DEMOCRACY, CORRUPTION AND CIVIL LIBERTIES: DOES NATIONAL CONTEXT INFLUENCE CORPORATE CARBON DISCLOSURE?

Democracia, corrupção e liberdades civis: o contexto nacional influencia a divulgação corporativa de carbono?

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ABSTRACT

Design/methodology/approach: This research analyzes the carbon disclosure of 1328 companies based in 19 countries. The level of democracy, corruption and civil liberties in the countries was measured using variables from the Varieties of Democracy database. The data were analyzed using three econometric models.

Purpose: This research paper answers the following question: How does the country level of democracy, corruption and civil liberties affect carbon disclosure?

Findings: The results show that the carbon disclosure of companies is affected by the institutional context of the country where the company operates. Therefore, in countries where the level of democracy and control of corruption is higher, companies are more involved in carbon disclosure.

Research limitations/implications: The findings confirm the Institutional Theory, by reinforcing that not only the organizational context, but also the social and political context of the country are relevant for the dissemination of carbon.

Practical implications: Managers of companies based in countries with a greater voice for citizens and a lower level of corruption should invest more resources for the dissemination of carbon. In these countries, companies are under greater pressure from stakeholders for information on carbon emissions.

Social implications: The findings show that policy makers can incorporate protection mechanisms for stakeholders and not just shareholders. Lawmakers can propose increased penalties and criminalized corrupt practices and illicit enrichment of public officials. Less power of voice for citizens and a higher level of corruption can reduce the effectiveness of national policies for sustainable development.

Originality/value: This research, in addition to advancing the studies on carbon disclosure in different national contexts, has for the first time used the credit rating control variable.

Keywords: Democracy; Corruption; Civil Liberties; Carbon Disclosure; Corporate Social Responsibility.

RESUMO

Desenho/metodologia/abordagem: Esta pesquisa analisa a divulgação de carbono de 1328 empresas sediadas em 19 países. O nível de democracia, corrupção e liberdades civis nos países foi medido usando variáveis do banco de dados Varieties of Democracy. Os dados foram analisados por meio de três modelos econométricos.

Objetivo: Este trabalho de pesquisa responde à seguinte pergunta: Como o nível de democracia, corrupção e liberdades civis do país afeta a divulgação de carbono?

Resultados: Os resultados mostram que a divulgação de carbono das empresas é afetada pelo contexto institucional do país onde a empresa atua. Portanto, em países onde o nível de democracia e controle da corrupção é maior, as empresas estão mais envolvidas na divulgação de carbono.

Limitações/implicações da pesquisa: Os achados confirmam a Teoria Institucional, ao reforçar que não apenas o contexto organizacional, mas também o contexto social do país é relevante para a divulgação do carbono.

Implicações práticas: Gestores de empresas sediadas em países com maior voz dos cidadãos e menor nível de corrupção devem investir mais recursos para a disseminação do carbono. Nesses países, as empresas estão sob maior pressão dos *stakeholders* por informações sobre as emissões de carbono.

Implicações sociais: Os resultados mostram que os formuladores de políticas podem incorporar mecanismos de proteção para as partes interessadas e não apenas para os acionistas. Os legisladores podem propor penalidades aumentadas e criminalizar práticas corruptas e enriquecimento ilícito de funcionários públicos. Menos poder de voz para os cidadãos e um nível mais alto de corrupção podem reduzir a eficácia das políticas nacionais para o desenvolvimento sustentável.

Originalidade/valor: Esta pesquisa, além de avançar os estudos sobre divulgação de carbono em diferentes contextos nacionais, utilizou pela primeira vez a variável de controle de classificação de crédito.

Palavras-chave: Democracia; Corrupção; Liberdades Civis; Divulgação de Carbono; Responsabilidade Social Corporativa.

1 INTRODUCTION

With the global debate on climate change, carbon management in large companies has been discussed as an important tool for mitigating carbon emissions (Grauel & Gotthardt, 2016). Companies around the world have taken initiatives to measure and control carbon (Luo, 2019), since carbon emissions have increased significantly in the atmosphere, being one of the main causes of rising temperatures, loss of fauna and flora diversity and melting of ice in Antarctica and Greenland (Niittynen et al., 2018).

Given the relevance of this theme not only for national governments and international organizations, stakeholders, and society in general, several studies have analyzed what factors can affect the level of disclosure of companies' carbon (Choi & Luo, 2020; Gallego-Álvarez et al., 2014; Luo, 2019; Pinheiro et al., 2020). However, it is not yet clear in the literature how the country's democracy and civil liberties can influence carbon disclosure. In addition, given the competitiveness of the market, for companies to engage and succeed in disclosing carbon, they must understand the institutional dynamics of the country. Understanding how institutional features work is imperative to recognizing the multifaceted challenges for business.

