

FUNDAÇÃO GETULIO VARGAS
ESCOLA DE ADMINISTRAÇÃO DE EMPRESAS DE SÃO PAULO

MELISSA VELASCO SCHLEICH

**Do ESG Metrics Impact
Financial Performance in Brazil?**

SÃO PAULO - SP

2021

MELISSA VELASCO SCHLEICH

**Do ESG Metrics Impact
Financial Performance in Brazil?**

Dissertação apresentada à Escola de Administração de Empresas de São Paulo, da Fundação Getulio Vargas, como requisito para obtenção do título de Mestre Profissional em Gestão para Competitividade – Linha Finanças e Controladoria.

Linha de Pesquisa: Finanças e Controladoria

Orientadora: Profa. Dra. Claudia Emiko Yoshinaga
FGV-EAESP

SÃO PAULO - SP

2021

Schleich, Melissa Velasco.

Do ESG metrics impact financial performance in Brazil? / Melissa Velasco Schleich. - 2021.

63 f.

Orientador: Claudia Emiko Yoshinaga.

Dissertação (mestrado profissional MPGC) – Fundação Getulio Vargas, Escola de Administração de Empresas de São Paulo.

1. Empresas - Finanças. 2. Empresas - Avaliação. 3. Empresas - Aspectos ambientais. 4. Governança corporativa. 5. Responsabilidade social da empresa. I. Yoshinaga, Claudia Emiko. II. Dissertação (mestrado profissional MPGC) – Escola de Administração de Empresas de São Paulo. III. Fundação Getulio Vargas. IV. Título.

CDU 658.15

MELISSA VELASCO SCHLEICH

**Do ESG Metrics Impact
Financial Performance in Brazil?**

Dissertação apresentada à Escola de
Administração de Empresas de São Paulo, da
Fundação Getulio Vargas, como requisito
para obtenção do título de Mestre
Profissional em Gestão para Competitividade
– Linha Finanças e Controladoria.

Linha de Pesquisa: Finanças e
Controladoria

Data de avaliação: 25 de Maio de 2021

Banca examinadora:

Profa. Dra. Claudia Emiko Yoshinaga
FGV-EAESP

Profa. Dra. Annelise Vendramini
FGV-EAESP

Prof. Dr. Jéfferson Colombo
FGV-EESP

...

Acknowledgment

I would like to express my deep gratitude to Professor Edilene Santos and Professor Claudia Yoshinaga, my supervisors, for their guidance, encouragement and useful critiques in the last two years, which have driven me to choose certain paths – not only in this research work, but also in my career.

My grateful thanks are also extended to Mr. Cesar Fukushima, for the discussions on the methodological analysis and constructive suggestions, and to Mr. Kieran McManus, for his valuable support on this project, during the planning and development of this research work.

Finally, I would also like to extend my thanks to all my teachers, colleagues and friends, whose willingness to give their time so generously and contribute to my learning process has been very much appreciated.

Resumo

Embora conceitos de sustentabilidade tenham surgido em meados da década de 1990 e o termo ESG¹ – designação para ambiental, social e governança - tenha sido cunhado em 2004, o conceito realmente ganhou força apenas nos últimos anos. Empresas em todo o mundo têm adotado práticas ESG, seguindo uma demanda insurgente de *stakeholders* e investidores institucionais - apesar da falta de obrigatoriedade, ou mesmo de métricas consolidadas ou convergentes. Dada a crescente relevância do assunto no mercado de capitais, esta pesquisa teve como objetivo investigar, com base em um *score* de ESG selecionado, se as práticas e reporte de âmbito do ESG poderiam afetar os resultados de companhias negociadas em bolsa de valores no Brasil. Para tanto, coletamos ESG *scores* (do sistema Refinitiv ESG) de 106 companhias no Brasil, negociadas na bolsa brasileira. Em seguida, utilizamos as métricas ESG disponíveis, por meio de uma série temporal transversal (*em painéis*) de 2015 a 2019, tendo Tobin's Q e ROA como variáveis dependentes. Em termos de desempenho de mercado (relacionado a Tobin's Q), observamos que as práticas de ESG afetaram negativamente o Tobin's Q em cerca de 16%, ao passo que a reputação das empresas (auferida por meio de indicador de controvérsias) correspondeu a um impacto positivo nos resultados da ordem de 25%. Em relação às dimensões E, S e G, separadamente, todas as dimensões indicaram impacto negativo, com a dimensão S apresentando o maior coeficiente, oriundo principalmente dos efeitos inversos advindos de práticas relacionadas à força de trabalho e a comunidades. Em termos de performance contábil (mensurada por meio de ROA), os coeficientes obtidos ficaram muito próximos de zero, indicando, em geral, pouco ou nenhum impacto de métricas ESG.

