho-RO, Brasil. gleicemoreno@unir.br
https/orcid.org/0000-0002-4926-2250

[***] Doutor em Contabilidade, Professor, FURB, Universidade Regional de Blumenau, Blumenau-RS, Brasil. tarcisio@furb.br
https/orcid.org/0000-0002-2370-791X

[****] Doutor em Administração, Professor, FURB, Universidade Regional de Blumenau, Blumenau-RS, Brasil. lccarvalho@furb.br
https/orcid.org/0000-0002-1740-6053

Culture of Individualism and Uncertainty Avoidance in the G20 Countries' Industries: An Analysis of Capital Structure and Performance

Abstract

The purpose of this study was to analyze the influence of two dimensions of national culture (individualism and uncertainty avoidance) in the relationship between the choice of capital structure formation and the performance of companies in the G20 countries from 2013 to 2018, all in the industrial segment. The companies that made up the sample totaled 3,431, all in the G20 countries, with a total of 14,743 observations. The analyses were performed by means of econometric structural equations. The results showed a significant and positive relationship between the capital structure and the performance of companies. Also, the capital structure variable and the cultural dimensions of individualism and uncertainty avoidance were positively and statistically significant in the performance of companies, proving that culture has an influence on the relationship between structure and performance. Finally, emerging and developed markets were checked separately, demonstrating that in emerging markets the relationship of structure with performance to culture moderation was less affected by national culture (individualism and uncertainty avoidance) than in the developed countries.

Keywords: national culture, capital structure, performance, corporate finance, governance.

JEL Classification: G30, G32, G34, H50, O16

Cultura de individualismo y prevención de la insertidumbre de las industrias de los países del G20: un análisis de la estructura y el comportamiento del capital

Resumen

El objetivo de este estudio fue analizar la influencia de dos dimensiones de la cultura nacional (individualismo y aversión a la incertidumbre) en la relación entre la estructura de capital y el rendimiento, en empresas del sector industrial de los países del G20, de 2013 a 2018. En total, 3.431 empresas conformaron la muestra, para un total de 14.343 observaciones. Los análisis se realizaron mediante ecuaciones econométricas estructurales. Los resultados mostraron una relación significativa y positiva entre la estructura de capital y el rendimiento de las empresas. Asimismo, la estructura de capital y las dimensiones culturales del individualismo y la aversión a la incertidumbre fueron positivas y significativas respecto al rendimiento de las empresas, probando que la cultura influye en la relación entre estructura y rendimiento. Finalmente, se examinaron por separados los mercados emergentes y desarrollados, y se demostró que en los mercados emergentes la relación de la estructura con el rendimiento respecto a la moderación cultural se vio menos afectada por la cultura nacional (individualismo y aversión a la incertidumbre) que en los países desarrollados.

Palabras clave: cultura nacional, estructura de capital, rendimiento, finanzas corporativas, gobierno corporativo.

INTRODUCTION

The studies that emerged from the statement of Modigliani and Miller (1958), which sought to identify theories capable of highlighting the relevance of capital structure, trying to determine the diversity of factors that affect the capital structure of organizations, became a relevant theme with different results. Studies on capital structure have sought explanations based on the trade-off theory, the pecking order theory, and the market timing theory.

However, in the diverse and broad themes related to finance, the capital structure, according to Nisiyama and Nakamura (2015), permeates a part of corporate finance that is still very controversial, as well as interrelated with the most diverse corporate aspects, both in the theoretical field as well as in corporations themselves. The capital structure has been researched in the most diverse aspects, mainly involving corporate variables that are directly or indirectly associated to the decisions that make up the capital structure (Nisiyama & Nakamura, 2015).

In this context, the study by Dawar (2014) concluded that capital structure choices have an influence on the performance of companies. His results suggested that the choice of structure has a negative influence on the financial performance of Indian companies, in contrast to the conclusions of other studies in other developed countries as well as emerging economies. Other studies have sought to analyze the impact of capital structure on performance and have demonstrated divergent and contradictory results, adding negative or positive value. (Miller, 1977; Weill, 2008; Ebaid, 2009; Nunes et al., 2009; Sadeghian et al., 2012; Berger & Di Patti, 2006; Rao et al., 2007). Therefore, these studies reveal that in different countries the capital structure can positively or negatively influence the companies' performance.

Also in this context, it is worth noting that the capital structure can be influenced by national culture. Studies on national culture have been disseminated since the study by Gert Hofstede (2001), who created cultural characteristics classified as dimensions: power distance, individualism, masculinity, uncertainty avoidance, long-term orientation, and indulgence.

Fauver and Mcdonald (2015) analyzed national cultural differences in capital structure choices and concluded that there is a differential impact on emerging and developed countries. Chang et al. (2012) and Kim and Nofsinger (2008) suggested that behavioral factors arising from culture can influence equity valuation and management decisions. Chui et al. (2002) used national-level static and time-invariant

data on culture (dominion and conservatism) and found that national culture affects managers' decisions regarding the use of leverage.

Hence, a company's performance is positively or negatively influenced by capital structure decisions, which can be influenced by national culture. Therefore, there is a research gap in this area which creates the need for a greater understanding, as there is evidence that companies show differences in their capital structure choices, according to Fama and French (2005) and Baker et al. (2007).