According to the literature review by Borghei (2021), most research analyzes the relationship between carbon disclosure and financial performance, not looking at macroeconomic factors. Hahn et al. (2015) found that institutional theory is the least used economic theory in studies on carbon disclosure. These authors state that they see unprecedented research opportunities in the relationship between an institutional approach and carbon disclosure. Additionally, the impact of the institutional environment on corporate carbon disclosure is still inclusive (Haque & Ntim, 2022).

Our paper aims to investigate how a country's level of democracy, corruption and civil liberties affects carbon disclosure. Therefore, the question that directs this research is: How does the country's level of democracy, corruption and civil liberties affect carbon disclosure? To answer this research question, we analyzed the carbon disclosure of 1328 companies based in 19 countries. Based on Institutional Theory, we selected three variables to represent each of the institutional pillars: regulative, cognitive, and normative, according to Scott (1995). In addition, according to Grauel and Gotthardt (2016), democracy, corruption and civil liberties are three important characteristics of the country's socio-political context.

In general, our findings show that, in fact, the institutional environment of countries influences carbon disclosure. We also find that the level of civil liberties negatively influences carbon disclosure, contrary to our expectations. Regarding the control variables, our findings show that countries with a better credit rating are more likely to have companies with less carbon disclosure and companies with better financial performance can invest more financial resources in the disclosure of carbon.

These findings make significant contributions to the debate on carbon disclosure: i) the institutional environment of countries is analyzed through a three-factor macroeconomic approach; ii) new evidence to support the Institutional Theory thesis that the behavior of companies is shaped by the institutional environment in which they operate; iii) we operationalized a new variable (country credit rating) that has not yet been explored in carbon disclosure studies; iv) we made advances to previous studies by Grauel and Gotthardt (2017) who analyzed only democracy and freedom, and the research by Povitkina (2018) that investigated the level of democracy and corruption in carbon disclosure.

The remainder of the paper is structured as follows. In the next section, we present a brief overview of Institutional Theory, as well as the research hypotheses. Then, we describe the data, variables and methods used in conducting this study. Then, we report the results obtained and discuss these findings. Finally, we conclude the study with the main findings, limitations, and suggestions for future research.
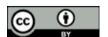
2 THEORETICAL BACKGROUND

2.1 Institutional Theory

The institutional theory defended initially by Selznick (1948), Gouldner (1954), in the old institutionalism, and later by DiMaggio & Powell (1983), Meyer and Rowan (1977), Zucker (1987), in the new institutionalism, seeks to explain and understand organizations as an actor, which is influenced by the environment in which it is inserted.

According to Greenwood and Hinings (1996), this theory explains how the organization's behavior can be shaped and changed by the national institutions of the country, in which the company operates. Institutional Theory is adequate to analyze how the behavior of the same company may vary according to the country's institutional pressures. For example, organizations can behave more ethically when they operate in countries with a higher density of unions and control organizations (Campbell, 2007).

Scott (1995) lists three pillars (origins) of an institution: regulative, cognitive, and normative elements. The identification of the pillar on which an institution is based makes it possible to understand which national characteristics can influence business behavior and how these characteristics shape the relationship between organization and society. National institutions are composed of regulative, cognitive, and normative elements, which, together with associated activities and resources, provide stability and meaning to social life.

The institutional regulatory environments of countries can be classified as higher or lower quality (Scott, 2008). In contexts of better regulatory quality, there is respect for democracy and people have more voice to fight for their rights. The cognitive pillar presents how government beliefs and attitudes can influence firm behavior (Meyer & Rowan, 1977). Corrupt national governments can discourage companies from behaving more responsibly with respect to carbon disclosure. Finally, the normative pillar recognizes the fact that a society's norms and values determine how its members perceive and react to the institutions that surround them (Scott, 1995). In countries with less civil liberties, people may find that national institutions interfere more in citizens' private lives and in business decisions. Scott (1995) argues that the normative pillar affects how people or firms do things daily. For example, in countries with less civil liberties, companies tend to follow the laws more, having less freedom, since there is a greater role for the state in the economy.

Table 1 presents the synthesis of the institutional pillars, according to Scott (1995).
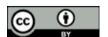
Table 1. Regulative, Cognitive, and Normative Elements.