Palavras-Chave

ESG, Métricas de ESG, ESG *Score*, Impacto de ESG; Retorno de ESG

¹ Nota de Tradução: alguns autores utilizam ASG, em referência aos termos em Português: Ambiental, Social e Governança.

Abstract

Although sustainability concepts have emerged in mid-1990s and the ESG term – for environment, social and governance – was coined in 2004, only in the last few years have this concept actually gained traction. Companies worldwide have been adopting ESG practices, following an insurgent demand from stakeholders and institutional investors - despite the lack of mandatory, consolidated or even convergent reporting metrics. Given the subject's increasing relevance in capital markets, the current research aimed to investigate whether ESG practices and reporting could affect publicly traded companies results in Brazil. For this purpose, we have collected ESG scores (from Refinitive ESG system) from 106 companies in Brazil traded in the Brazilian stock exchange. We have then used the available ESG metrics through a cross-sectional time-series (panel) from 2015 to 2019, having Tobin's Q and ROA as dependent variables. In terms of market performance (related to Tobin's Q), we have observed that ESG practices negatively affected securities in around 16%, whereas companies' reputation (measured through a controversies indicator) could respond for a positive impact on results in the magnitude of 25%. When looking at E, S and G separately, all dimensions indicated a negative impact, with S presenting a higher negative coefficient (of around 11%), mostly due to an inverse effect driven by practices related to workforce and communities. In terms of accounting performance (measured through ROA), all coefficients were very close to null, generally indicating little or no impact from ESG metrics.

Keywords

ESG, ESG Metrics, ESG Score, ESG Impact, ESG return

List of Abbreviations and Acronyms

AUM – Assets under Management

B3 – *Brasil, Bolsa, Balcão* (the Brazilian stock exchange)