Therefore, this study seeks to answer the following question: What is the influence of two dimensions of national culture (individualism and uncertainty avoidance) on the relationship between capital structure choices and company performance? The study by Fauver and Mcdonald (2015) also focused on these two cultural characteristics to define the behavior of a society. Davydov (2015) states that there is a lack of empirical evidence on the capital structure's effect on the organizations' performance. As highlighted by Hofstede (1983), it is naive to consider that the administration is the same in the four corners of the earth. In other words, management practices can be implemented in different countries considering the influence of national culture, under the political, economic, legal, or historical situation.

Thus, the results of this study can contribute to the literature showing the possible relationships between national culture, capital structure and company performance.

The paper first provides a review of the existing literature. Secondly, it presents the methodologies used for the estimation. Thirdly, the results are presented. Finally, the results obtained are compared and discussed, as well as the main conclusions.

REVIEW OF THE LITERATURE AND HYPOTHESES

The companies' capital structure refers to the origin of the used resources, considering a combination of short, medium and long-term debt and equity. This structure demonstrates the efforts of firms to generate results in relation to the employed capital, that is, the capital structure is the choice of the financing source in order to maximize the investors' results (Myers & Majluf, 1999). It can also be formed by the relationship of one's own capital with that of third parties in the financing of one's asset. Brito et al. (2007) consider that each funding source has its advantages and risks. Therefore, a continuous assessment of this structure's composition by

the company is necessary, allowing the definition of the most adequate financing structure in terms of term, cost, and amount, compared to the expected return on investment.

According to Cordeiro Filho et al. (2018), the theories that deal with financial decisions to determine the capital structure are defined first, by the hierarchization of the origin of resources formed by equity and third-party capital for the financing of projects, known as the pecking order theory, and second, by the use of heavy debt loads (third-party resources) static trade-off, considering the benefit provided by taxes due to the deduction of interest incurred from debts in the calculation of taxable income, theories proved by Myers (1984).

Different analyses of the capital structure were considered, but we chose to use indebtedness as the dependent variable of the capital structure. Metrics show leverage alternatives seeking to address different considerations about indebtedness: long-term versus total, market value versus accounting, as well as alternative metrics using the logarithm of equity quantities. Therefore, this study opted for total debt considering total assets, as has been done in other studies that used debt analysis as a proxy (Dawar, 2014; Bastos & Nakamura, 2009; Brito et al. 2007).

Other studies have shown a relationship of influence between capital structure choices and the performance of companies. A vast amount of literature in recent decades has studied the choice and impact of capital structure decisions on firm performance (Miller, 1977; Stulz, 1990; Roden & Lewellen, 1995; Berger & Di Patti, 2006; Weill, 2008; Ebaid, 2009). Empirical evidence has been contradictory with regard to debt, as it has been shown that adds positive or negative value to companies' performance.

Dawar (2014) investigated the impact of the choice of capital structure on the performance of companies in India, as one of the most important emerging economies. His results suggested that the choice of structure has a negative influence on the financial performance of Indian companies, in contrast to other studies for other developed countries and emerging economies. Studies that sought to analyze the impact of structure on performance have produced divergent and contradictory results, adding negative or positive value. (Miller, 1977; Weill, 2008; Ebaid, 2009; Nunes et al., 2009; Sadeghian et al., 2012; Berger & Di Patti, 2006; Rao et al., 2007).

Capital structure decisions can be influenced by national culture. Some studies (Gleason et al. 2000; Ramirez & Kwok, 2009; Chang et al., 2012; Zheng et al., 2012; Bhaird & Lucey, 2014; Antonczyk & Salzmann, 2014; Fauver & Mcdonald, 2015;

Haq et al., 2018; Chui et al., 2010) have addressed the behavioral issue, induced by national culture, as a possible influencer on corporate financing decisions and on the composition of the capital structure.

National culture was considered by Hofstede (1983) as a fundamental issue for the organization. The influence of national culture on management behavior and, consequently, on decisions that may interfere with the disposition of the capital structure is considered relevant. The way in which decisions are made and activities are carried out are directly influenced by beliefs, attitudes, behaviors, habits, and customs learned by the people who make up the organization and applied to day-to-day routines, impacting the performance levels of the company (Crozatti, 1998).

Culture consists of unwritten rules of a social game; thus, it is a collective programming of the mind, which distinguishes the members of a group or category from people of other categories (Hofstede et al., 2005). Therefore, to study organizations Hofstede (2001) developed a series of measures of culture, including power distance, individuality, masculinity, uncertainty avoidance, short and long-term orientation, and indulgence.

Each measure was defined as follows: Power Distance is the extent to which less powerful members of a country's institutions and organizations expect and accept that power will be unevenly distributed; Individuality is the degree of interdependence that a society maintains among its members; Masculinity is what motivates people, wanting to be the best (Male) or like what you do (Female); Uncertainty Avoidance has to do with the way a society deals with the fact that the future can never be known; Short and Long-Term Orientation is the dimension that describes how every society must maintain some links with its own past, while dealing with the challenges of the present and the future; and finally, Indulgence is defined as the extent to which people try to control their desires and impulses, based on the way they were raised. The quantification of national culture is created by an index, applied to each dimension, which varies from 0 to 100 (Hofstede, 2001).