Institutional Pillar	Description	Central Rudiments	Examples
Regulative	This pillar refers to restrictions, rights, power and benefits and obligations. The country's political system can establish certain control over the lives of people and institutions.	Policies and rules	Law issued by national, state, and municipal legislatures.
Cognitive	This pillar is characterized by conceptions, behaviors and beliefs shared by the same society.	Values, beliefs, and assumptions	Symbols, words, signs and hand gestures and facial expressions
Normative	This pillar refers to the institutions that prescribe and evaluate the social life of the actors, aiming that they have planned and appropriate behaviors.	Work roles, habits, and norms	Professional codes issued by class councils.

Source: Developed by the authors (2022).

According to Povitkina (2018), national characteristics, such as the level of democracy (pillar 1) and corrupt practices (pillar 2) can be considered institutions that exert influence capable of shaping the actions and behavior of organizations. Civil liberties (pillar 3), resulting from the process of changing man from his state of nature to his civil status (Grauel & Gotthardt, 2017; Obiedkov et al., 2013). In countries with greater civil liberties have softer coercive pillar institutions, which allow their individuals to act more flexibly (Almeida & García-Sánchez, 2017).

This strand of literature is related to our paper, in the sense that institutional pillars can shape the behavior of companies in relation to carbon disclosure. Companies operating in different institutional environments may deal with different national characteristics and this can lead to more transparent disclosure (Acquah et al., 2021; Amorim et al., 2021; Pinheiro, Costa, et al., 2021; Soares et al., 2018). We believe that the Institutional Theory is the most appropriate to analyze the results, since it goes beyond the physical space of the organization and focuses on how organizations build their legitimacy while maintaining values and respecting the needs of society and national charac-

teristics (Davis & North, 1970).

Research investigating the relationship between the institutional environment and carbon disclosure is recent. Studies have shown that the country's regulatory dimension plays an important role for companies to disclose more carbon information (Luo, 2019; Mateo-Márquez et al., 2020, 2021). The study by Villena and Dhanorkar (2020) show that suppliers can pressure companies for more carbon disclosure and that the country's GDP (Gross Domestic Product) is not a determining factor for companies to carry out greater carbon disclosure. In turn, Bandeira Pinheiro et al. (2022) found that the country's culture affects the carbon disclosure of its companies. According to these authors, countries with more individualistic cultures, companies tend to have less carbon disclosure.

2.2 Research Hypotheses

Democracy is a political system that influences the lifestyle of citizens and the behavior of companies. In stronger democracies, managers are more likely to pay greater attention to collective problems, making their decisions taking into account the interests of all stakeholders and not just their personal beliefs (Almeida & García-Sánchez, 2017).

Democratic institutions favor sustainable development and, consequently, the transparency of companies regarding their carbon emissions, because freedom of expression allows individuals, the media and non-governmental organizations to increase public knowledge about climate change (Povitkina, 2018).

In democratic states participate more actively in international meetings on climate change and comply with international agreements, creating national regulations to reduce the business impact on the environment, and people have more access to information, they are more likely to know more about environmental issues and make more environmentally responsible decisions (Bättig & Bernauer, 2009; Grauel & Gotthardt, 2017).

Previous studies have found that the country's level of democracy positively influences carbon disclosure (Bättig & Bernauer, 2009; Grauel & Gotthardt, 2017; Povitkina, 2018), environmental performance (Almeida & García-Sánchez, 2017) and environmental quality (Arvin & Lew, 2011; Iwińska et al., 2019). Therefore, according to these arguments, we propose the following research hypothesis:

H1: The country's level of democracy positively influences carbon disclosure.

According to Jensen and Berg (2012), firms adopt the main characteristics of the political system of the country in which they operate, including environmental performance (Rosati & Faria, 2019). Therefore, companies mirror national policy. In countries with high levels of corruption, companies are discouraged from adopting more ethical and responsible behavior (Walker et al., 2019).

Furthermore, in countries with high levels of corruption, companies that publicly adopt sustainable may expose themselves to the risk of missing out on new business opportunities. In other words, companies based in these countries can convey an idea of opposition to the national government, as they are transparent, ethical and therefore would not side with corrupt regimes. Ioannou and Serafeim (2012) and Chantziaras et al., (2020) argue that in countries with a high level of corruption, companies generally assume a lower level of environmental disclosure, because they are more involved in unethical practices.

In corrupt countries, governments often manipulate environmental protection laws, making it possible to act without respecting ecosystems (Bahoo et al., 2020). On the other hand, countries with a lower level of corruption have a sustainable development committee, create more laws to protect the environment and participate more actively in international meetings on sustainable

development (Almeida & García-Sánchez, 2017).