CDP – Carbon Disclosure Project

CDSP - Climate Disclosure Standards Board

CEO – Chief Executive Officer

CSR - Corporate Social Responsibility

DJSI – Dow Jones Sustainability Index

Eq. - Equation

ESG – Environmental, Social and Governance

ESI - Ethibel Sustainability Indices

EY - Ernst & Young Global Limited

FE – Fixed Effects

GRI - Global Reporting Initiative

GVces - Centro de Estudos em Sustentabilidade

IBOV – Índice Bovespa

ICO2 - *Índice de Carbono Eficiente*

IFRS Foundation - International Financial Reporting Standards Foundation

IIRC - International Integrated Reporting Council

ISE – Índice de Sustentabilidade Empresarial

ISS - Institutional Shareholder Services

MSCI - Morgan Stanley Capital International

OECD - The Organization for Economic Co-operation and Development

PwC - PricewaterhouseCoopers

ROA – Return on Assets

ROE – Return on Equity

ROIC – Return on Invested Capital

SRI - Socially Responsible Index

SSGA - State Street Global Advisors

SASB - Sustainability Accounting Standards Board

SDGs – Sustainable Development Goals

SEC - Securities Exchange Commission

TBL – Triple Bottom Line

TQ – Tobin's Q

Table of Contents

1. INTRODUCTION	11
2. THEORETICAL FRAMEWORK.....	15
2.1. Current Relevance of Sustainability (ESG) Reporting Worldwide	15
2.1.1. ESG Materiality Concept	17
2.2. Most Common ESG Metrics: Return and Risk.....	17
2.3. Most Common ESG Guidelines.....	19
2.4. The ESG Challenge.....	21
2.5. ESG Indices	23
2.5.1. Índice de Sustentabilidade Empresarial (“ISE”)	23
2.5.2. S&P /B3 Brazil ESG Index	25
2.5.3. Índice Carbono Eficiente - ICO2 (B3)	26
2.6. ESG News and Stock Markets Reaction.....	27
2.7. Corporate Governance (“G”) and Performance Approaches	27
2.8. ESG Parameters and Performance Approaches	28
3. DATA AND METHODOLOGY	31
3.1. Selected Dependent Variables	31
3.2. ESG Measurement	31
3.3. Securities Sample.....	36
3.4. Descriptive Statistics and Correlations	36
3.5. Estimation Approach	36
3.5.1. Fixed Effects (“FE”) Estimator Model	37
3.6. Timeframe, Framework and Scope Limitations	39
4. EMPIRICAL RESULTS.....	40
4.1. Sample Profile.....	40
4.2. Descriptive Statistics.....	41
4.3. Analysis of Person’s Correlation	43
4.4. Estimation Results	44
5. DISCUSSION.....	48
6. CONCLUSION	50
7. REFERENCES	52
APPENDIX	59
ATTACHMENTS.....	61

1. INTRODUCTION

Sustainability is generally defined as the ability to reach development that meets the needs of the present, while assuring that next generations will also be able to meet their own needs in the future (ARMSTRONG, 2020).

Discussions on sustainability aspects are almost 70 years old. The subject has reached increased interest in the mid-20th century, driven mostly by a global awareness of climate changes and biodiversity threats enhanced by the greenhouse effects, forests clearing, fossil fuels burning and the endangered species list rising, amongst other environmental catastrophes (RUSU, 2020; ARMSTRONG, 2020).

By mid-1990s, John Elkington coined the term “Triple Bottom Line” (“TBL”), challenging business leaders to rethink capitalism by proposing a systemic disruption, based on the concept that organizations should track and manage economic – and not just financial – performance, which would include social and environmental value added (ELKINGTON, 2018).

Based on the TBL concept, a new encompassing framework was created to measure performance beyond the traditional accounting standards of return on investment and shareholder financial value. Environmental and social dimensions were brought together with accounting and financial return metrics, connecting the three dimensions of profits, people and planet. Interest in the TBL methodology has grown until the first decade of the 21st century, across both for-profit, nonprofit and government sectors (SLAPER & HALL, 2011).

In January 2004, the United Nations Secretary General Kofi Annan wrote to 55 Chief Executive Officers (“CEOs”) from the world’s leading financial institutions, inviting them to join an initiative aiming at building more strong and resilient financial markets through sustainable development. Such letter encompassed a landmark report written by Ivo Knoepfel, which coined the term “ESG” – for Environmental, Social and Governance aspects (THE GLOBAL COMPACT, 2004).

Since then, addressing environmental, social and governance matters has gradually become a critical component of business strategy. Although the ESG concept is generally more related to financial markets and investors, stakeholder engagement is usually crucial to enhance

companies environmental policies, as well as global sustainable development (LOKUWADUGE; HEENETIGALA, 2016).

Especially in the last few years, stakeholders and institutional investors have been demanding more sustainable investment options within the financial markets. This growth has been pressuring companies to adopt ESG practices and reporting, as well as investment professionals to run portfolios meeting clients' financial and non-financial goals (BERTOLOTTI, 2020).

In this regard, the term ESG has become fundamentally a financial market concept (ARMSTRONG, 2020). ESG products integration into portfolios is now a relevant share of the investing industry (BERTOLOTTI, 2020). Currently, the estimated amount of assets under management ("AUM") at funds enhancing ESG practices is over USD 40 trillion – from around USD 30 trillion in 2018 and USD 22 trillion in 2016 (FOUBERT, 2020).

Although there are discussions whether ESG metrics and commitment would be a fad, the Coronavirus pandemic, as of 2020, seems to have actually strengthened investors' conviction and demand for sustainable products, as ESG funds had a record of resources inflow in the first quarter of 2020 in the United States, compared to significant outflows from non-ESG segments (CME GROUP, 2020).

Currently, more than 85% of the S&P 500 participants in the United States and more than 90% of the largest global firms produce sustainability reports with some sort of ESG information disclosure; many organizations also voluntarily include sustainability or other ESG items in their annual reports. (HO, PARK, 2019).