With these indexes, several studies emerged with the aim of measuring the national culture with other characteristics. Among the levels classified by Hofstede (2001), the individualism and uncertainty avoidance indexes have shown significant effects at the macroeconomic level (Gorodnichenko & Roland, 2011; Fauver & Mcdonald, 2015).

A study by Zinn (2008) showed that higher levels of individualistic behavior are associated with higher levels of risk. Other studies have shown that individualism

is associated with higher levels of overconfidence as well (Gupta et al., 2006). Fauver and Mcdonald (2015) highlight that companies from more individualistic societies tend to be led by executives who are more confident in their own abilities. As a result, they will be more confident in their understanding of the inherent risks of higher levels of debt. Therefore, this would imply that these companies prefer to use riskier debts. The authors also point out that an increase in the uncertainty avoidance index should lead to a reduction or avoidance of the risk associated with managing a highly indebted company.

Other studies analyze these cultural influences in the capital structure, but there is no single definition. The study by Gleason et al. (2000) studied retailers in 14 European countries grouped in four cultural groups and identified that capital structures vary according to these cultural groups. Ramirez and Kwok (2009), using panel data from 50 countries, showed that multinational companies reduce the impact of national culture on their capital structure. Chang et al. (2012) found that national culture and governance influence financing decisions in the presence of uncertainties and ambiguities and argued that these decisions depend on a country's financial system, regardless of whether it comes from a bank-based economy (code law) or a capital market economy (common law).

Zheng et al. (2012) assessed the influence of national culture in choosing the maturity of corporate debt, using four of Hofstede's cultural dimensions (uncertainty, collectivism, distance from power, and masculinity) with a sample of 114,723 companies from 40 countries in the period 1991-2006, and found evidence that companies with these dimensions tend to use more short-term debt. In another study, Bhaird and Lucey (2014) developed a survey covering small and medium-sized companies in 13 countries over a seven-year period, and analyzed empirically the influence of culture on the capital structure. They observed that uncertainty avoidance and individuality are negatively related to long-term debt; they also highlighted that companies of this size avoid a greater risk to the business, reducing the interference of debt providers and maintaining autonomy and independence.

Antonczyk and Salzmann (2014) assessed whether fluctuations in the capital structure are caused by certain cultural characteristics of each country. For this, the authors analyzed companies from 42 countries and provided evidence that financial decisions are affected by the national culture, in particular by the degree of individualism in the country, reflected in the optimism and overconfidence traits of managers. Haq et al. (2018) presented new evidence on national culture and capital structure,

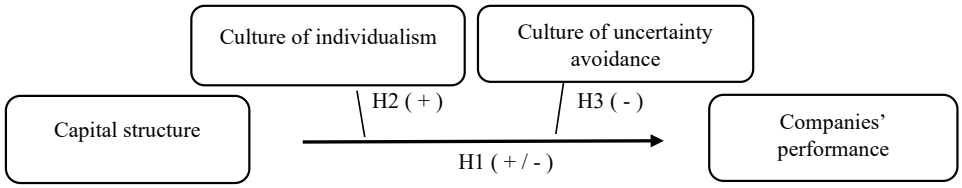
using a sample of 1,701 banks from 79 countries in the period 2000-2013, with 18,996 observations per banking year. They found that banks in countries with a high culture of individualism maintain more leverage, while banks in countries with a high capacity to avoid uncertainty, power distance and long-term orientation have less influence of the national culture.

Chui et al. (2010) suggest that the cultural characteristics of a society can have real impacts on stock investment decisions. Specifically, they show that the Individualism Index developed by Hofstede (2001) is positively associated with trading volume and volatility, as well as with the magnitude of current profits. Using time-invariant measures of culture, the authors showed that debt ratios in 22 countries are partially explained by cultural factors.

Considering these studies, it is necessary to examine whether the national culture maximizes or minimizes the choice of capital structure, which consequently influences or not the companies' performance. For an illustration of the research design, see Figure 1.

Figure 1.

Influence of Capital Structure Performance through the Culture of Individualism and Uncertainty Avoidance



Source: Prepared by the authors.

We formulated the following hypotheses for this research:

H1: The capital structure positively (negatively) influences the companies' performance.

H2: Individualism maximizes the influence of the capital structure on performance.

H3: Uncertainty avoidance minimizes the influence of capital structure on performance.

METHODOLOGY

The survey's population was the group of publicly traded companies in the industrial sector (code 52 from the Thomson Reuters Eikon database) of the G20 Group countries: Argentina, Australia, Brazil, Canada, China, France, Germany, Indonesia, Italy, Japan, South Korea, Mexico, Russia, Saudi Arabia, South Africa, Turkey, the United Kingdom, and the United States of America. The decision to analyze G20 companies was made because of the significance of this group to the global economy. The G20 includes advanced and developing nations and contains diversified economies as well as economies dependent on some key industries; it also includes democracies, oligarchies, and monarchies. It stands out that, among these countries, only India did not have industrial companies registered in the list collected.