Previous studies have found that in countries with greater control of corruption, companies disclose more environmental information (Ioannou & Serafeim, 2012), CSR information (Coluccia et al., 2018; De Villiers & Marques, 2016; Pinheiro, da Silva Filho, et al., 2021; Xu et al., 2019), and ESG information (Baldini et al., 2018; Jensen & Berg, 2012). Therefore, according to these arguments, we propose the following research hypothesis:

H2: The country's level of corruption control positively influences carbon disclosure.

In general, freedom is the capacity for individual choice that allows citizens to make their own decisions about politics, economics, press and civil association, and discuss them in public (Obiedkov et al., 2013).
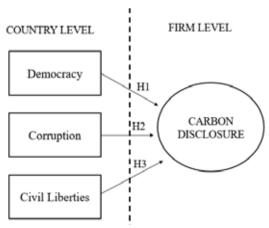
According to Grauel and Gotthardt (2017), countries with a wide range of civil liberties are more likely to have environmental organizations and independent press. In this sense, a high rate of freedom in the country favors the development of an independent press, and a higher degree of press freedom, greater public awareness about corporate corruption and unethical behavior (Almeida & García-Sánchez, 2017; Barkemeyer et al., 2018).

In free societies, companies use carbon disclosure to communicate with stakeholders, such as the state, investors, NGOs and the media (Grauel & Gotthardt, 2017). Political aspects such as political rights and civil liberties influence the behavior of companies (Williams, 1999), especially with regard to carbon disclosure.

Previous studies have found that the country's level of freedom can positively influence environmental disclosure (Almeida & García-Sánchez, 2017; Barkemeyer et al., 2018) and environmental quality (Barrett & Graddy, 2000). Additionally, the findings of Grauel and Gotthardt (2017) show that in countries with greater civil liberties, companies disclose more information about their carbon emissions. Therefore, according to these arguments, we propose the following research hypothesis.

H3: The country's level of civil liberties positively influences carbon disclosure.

Figure 1 shows the conceptual framework of our research. The larger sphere represents the institutional characteristics of the countries, and the smaller sphere represents the disclosure of carbon at the company level.

Figure 1. The conceptual framework.

3 METHODS

3.1 Sample

Our initial sample consisted of 2000 companies listed on the Global 2000 list, from Forbes (2020). Next, we selected only the companies based in the countries that emit the greatest amount of CO2 in the atmosphere, according to Global Carbon Atlas (2020), that is, we exclude 672 companies. Therefore, our final sample consists of 1328 companies (66.40% of the population of the largest companies in the world).

As it is the year with the most up-to-date information and due to the availability of data, we have analyzed the year 2020. Table 2 shows the number of firms by country. Iran-based companies were excluded from the sample because they did not have information available in the Carbon Disclosure Project database. Thus, we analyzed companies from 19 countries. As can be seen, the country with the highest representation is the United States with 477 companies represents (36%).

Table 2. Number of companies by country and by industry.

Country	Total companies	Economic sector name	Total companies
Australia	30	Communication	69
Brazil	17	Consumer discrionary	158
Canada	54	Consumer staples	99
China	188	Energy	64
France	53	Financials	294
Germany	46	Health care	90
India	49	Industrials	194
Indonesia	3	Materials	114
Italy	25	Real Estate	49
Japan	194	Technology	121
Mexico	11	Utilities	76
Poland	2		
Russia	19		
Saudi Arabia	12		
South Africa	10		
South Korea	58		
Turkey	6		
United Kingdom	74		
United States	477		
Total	1328	Total	1328

Source: Developed by the authors (2022).

Japan and China also have a high representation in the sample with 194 and 188 companies, respectively, unlike countries like: Turkey, Indonesia, and Poland, with six, three and two companies, respectively. Table 2 shows that the sample operates within eleven industries. The industries with the largest representation are financial with 294 (22%) companies. Then, the industries with the highest representation are industrial and discretionary consumption with 194 (15%) and 158 (12%) companies, unlike industries like: real estate, energy, and communication.

3.2 Variables

The dependent variable is the carbon disclosure (CARDIS). Our proxy for carbon disclosure was measured using the Kouloukoui *et al.* (2018) construct. The information for this variable was collected from the Carbon Disclosure Project Database (CDP) - a British organization. Information on CO_2 emissions is collected through a questionnaire that addresses: i) risks, opportunities and strategies related to climate change; ii) accounting system and greenhouse gas emission indicators; iii) additional data to the previous area; iv) greenhouse gas management; and v) corporate climate change mechanisms. Then, CDP evaluates responses according to the level of transparency and assigns a letter to each company, ranging from A to F. Table 3 shows the variables selected in our study.