However, higher contingents of voluntary reporting have not solved - and could actually jeopardize ESG information comparability (HO, PARK, 2019). Most of ESG aspects are stated by the companies themselves and organized by private consulting firms, who sell indices and scores to portfolio managers and institutional investors. While the process may seem alike a credit rating sort, it actually differs as ESG data providers and data users can add or use their own views, metrics, opinions, scores, highlights and weights as value-added components - which might create different views for the same company or portfolio. A new challenge has thus been created: as portfolio managers and institutional investors integrate ESG characteristics into their respective strategies and evaluations, they actually add new

components of risk and uncertainty to the traditional framework analysis (BERTOLOTTI, 2020).

An increasing set of ESG academic research can be found for developed economies. In this regard, Mervelskemper and Streit (2017) have concluded that ESG practices seem to indeed generate stronger value to adopting firms. Additionally, Lopez-de-Silanes, McCahery and Pudschedl (2020) have analyzed firms from the United States, as well as United Kingdom, Japan, Switzerland, Australia and France, generally suggesting that a better disclose of ESG information is correlated to decreased risk perception. Broadstock et al. (2020) have examined the role of ESG performance on Chinese companies during the financial crisis triggered by the COVID-19 global pandemic, showing that portfolios with higher ESG standards tend to outperform portfolios with lower ESG standards; and that ESG performance mitigates financial risks during a financial crisis.

There is still a lack of studies regarding actual ESG practices and their respective impacts on companies from emerging economies. In India, for instance, Dalal and Thaker (2019) have indicated that ESG practices enhance financial performance evaluated both through market-based and accounting-based measures.

In Brazil, fewer studies have investigated ESG concepts using statistical treatment, being most of them related to either corporate governance practices only (“G”), or to the *Índice de Sustentabilidade Empresarial* (ISE) index.

Still, some studies have demonstrated that the importance of ESG studying in the Brazilian markets, including the facts that: (i) sensitive Brazilian industries may be positively affected by social and corporate governance practices (MIRALLES-QUIRÓS; MIRALLES-QUIRÓS; GONÇALVES, 2018); (ii) ESG investment strategies in Brazil may result in better risk-adjusted long-term returns (JUKEMURA, 2019); and (iii) ESG may have a moderating effect on financial performance when considering geographic international diversification and financial performance (DUQUE-GRISALES; AGUILERA-CARACUEL, 2019).

This study aims to investigate, based on a selected ESG score, if ESG metrics could affect on the performance of Brazilian securities and companies’s results. Our goal is to contribute to previous research on the Brazilian financial markets regarding ESG, by deepening our analysis and testing whether indicators within each of the three dimensions (E, S and G) could have significant impact on the performance of Brazilian securities and companies’s results.

For this purpose, we have analyzed 106 publicly traded companies whose data was available in the *Refinitiv ESG Score* system, in order to observe which dimensions of ESG could be responsible for impacting performance. With this study, we hope to be able to contribute to previous research on the connection of ESG metrics and financial performance.

This contribution could be an important tool for: (i) companies and professionals interested in sustainability and ESG metrics, so that they have a better view on the impact of such metrics on organizations, which may help them to expand their respective policies, practices and reporting; (ii) financial analysts, portfolio managers and individual investors, who may include specific metrics in their respective assessments, valuation models and investment selections; in addition to (iii) government policy makers and regulators related to ESG disclosures, who could have additional information to consider the feasibility of future reporting standards and obligations; and, finally, (iv) our society as a whole, which benefits from ESG practices.

In the Introduction section, we have presented a brief historical overview of ESG concept and status, highlighting its importance and main implications to capital markets.

In section 2, we present a theoretical framework based on recent academic research, related to: (i) the ESG theme and its implications to financial markets worldwide; (ii) most common ESG metrics and guidelines; (iii) main Brazilian ESG indices; and (iv) comparative international and domestic studies concerning Corporate Governance and ESG impacts on firms financial performance.

Section 3 depicts the quantitative methodology used for the present study, including: (i) the description of selected variables and ESG indicators; (ii) descriptive statistics; (iii) proposed estimators; and (iv) limitation of time, framework and scope.