The industrial segment was chosen because of its great economic growth and development; according to Vieira et al. (2014), the industrial sector has a strong participation in the economy when compared to other sectors such as agriculture and services. This sector also has a greater dynamic of incorporating advances in productivity and a greater remuneration for production factors. Other studies that opted for this segment stand out, such as the one by Leite and Silva (2019) and other articles have suggested that future studies should focus on the industrial sector (Machado et al., 2015).

To delimit the sample, companies that did not contain data to calculate the variables and outliers were excluded, as they presented three standard deviations far from the mean.

Table 1 shows the companies and countries that make up the sample, which totaled 3,431 companies and 14,743 observations.

It is observed that countries like Japan contain the largest number of industrial companies listed in publicly held companies, followed by China, the United States and South Korea. The countries with the lowest number of companies are Argentina, Mexico, and Saudi Arabia.

Information regarding dependent, independent and control variables was collected from the *Thomson Reuters Eikon* database and structured and conceptualized as follows in Table 2.

Table 1.

National Culture Indices and Number of Selected Companies

Country	Number of industries per country	Average Individualism Index	Average Uncertainty Avoidance Index
Argentina	6	46	86
Australia	104	90	51
Brazil	38	38	76
Canada	114	80	48
China	678	20	30
France	82	71	86
Germany	100	67	65
Indonesia	60	14	48
Italy	39	76	75
Japan	910	46	92
South Korea	330	30	82
Mexico	12	39	95
Russia	81	25	80
Saudi Arabia	19	65	49
South Africa	39	18	85
Turkey	44	37	85
United Kingdom	160	89	35
United States	615	91	46
Total	**3,431**	**52.11**	**66**

Source: Prepared by the authors.

Following Oliveira (2017), to establish the economic performance of industrial companies, the Market-to-Book indicators were used as the dependent variable. On the other hand, the indebtedness level was used as an explanatory variable for the performance of companies (Dawer, 2014).

Cultural dimensions were sought in the structures developed by Hofstede (1984, 1988, 2001, 2018), who is known for characterizing the cultural traits of a nation in six dimensions. The selected dimensions for this study are individualism and uncertainty avoidance, following other studies, such as Fauver and Mcdonald (2015) and Gorodnichenko and Roland (2011).

Table 2.

Variables and Operational Definitions

Dependent variable	**Description**	**Formula**	**Studies**
MTB	MTB (Market-to-Book) is the relationship between market value and book value (net worth).	Market value / Net worth	Oliveira et al., 2017; De Carvalho et al., 2017.
Independent variable	**Description**	**Formula**	**Studies**
END	Total debt of the company / Total assets	Total debts / Total assets	Silva & Valle, 2008; Bastos & Nakamura, 2009; Dawar, 2014; Bastos et al., 2009.
Moderators' variable	**Description**	**Formula**	**Studies**
IND	Measures the degree of interdependence that a society maintains among its members.	Score from 0 to 100, obtained from Hofstede's website. The closer to 100, it means that the country has tendencies of high individualism and aversion to uncertainty. The closer to 0, the lower the uncertainty aversion.	Hofstede (1983; 2020).
AV	Measures the extent to which members of a culture feel threatened by ambiguous or unknown situations and create rules and legal systems that try to avoid them.		
Control variable	**Description**	**Formula**	**Studies**
TANG	Tangibility was calculated as total fixed assets over total assets.	Net fixed assets / Total assets	Dawar (2014); Bastos et al. (2009); Espinosa et al. (2012)
TAM	Total asset natural logarithm to measure company size.	Ln total assets	Perobelli & Famá (2001); Fama & French (2002)

Source: Prepared by the authors.

As control variables, size and tangibility were used. According to Lakatos and Marconi (2011), a control variable is a factor, phenomenon, or property that the investigator purposely neutralizes or nullifies in a piece of research, in order to prevent it from interfering in the analysis of the relationship between the studied variables. That said, the control variables were selected based on the possible relationship with the economic performance variables.

The research hypotheses were tested by means of a multiple linear regression. Year and country fixed-effect controls were used, in addition to robust standard errors. The operation was carried out in Stata software, version 13.

The general equation used is as follows:

$$MTB_{it} = \beta_0 + \beta_1 END_{it} + \beta_2 TAM_{it} + \beta_3 TANG_{it} + \Sigma\ Efeito\ Fixo\ Ano_{it} + \Sigma\ Efeito\ Fixo\ País_{it} + \varepsilon_{it} \quad [1]$$

$$MTB_{it} = \beta_0 + \beta_1 END_{it} + \beta_2 END_{it} + \beta_3 \boldsymbol{END_{it}} * \mathbf{INDj} + \beta_4 TAM_{it} + \beta_5 TANG_{it} + \Sigma\ Efeito\ Fixo\ Ano_{it} + \varepsilon_{it} \quad [2]$$

$$MTB_{it} = \beta_0 + \beta_1 END_{it} + \beta_2 AV_{it} + \beta_3 \boldsymbol{END_{it}} * \boldsymbol{AV_j} + \beta_4 TAM_{it} + \beta_5 TANG_{it} + \Sigma\ Efeito\ Fixo\ Ano_{it} + \varepsilon_{it} \quad [3]$$

In which:

MTBit: the relationship between market value and book value (net equity value) –market-to-book- in which the market value is obtained by multiplying the share price value by the number of shares of company i, in the period t;
END: Total debt of the company over total assets;
INDIVit = Hofstede's level of individualism;
AVit = Hofstede uncertainty avoidance level;
TANGit = Tangibility was calculated from net fixed assets/final total assets;
TAM it = Size of the company measured by the LN of its total assets;
ENDit*INDj = Indebtedness and individualism variable multiplication (moderator);
ENDit*AVj = Indebtedness variable and uncertainty avoidance multiplication (moderator).