Table 3. Variable's description.

Variable	Description	Source
CARDIS	Carbon disclosure: The responses of the Carbon Disclosure Project were used as a dependent variable, applying the methodology of Kouloukoui *et al.* (2018) We assign a grade to each letter obtained by the companies: A = 100, A- = 95, B + = 85, B- = 80, C + = 60, C- = 40; D + = 20; D- = 5 and F = 1.	Carbon Disclosure Project database
DEMOC	Electoral democracy index: This variable is measured by the average of other sub-variables, such as freedom of association thick, clean elections, freedom of expression, elected official, and suffrage. It ranges from -1 (lowest level of democracy) to 2 (highest level of democracy).	Varieties of Democracy database
CORRU	Control of Corruption: This variable measures the control of corruption, conventionally defined as the exercise of public power for private gain. It ranges from 0 (most corrupt countries) to 1 (least corrupt countries).	Varieties of Democracy database
LIBER	Freedom House - Civil Liberties: This variable measure freedom of expression and belief, associative and organizational rights, the rule of law and personal autonomy without State interference. It ranges from 0 (least free) to 1 (most free).	Varieties of Democracy database
RATIN	Credit rating by country: This variable measures the credit rating of the sovereign debt, according to the S&P agency. For each country, we assign a grade according to its classification: AAA = 20, AA + = 19, AA = 18, AA- = 17, A + = 16, A = 15, A- = 14, BBB + = 13, BBB = 12, BBB- = 11, BB + = 10, BB = 9, BB- = 8, B + = 7, B = 6, B- = 5, CCC = 4, CC = 3, C = 2 and D = 1.	Standard & Poor Website
PROFITS	Annual Profits: This variable measures the current year pre-tax profit before the deduction of the staff remuneration and director remuneration.	Forbes (2020)

Source: Developed by the authors (2022).

As independent variables, we selected three important institutional characteristics of the countries' socio-political context: electoral democracy index, control of corruption and civil liberties, according to Grauel and Gotthardt (2017). These data were collected from the Varieties of Democracy Database (2021). The V-Dem database is based on information obtained from official documents such as constitutions and government records, as well as reports from the World Bank and United Nations Organization. The Headquarters is based at the V-Dem Institute, the Department of Political Science at the University of Gothenburg, Sweden.

Two control variables were included in our empirical analysis: i) the credit rating by country was measured by assigning a score for each letter given by the Standard & Poor agency. We use the country risk variable because investors may demand carbon information when investing in riskier markets. Companies with less transparency of their emissions can get involved in environmental scandals, which reduces the profitability of investors; ii) the annual profits variable is recurrent in previous studies on carbon disclosure (Gallego-Álvarez et al., 2014; Grauel & Gotthardt, 2016; Luo, 2019). We do not adopt a control variable for the industry sector. The energy sector represents a small percentage of our sample, just 64 companies. In addition, we analyzed the world's largest companies listed in Forbes (2020), which means that they have similar pressures for carbon disclosure.

3.3 Model and statistical Analysis

In order to verify the hypotheses developed in this study, the following model has been prepared:

$$CARDIS_i = \beta_0 + \beta_1 DEMOC_i + \beta_2 CORRU_i + \beta_3 LIBER_i + \beta_4 RATIN_i + \beta_5 PROFITS_i + \theta_i$$

Where the subscript "*i*" represents the firm, "*ß*" refers to the estimated parameter, "*CARDIS*" is the dependent variable, "*DEMOC", "CORRU", "LIBER*" are the independent variables, "*RATIN*" and "*PROFITS*" are the control variables and finally "*ϑ*" is an error term in the within-part of the equation. For estimation, we use the STATA® software, version 13.

We performed the descriptive analysis of the data, operationalized the bivariate analysis, and presenting the correlation matrix between the disclosure of carbon and the explanatory variables. We performed four tests on our hierarchical data regression: normality test, collinearity test and heteroscedasticity test - since high collinearity present in all variables and heteroscedasticity can affect the reliability of the econometric model (Miniaoui et al., 2019).

We operationalized these tests to validate our findings and increase confidence in the results, since to run econometric models, it is necessary to verify the normality of the sample, the collinearity between the variables and the heteroscedasticity. To avoid biasing the data, in addition to the main model, we operationalized additional regressions, removing US companies and financial companies.