First, all countries with the necessary variables to generate multiple linear regression analysis were selected. Then, a sensitivity/robustness test was performed and the models were operationalized with the observations of the selected period.

The models followed the sequence of initially identifying the relationship of the debt structure in relation to performance, and then analyzing this relationship of structure and performance with the moderating variable of the national culture of individualism and uncertainty avoidance.

The assumptions of the multiple linear regression models (homoscedasticity, multicollinearity, autocorrelation of residuals, and normality) were tested before proceeding with the data analysis, the descriptive statistics were obtained and the correlation test between variables was performed.

The VIF (multicollinearity) tests –that is, measuring the level of collinearity between the regressions of each equation, checking how much variance of an estimator is influenced by the presence of collinearity of other repressors– were performed (Favero, 2013).

The Winsorize process, which assigns the limit value in case the observation was outside the lower or upper limit, was also applied. The Durbin-Watson (residue autocorrelation) was tested and presented in the results tables (Favero, 2013).

It should also be noted that the moderate and moderating variables were operationalized in *z-score* values.

Finally, a regression differentiating emerging and developed countries was performed. The purpose of this separation was to control a factor likely to influence the management practices of the debt structure, as highlighted by Desai et al. (2004), where differences in emerging and developed market capital structures are observed and show that many companies from less developed countries use less debt and pay more for that debt.

RESULTS AND DISCUSSIONS

The descriptive statistics presented in Table 3 show the averages and standard deviations in their entirety, also differentiating by emerging and developed markets.

Table 3.

Descriptive Statistics

Variables	Companies		Emerging market companies		Developed market companies	
	Mean	DP	Mean	DP	Mean	DP
MTB	1.89084	1.4304	2.704689	1.907872	1.563138	1.14303
Estrcap	0.6247853	0.5918744	0.6959241	0.6450057	0.5971399	0.5713628
Tang	0.2405949	0.1666222	0.2306625	0.1554788	0.2447211	0.17087
Tam	19.82507	1.634038	20.22983	1.202288	19.62249	1.827935
Indiv	50.21346	27.78985	23.93106	7.38758	61.16132	25.67668
Avers	62.61514	25.50705	41.94161	20.56813	72.04956	20.78621
Firm-year observations	14,743		4,453		10,290	

Definition: MTB it: the relationship between market value and book value (net worth) –market-to-book- in which the market value is obtained by multiplying the share price value by the number of shares of company i, in period t; END: Total indebtedness of the company over total assets; INDIVit = Hofstede's levels of individualism; AVit = Hofstede uncertainty avoidance levels; TANGit = Tangibility was calculated from net fixed assets/final total assets; TAM it = Size of the company measured by the LN of its total assets. Source: Prepared by the authors.

Among the data, there is a great disparity between companies from emerging countries and developed countries in terms of average performance. It is observed that the average indebtedness of developed countries is lower than that of emerging countries. Cultural aspects are different between emerging and developed countries. It is also observed that all accounting variables are significantly different between emerging and developed countries.

In general, companies in developed countries are larger (as measured by total assets), have greater investments, are more likely to use debt, and have a higher debt-to-equity ratio. Therefore, Table 2 also suggests that it is important to control for the level of economic development in our multivariate framework.

Table 4 shows the correlations between all variables of interest.

Table 4.

Pairwise Correlations

Variables	1	2	3	4	5	6
1	1.000					
2	0.1870	1.000				
3	0.1822	-0.1496	1.000			
4	0.2558	0.1383	0.0384	1.000		
5	-0.0127	-0.0289	-0.1226	-0.0878	1.000	
6	-0.0157	-0.4015	0.1278	-0.1188	0.0993	1.000

Definition: 1. ENDit: Total indebtedness of the company over total assets; 2. MTB it: is the relationship between market value and book value (net equity value); 3. TANGit = Tangibility was calculated from net fixed assets/final total assets; 4. TAM it = Company size measured by LN of its total assets 5. INDIVit = Hofstede individualism levels; 6. AVit = Hofstede uncertainty avoidance levels.

Source: Prepared by the authors

Table 4 shows that multicollinearity is unlikely to be a major concern in the regression specifications used. It is observed that individualism and uncertainty avoidance are negatively correlated with indebtedness. This suggests that countries with a higher level of individualism use less debt in their capital structures. Also, performance is positively correlated with indebtedness, suggesting that the greater the indebtedness, the greater the performance of companies in the countries studied.

Uncertainty avoidance is negatively correlated with equity debt, suggesting that when countries are more risk-averse, they are less likely to use debt. Uncertainty avoidance is positively correlated with tangibility.