4 RESULTS AND DISCUSSION
4.1 Descriptive Analysis

Table 4 shows the main statistics for all variables in our study. The *CARDIS* shows that, on average, a value of 50.92. This means that, on average, the companies in the sample reported 50.92% of the total 100%. This variable has a standard deviation of 42.02. Additionally, the minimum is 1 (there were companies that disclosed only the minimum information) and the maximum 100 (there were companies that disclosed the maximum information).

Table 4. Descriptive Analysis.

Variable	Nº. of observations	Mean	Std. Dev.	Min.	Max.
CARDIS	1328	50.92	42.02	1	100
DEMOC	1328	0.94	0.76	-0.83	1.90
CORRU	1328	0.70	0.48	0.01	15
LIBER	1328	0.82	0.31	0	1
RATIN	1328	16.26	2.47	7	20
PROFITS	1328	50.15	1214.15	-0.98	44256

Source: Developed by the authors (2022).

Regarding the independent variables, the *DEMOC* has, on average, a value of 0.76. The data show that the country with the weakest democracy has a value of -0.83 and the country with the strongest democracy has a value of 1.90. The *CORRU* (less corruption) has an average of 0.70, has a minimum of 0.01 and a maximum of 15. The *LIBER* has an average of 0.82, has a minimum of 0 and a maximum of 1. Regarding control variables, the data show that the *RATIN* has an average of

16.26 and *PROFITS* has an average of 50.15.

4.2 Bivariate Analysis

Table 5 provides the correlation matrix of the variables analyzed in our research. There is a direct linear correlation between carbon disclosure and the following variables: *DEMOC, CORRU, LIBER, RATIN*, significant at the 1% level. No correlation between the dependent variable and the other variables is higher than 0.8, that is, multicollinearity is not a problem in our analysis, according to Pucheta-Martínez and Gallego-Álvarez (2019).

Table 5. Correlation Matrix.

	CARDIS	DEMOC	CORRU	LIBER	RATIN	PROFITS
CARDIS	1.000					
DEMOC	0.397***	1.000				
CORRU	0.247***	0.493***	1.000			
LIBER	0.446***	0.854***	0.974***	1.000		
RATIN	0.085***	0.695***	0.459***	0.474***	1.000	
PROFITS	-0.029	0.001	0.811***	-0.023	0.001	1.000

*** $p<0.01$.
Source: Developed by the authors (2022).

The data show that the *DEMOC* has a positive and significant correlation with the variables: *CORRU, LIBER* and *RATIN*. The *CORRU* has a positive and significant correlation with the variables: *LIBER, RATIN* and *PROFITS*. The *LIBER* has a positive and significant correlation with the variable *RATIN*. The data demonstrate that our dependent variable does not have a high correlation with any other variable under analysis. The variable that presented the least significant correlation with the others was profits, reaffirming the importance of having financial control variables at the company level.

4.3 Multivariate Analysis and Discussion

We applied the Shapiro-Francia test to analyze the normality of the data, and we can accept the hypothesis that data is normally distributed. Table 6 presents the analysis of normality, collinearity and heteroscedasticity of the data, and the results of the Multivariate Analysis.

Table 6. Analysis of normality, collinearity, and heteroscedasticity and Multivariate Analysis Results.

Variable	W'	VIF	Breusch-Pagan test	Model 1 Coef.	Model 2 Coef.	Model 3 Coef.
CARDIS	0.88		chi2(1) = 13.28			
DEMOC	0.85	6.29	Prob>chi2 = 0.0003	18.92***	20.15***	20.47***
CORRU	0.30	0.33		88.58***	91.50***	98.04***
LIBER	0.89	1.76	White's test	-38.50***	-43.76***	-45.61***
RATIN	0.89	2.18	chi2(20) = 231.69	-4.98***	-5.24***	-5.82***
PROFITS	0.01	1.00	Prob>chi2 = 0.0000	0.40***	0.36***	0.34***
Obs.				1327	850	1035
Prob>F				0.0000	0.0000	0.0000
R²				0.3064	0.4262	0.3226
Adj R²				0.3038	0.4228	0.3193

*** $p<0.01$.

We operated the Variance Inflation Factors (VIF) to test the collinearity of the data (Fávero and Belfiore, 2017). According to Fávero et al. (2009) ,VIF values below 10 are acceptable. To test heteroscedasticity, we applied the Breusch-Pagan test and then the White's test to prove the first test. Since Prob> chi2 is less than 0.05, we can confirm that the data is homoscedastic.

To test the influence of independent and control variables on environmental disclosure, we have developed three models. In Model 1, we analyzed all the companies in the sample. Then, we did two additional tests to verify the results of Model 1. In Model 2, we excluded American companies from the sample, because the results could be biased by the large number of companies in that country. In Model 3, we exclude companies in the financial sector, as these companies may follow different regulations than other sectors.

The *DEMOC* provides a positive signal, according to our expectations, so the country's level of democracy has a positive influence on carbon disclosure. In other words, companies based in countries with stronger democracies are more committed to disclosing their carbon emissions. This assumption is supported by Bättig and Bernauer (2009), Grauel and Gotthardt (2017) and Povitkina (2018).

Given the openness present in countries with more solid democracies, citizens can inspect corporate actions and question them (Almeida & García-Sánchez, 2017). In this way, it is more likely that in economies with a higher level of democracy, stakeholders have an active voice to question corporate actions in relation to carbon disclosure. In contrast, in autocratic states, where competition between firms is less, the disclosure of carbon as a source of additional information to stakeholders is discouraged (Grauel & Gotthardt, 2017).

Additionally, in countries with a higher level of democracy, the independent media can bring more information to society about oil spills, high pollutant emissions, and other unethical practices committed by companies. As a result, customers and suppliers can reduce consumption at these companies, NGOs can push for greater environmental transparency, and the state can impose fines and sanctions on these firms. Therefore, democracy as a regulative pillar is a determining factor for firms to disclose more information about their carbon emissions.

Our second finding is that *CORRU* control has a positive influence on carbon disclosure, so countries with less corruption companies disclose more information about their carbon emissions. Our findings are in line with other studies (Baldini et al., 2018; Ioannou & Serafeim, 2012; Povitkina, 2018). As advocated by Institutional Theory, national institutions are the rules of the game. Thus, in countries with a high level of corruption, governments are less likely to create control mechanisms so that their firms are more transparent about carbon disclosure.

The quality of public administration, which develops environmental actions, shapes the environmental performance of companies. In countries with a higher level of corruption, companies can be discouraged from having more carbon disclosure for reasons like: i) corruption reduces the state's coercive power (Povitkina, 2018); ii) slow-growing economies are discouraged from developing technologies to mitigate the effect of carbon emissions and have less participation in international committees and meetings on climate change.

According to Walker et al. (2019), firms are mirrored in the national institutions of the countries in which they operate. Being transparent in its carbon emissions in countries with a high level of corruption can be a risk for the company since it can miss business opportunities.

The *LIBER* provides a negative sign, what´s show us that the level of civil liberties negatively influences carbon disclosure. Therefore, in countries with lesser civil liberties, companies behave more ethically, disclosing more information about their carbon emissions. This contradicts the work by Grauel and Gotthardt (2017), who support the thesis that civil society actors will have more reason to criticize the behavior of firms in relation to environmental pollution in countries with the

lowest environmental regulations, as is the case in countries with the lowest level of civil liberties.

One of the justifications for this finding is that even in countries with lesser civil liberties, companies create normative elements, such as codes, to encourage the dissemination of carbon among them. The disclosure of carbon can increase business transparency and attract new foreign investments, while also reducing the international view that the country has a low level of civil liberties. Furthermore, the sample of this study is composed of large companies. This means that these companies have operations in other markets and greater pressure from stakeholders for additional information, which includes carbon disclosure. The results could be similar in other contexts of corporate transparency, as larger companies tend to have greater transparency to reduce informational asymmetry between internal and external investors.

In environments with less civil liberties, there may be greater state interference in business decisions, imposing greater ethical commitment on the part of companies to carbon disclosure. As we analyze the year 2020, the civil liberties variable may have been affected by the Covid-19 pandemic, as that year, people had reduced their civil liberties and greater influence from government regulation on their behavior.

Concerning the control variables, the findings show that the better *RATIN* are more likely to have companies with less carbon disclosure. These findings allow us to infer that in environments with greater distrust regarding the payment of debts or obligations related to the interests of institutional investors, companies tend to disclose more information about their carbon emissions as a tool to legitimize their performance in the market. In addition to generating greater transparency and reducing information asymmetry for foreign investors, disclosure of carbon is additional information, which can reduce the costs of corporate bonds (Gong et al., 2018).

Moreover, *PROFITS* have a positive influence on carbon disclosure, what is in line with previous findings (Gallego-Álvarez et al., 2014; Grauel & Gotthardt, 2016; Luo, 2019; Pinheiro, Sampaio, et al., 2021). In fact, companies with higher financial performance can act on additional issues and have greater financial performance because they work in more than one country, which increases the number of stakeholders, which may require more information on carbon emissions. In Table 7, we provide a summary of the expected and obtained signs for each of the hypotheses.