A multivariate analysis running a probit regression was performed to test the hypotheses of the three models considering all selected countries. Table 5 presents the results.

Table 5.

Results of the Analysis of the Companies of the G20 Countries

Variables	**Dependent variable**		
	P_{it}: MTB		
	Eq. 1	**Eq. 2**	**Eq. 3**
	Coef. (Est. t)	**Coef. (Est. t)**	**Coef. (Est. t)**
Constant	1.616993*** (10.14)	0.8537886*** (5.81)	2.294021*** (15.34)
END_{it}	0.4845947*** (22.94)	**0.4784481***** (22.29)	**0.4618815***** (22.00)
TAM_{it}	0.0185868** (2.51)	0.0698175*** (9.76)	0.0500056*** (6.94)
$TANG_{it}$	-1.168804*** (-17.74)	-1.709902*** (-25.87)	-1.224242*** (-18.70)
$INDIV_{it}$	-	-0.0026372*** (-6.14)	-
$END_{it} * INDIV_{it}$	-	**0.2481468***** (20.18)	-
AV_{it}	-	-	-0.0209096*** (-50.20)
$END_{it} * AV_{it}$	-	-	**0.0395733***** (3.37)
	0.0000***	0.0000***	0.0000***
R-squared	0.2503	0.1232	0.2280
VIF	1.10 – 1.18	1.01 – 1.11	1.02 – 1.11
Durbin Watson	0.7779	0.7779	0.7779
Year dummies	Yes	Yes	Yes
County dummies	Yes	No	No
Observations	14,743	14,743	14,743

Definition: VIF: Variance inflation factor. MTB it: the relationship between market value and book value (net equity value), market-to-book, in which the market value is obtained by multiplying the share price value by the number of shares of company i, in the period t; END: Total indebtedness of the company over total assets; INDIVit = Hofstede's levels of individualism; AVit = Hofstede uncertainty avoidance levels; TANGit = Tangibility, which was calculated from net fixed assets/final total assets; TAM it = Size of the company measured by the LN of its total assets. Multiplication of z-score END and AV. END and INDIV z-score multiplication. εit = Residual. * p<0.1; ** p<0.05; *** p<0.01.

Source: Prepared by the authors.

Equation [1] analyzed the relationship between the capital structure and the performance of companies. It was possible to identify that the greater the indebtedness of the companies, the greater the performance based on the MTB. This result corroborates that of Do Nascimento et al. (2018) but contradicts the study by Sadeghian et al. (2012). Size was also positively related to performance, that is, the larger the company, the greater its performance. Tangibility had a negative relationship with performance, that is, the greater the tangibility, the lower the performance.

In Equation [2] the interaction between the variable ENDit and the cultural dimension of individualism (ENDit*INDIj) was analyzed. We found that it was positive and statistically significant in performance (MTB), but this relationship was attenuated. Based on the economic analysis of the coefficients, it is observed that companies that are exposed to a cultural context of high individualism tend to reduce their influence on performance through indebtedness, as the coefficients change from 0.4784 to 0.2481. If one considers that the increase in individualism can be associated with increased trust (Gupta et al., 2006), and that the increase in trust leads to a greater belief in the ability of a company's managers to deal with debt, this increase in debt would result in better performance. The results differed from this interpretation, as it was expected that this relationship of individualism would enhance the relationship between indebtedness and performance.

From Equation [3] we found that the interaction between the variable ENDit and the cultural dimension of uncertainty avoidance (ENDit*AVIj) was positively related to MTB. The positive relationship between END and MTB was also attenuated by the moderating variable. The uncertainty avoidance index can be interpreted as follows: the higher the uncertainty avoidance level, the greater the inclination to avoid risks and uncertainties. Considering that taking on more debt increases the financial risk, the inclination of the more risk-averse companies is taking on less debt, hence less performance. With that, it was expected that this relationship would be attenuated or inverted in the indebtedness and performance relationship. Therefore, what was found is a positive relationship, albeit attenuated, based on the economic analysis of the coefficients, which changed from 0.4618 to 0.0395. It can be seen, therefore, that companies that have a higher NDT and are exposed to the cultural context of high uncertainty aversion tend to reduce the MTB.

After obtaining these results, we performed the same analysis considering the separation of emerging and developed countries. Fauver & Mcdonald (2015) argue that culture seems to be a more significant factor in capital structure choices in developed markets than in emerging markets.

We sought to identify the same multivariate analysis models by running a probit regression to test the hypotheses of the three models, considering emerging and developed countries. Table 6 shows the results for the emerging countries.

Table 6.

Results of the Analysis of the Industries of the G20 Emerging Countries

Variables	**Dependent variable**		
	P_{it}: MTB		
	Eq. 1	**Eq. 2**	**Eq. 3**
	Coef. (Est. t)	**Coef. (Est. t)**	**Coef. (Est. t)**
Constant	12.95275*** (24.04)	12.9572*** (22.78)	12.62557*** (22.77)
END_{it}	0.5060844*** (10.89)	**0.3107208*** (6.36)**	**0.3744508*** (7.65)**
TAM_{it}	-0.55018*** (-20.60)	-0.3814861*** (-14.56)	-0.4078486*** (-15.45)
$TANG_{it}$	-1.318161*** (-8.20)	-1.835707*** (-11.22)	-1.543831*** (-9.57)
$INDIV_{it}$	-	-0.0947666*** (-26.87)	-
END_{it} * $INDIV_{it}$	-	**0.2323519*** (8.83)**	-
AV_{it}	-	-	**-0.036586*** (-27.10)**
END_{it} * AV_{it}	-	-	0.2159578*** (8.47)
	0.0000***	0.0000***	0.0000**
R-squared	0.3063	0.2511	0.2593
VIF	1.05 – 1.34	1.02 – 1.20	1.02 – 1.23
Durbin Watson	0.7796869	0.7796869	0.7796869
Year dummies	Yes	Yes	Yes
Country dummies	Yes	No	No
Observations	4,453	4,453	4,453

Definition: VIF: Variance inflation factor. MTB it: the relationship between market value and book value (net equity value) –market-to-book- in which the market value is obtained by multiplying the share price value by the number of shares of company i, in the period t; END: Total indebtedness of the company over total assets; INDIVit = Hofstede's levels of individualism; AVit = Hofstede uncertainty avoidance levels; TANGit = Tangibility was calculated from net fixed assets/final total assets; TAM it = Size of the company measured by the LN of its total assets. Multiplication of z-score END and AV. END and INDIV z-score multiplication. εit = Residual. * p<0.1; ** p<0.05; *** p<0.01.

Source: Prepared by the authors.

In Equation [1], the relationship between the capital structure and the performance of companies in the emerging countries was analyzed. It was possible to identify that the greater the indebtedness of the companies, the greater the performance based on the MTB.

Size, for the emerging countries, showed a negative relationship with performance, that is, the larger the company, the lower the performance. Tangibility also had a negative relationship with performance: the greater the tangibility, the lower the performance.

Equation [2] represented the interaction between the ENDit variable and the cultural dimension of individualism (ENDit*INDIj). It proved to be positive and statistically significant in performance (MTB), which is again in line with the cultural trend towards individualism, causing the positive relationship between END and MTB to be attenuated. Based on the economic analysis of the coefficients, the ratio is smaller and goes from 0.3107 to 0.2323. In the emerging countries individualism appeared less mitigated than in all countries, as seen in Table 5.

From Equation [3] we found that the interaction between the variable ENDit and the cultural dimension of uncertainty avoidance (ENDit*AVIj) was negatively related to MTB. The positive relationship between END and MTB was inverted by the moderating variable, based on the economic analysis of the coefficients, which changed from 0.374 to -0.0365. Thus, it was observed that companies that have a higher NDT and are exposed to a cultural context of high uncertainty aversion tend to have a low performance by the MTB.

Equation [1] considered the relationship of the capital structure with the performance of companies. In this case, it was possible to identify that the greater the indebtedness of companies, the greater the performance based on the MTB, noting that the indebtedness of emerging countries is lower than the indebtedness of developed countries (coef. 0.5393 for developed countries and coef. 0.5060 for emerging countries). Fauver & Mcdonald (2015) also found that companies in emerging countries are on average 13% less likely to use debt than comparable companies in developed countries. Demirgüç-Kunt and Levine (1996) point out that companies from countries with more developed stock exchanges make greater use of debt. Table 7 shows the results for the developed countries.

Table 7.

Results of the Analyses of the Industries of the G20 Developed Countries

Variables	Dependent variable		
	P_{it}: *MTB*		
	Eq. 1	**Eq. 2**	**Eq. 3**
	Coef. (Est. *t*)	**Coef. (Est. *t*)**	**Coef. (Est. *t*)**
Constant	-0.0114578*** (-0.08)	-0.6225317*** (-4.79)	0.9587755*** (7.43)
END_{it}	0.539346*** (25.22)	**0.56575*** (27.29)**	**0.5368701*** (25.58)**
TAM_{it}	0.0949677*** (14.74)	0.0785465*** (12.32)	0.0862894*** (13.33)
$TANG_{it}$	-1.246923*** (-19.47)	-1.220383*** (-19.14)	-1.238906*** (-19.48)
$INDIV_{it}$	-	0.0103925*** (24.89)	-
$END_{it} * INDIV_{it}$	-	**0.1214191*** (10.94)**	-
AV_{it}	-	-	-0.014989*** (-29.21)
$END_{it} * AV_{it}$	-	-	**-0.1270549*** (-11.14)**
	0.0000***	0.0000***	0.0000***
R-squared	0.2311	0.2214	0.2370
VIF	1.05 – 1.34	1.03 – 1.13	1.04 – 1.14
Durbin Watson	0.7439335	0.7439335	0.7439335
Year dummies	Yes	Yes	Yes
County dummies	Yes	No	No
Observations	10,290	10,290	10,290

Definition: VIF: Variance inflation factor. MTB it: the relationship between market value and book value (net equity value), market-to-book, in which the market value is obtained by multiplying the share price value by the number of shares of company i, in the period t; END: Total indebtedness of the company over total assets; INDIVit = Hofstede's levels of individualism; AVit = Hofstede uncertainty avoidance levels; TANGit = Tangibility was calculated from net fixed assets/final total assets; TAM it = Size of the company measured by the LN of its total assets. Multiplication of z-score END and AV. END and INDIV z-score multiplication. εit = Residual. * p<0.1; ** p<0.05; *** p<0.01.