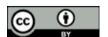**Table 7.** Expected and Obtained Signs.

Variable	Hypothesis	Expected signs	Obtained signs	Result
Democracy	H1	Positive	Positive	H1 confirmed
Corruption	H2	Positive	Positive	H2 confirmed
Civil Liberties	H3	Positive	Negative	H3 not confirmed

Source: Developed by the authors (2022).

5 CONCLUSION AND IMPLICATIONS

Under the theoretical lens of Institutional Theory, our article aimed to investigate how the level of democracy, corruption and civil liberties in the country affects carbon disclosure. To achieve this research objective, we use as a proxy to measure carbon disclosure, the responses of companies available from the Carbon Disclosure Project database. For the explanatory variables, we collected data from the Varieties of Democracy database.

The findings show that organizational behavior in relation to carbon disclosure is shaped by national characteristics, such as democracy, corruption, and civil liberties. Therefore, in countries where there is a higher level of democracy and greater control of corruption, companies are more engaged in carbon disclosure. In contrast, when based in countries with a higher level of civil liber-

ties, firms disclose less information about their carbon emissions.

Several academic contributions can be derived from our study: i) our evidence confirms the main thesis of Institutional Theory: the behavior of organizations is shaped by the institutional environment in which they operate; ii) our findings provide a solid understanding and bring new evidence of how the level of democracy, corruption and civil liberties affect carbon disclosure; iii) our study expands the discussion of the determinants of carbon disclosure, contemplating in a single study explanatory variables that were researched separately (Povitkina, 2018; Grauel and Gotthardt, 2017). Our study differs from the study by Povitkina (2018), as it analyzed carbon emission data from the country and not from companies. The analysis by Grauel and Gotthardt (2017) does not analyze carbon disclosure from the perspective of institutional pillars.
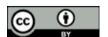
From a theoretical point of view, our findings may suggest that globalization may influence the effect of national differences on large companies. The results show that, although in countries with less civil liberties, companies are more engaged in carbon disclosure. The findings may indicate that companies can disclose their carbon information, even if people have less civil liberties.

Our study also has practical implications: i) managers should pay more attention to the institutional environment before installing their industries in new markets. In more developed markets, companies need to report their carbon emissions more transparently, because there is a more democratic environment, in which people demand greater accountability from firms; ii) managers of companies based in more democratic countries should invest more financial resources to publicize environmental practices, since in these environments there is greater pressure from national institutions and stakeholders to make firms more transparent; iii) Despite the importance of disclosing carbon to legitimize business activities, managers must commit to other environmental practices to mitigate the effects of climate change. Carbon disclosure alone is not enough for companies to fulfill their social role with the climate change agenda, since in many countries this carbon disclosure is neither audited nor mandatory.

Finally, our findings show that national institutions have a fundamental role in encouraging companies to increase the level of environmental disclosure: i) policy makers can incorporate protection mechanisms for stakeholders - and not just shareholders; ii) lawmakers can propose increased penalties and criminalized corrupt practices and illicit enrichment of public officials; iii) less power of voice for citizens and a higher level of corruption can reduce the effectiveness of national policies for sustainable development.

In future research, we encourage other studies to assess new variables to measure countries' political systems, as well as the proxy for carbon disclosure can be measured using a new metric. We recommend that new evidence add the credit rating variable to the econometric model, since this variable is not yet widely explored in studies on carbon disclosure. We also suggest that further studies go beyond the time constraint, as we did not compare carbon information before and during the Covid-19 pandemic. These differences can illuminate further discussions on carbon disclosure.

Therefore, we suggest the following research questions, which the present study did not answer: (i) How can the country's cultural characteristics affect carbon disclosure? (ii) What influence do different stakeholder groups have on carbon disclosure? (iii) What is the effect of the country's economic freedom on carbon disclosure? (iv) How does the country's level of corruption affect the carbon disclosure practices of companies based in emerging economies?

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1. Definition of research problem	√	√		
2. Development of hypotheses or research questions (empirical studies)	√		√	√
3. Development of theoretical propositions (theoretical work)	√	√		
4. Theoretical foundation / Literature review	√	√		
5. Definition of methodological procedures	√		√	
6. Data collection		√	√	√
7. Statistical analysis	√	√		
8. Analysis and interpretation of data	√		√	√
9. Critical revision of the manuscript	√			
10. Manuscript writing	√	√		
11. Other (please specify)				

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