Source: Prepared by the authors.

Size was also positively related to performance, that is, the larger the company, the greater the result of its performance. Tangibility had a negative relationship with performance: the greater the tangibility, the lower the performance.

Equation [2] represented the interaction between the variable ENDit and the cultural dimension of individualism (ENDit*INDIj). For the developed countries it was positively and statistically significant in performance (MTB), which is consistent with the premise that the cultural tendency to individualism attenuates the positive relationship between END and MTB. The economic analysis of the coefficients from 0.5657 to 0.1214 demonstrates that the individualism factor in developed countries has a greater impact on the relationship between END and MTB than in emerging countries.

From the Equation [3] it is noted that for the developed countries the interaction between the ENDit variable and the cultural dimension of uncertainty avoidance (ENDit*AVIj) was also negatively related to the MTB. The positive relationship between END and MTB was inverted by the moderating variable, based on the economic analysis of the coefficients that changed from 0.5368 to -11.14. From there, it is clear that companies that have a higher NDT and are exposed to the cultural context of high uncertainty aversion tend to have a low performance in terms of MTB.

Table 8 summarizes the results of the hypotheses.

Table 8.

Summary of Hypotheses Results

Hypothesis	All countries		Emerging countries		Developed countries	
	Expected signal	Signal found	Expected signal	Signal found	Expected signal	Signal found
H1	+ / -	+	+ / -	+	+ / -	+
H2	+	+	+	+	+	+
H3	-	+	-	+	-	-

Source: prepared by the authors.

With these results, it can be affirmed that emerging and developed countries were divergent in the decisions about the debt structure that affects performance, regarding the expected and verified sign. Fauver and Mcdonald (2015) highlighted that culture seems to be a more significant factor in capital structure choices in developed markets than in emerging markets. Gozzi et al. (2012) stated in their

study that national culture impacts capital structure choices and that this impact is markedly different in emerging and developed countries.

The results for developed countries are consistent with the study by Chang et al. (2012), who demonstrated that uncertainty avoidance is negatively related to the overall debt maturity in a country, with the increased use of short-term debt associated with higher levels of uncertainty, unlike what happens in emerging countries. This demonstrated that the culture of uncertainty avoidance maintained a positive relationship between indebtedness and performance.

It stands out, based on the studies by Fauver & Mcdonald (2015) about the relationship between national culture and capital structure, that the increases in the Individualism Index are associated with increases in the companies' leverage, while the increases in the Aversion to Risk Index have a negative and significant association with leverage. This result is valid only in developed markets, which may be different from companies in emerging markets that face other restrictions, such as limited access to capital.

CONCLUSIONS

Previous research has examined the effects of culture in the capital structure and, more recently, on debt. This article aimed to analyze the influence of two dimensions of national culture (individualism and uncertainty avoidance) in the relationship between the choice in the formation of the capital structure and the performance of companies in the G20 group for the period 2014 to 2018.

It was possible to prove that the level of indebtedness is related to performance. This result corroborates studies by Machado et al. (2015) and Berger and Di Patti (2006).

Chui et al. (2010) suggested that the cultural characteristics of a society can have real impacts on stock investment decisions. The results showed that the culture of individualism and uncertainty avoidance affects the debt structure, which in turn has a significant influence on the companies' performance.

Considering that the increase in individualism is an increase in confidence (Hofstede, 2001), which leads to an increase in debt and this increase in debt would lead to a better performance, the results showed that the level of individualism attenuates the relationship between indebtedness and the performance of the selected companies.

It was expected that individualism would enhance the relationship between indebtedness and performance. Chui et al. (2010) stated that increased levels of national individualism affect stock market trading decisions.

The uncertainty avoidance index was interpreted in the sense that the higher the level of uncertainty avoidance, the greater the inclination to avoid risks and uncertainties (Hofstede, 2001) and, considering that taking on more debt increases the financial risk, it would lead towards more adverse companies. Risk is taking on less debt, hence lower performance. With this, it was expected that this relationship would be attenuated, or the sign would be inverted in the debt and performance relationship. Therefore, what was found is a positive but attenuated relationship.

The study corroborates Fauver & Mcdonald (2015), who highlight culture as a significant factor in capital structure choices in developed and emerging markets. Among the results, it is noteworthy that countries diverge in terms of the culture of uncertainty avoidance, and in the relationship between indebtedness and performance, in which a positive relationship was identified for emerging countries and a negative one for developed countries. This suggests that emerging countries with greater uncertainty avoidance have less influence on indebtedness, which reflects on performance.

The theoretical contribution of this study was to bring to the discussion agenda in the field of financial theory the debate on the relevance of capital structure and its different approaches. The empirical contribution is the testing of theories referring to capital structure, performance, and national culture of listed companies in the international context.

The limitation of the work is related to the non-observance of the data for a significant period of time. Another limiting factor was not considering more items as an independent control variable that could interfere in the relationship with performance.

Future studies could research in more detail the quantitative aspects of performance beyond the MTB or even focus on sectors other than the industrial.

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