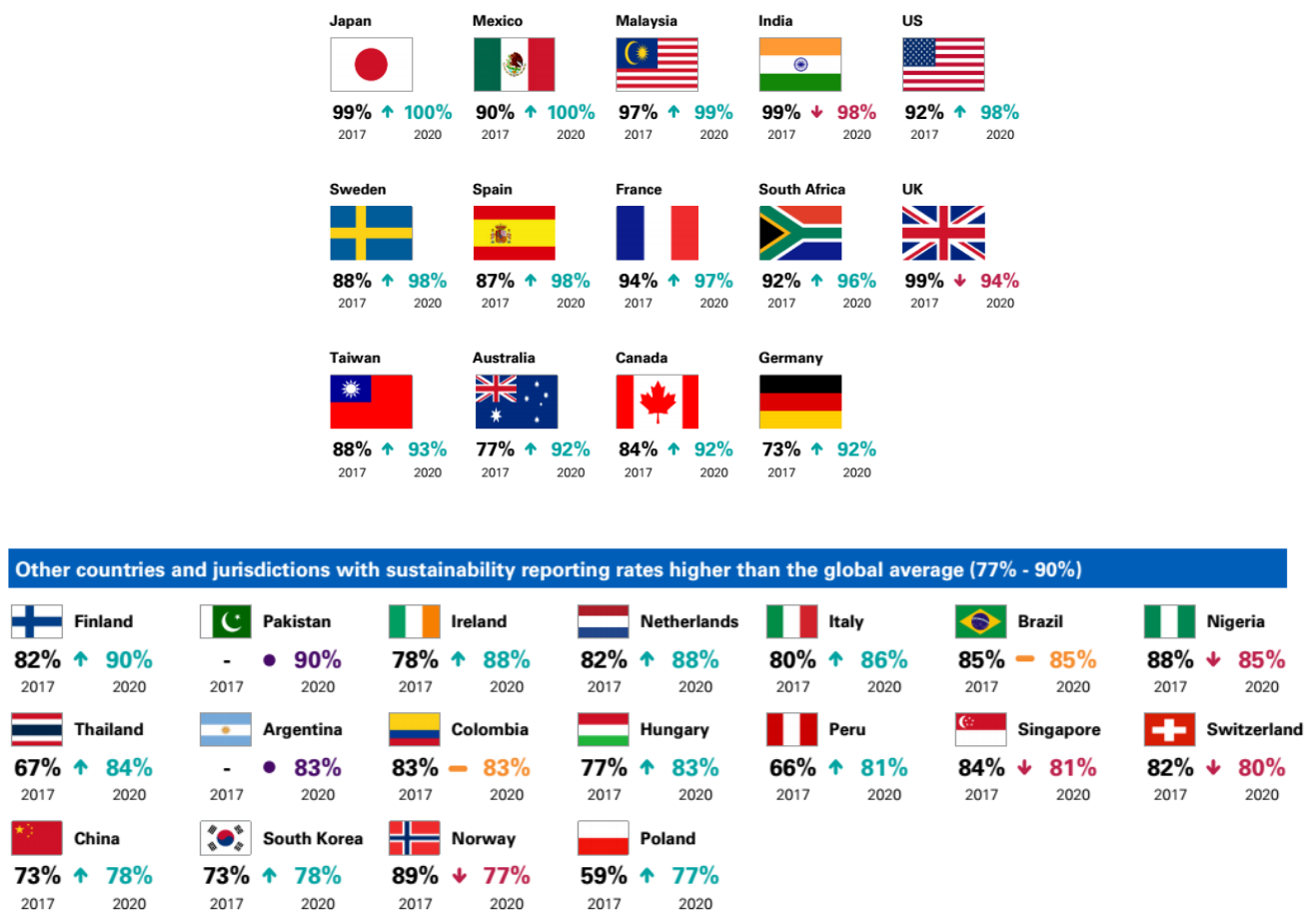
On section 4, we detail the results achieved by the proposed methodology. Such results and their respective implications are discussed and explored in sections 5 and 6, respectively.

2. THEORETICAL FRAMEWORK

2.1. Current Relevance of Sustainability (ESG) Reporting Worldwide

Sustainability reporting corresponds to the practice of measuring, disclosing and being accountable for sustainable development both internally and externally (HEENETIGALA et al, 2016). According to Jebe (2019), “Sustainability reporting can be seen as an attempt to bring improved environmental, social, and governance (ESG) practices to mainstream business”.

According to a survey from KPMG (2020), which involved 5,200 companies in 52 countries (“N100”), the average of sustainability reporting in 2020 was 77% globally, with 14 countries rating more than 90%. Brazil appeared in the second tier, with 85% - thus higher than the reporting average (Figure 1).



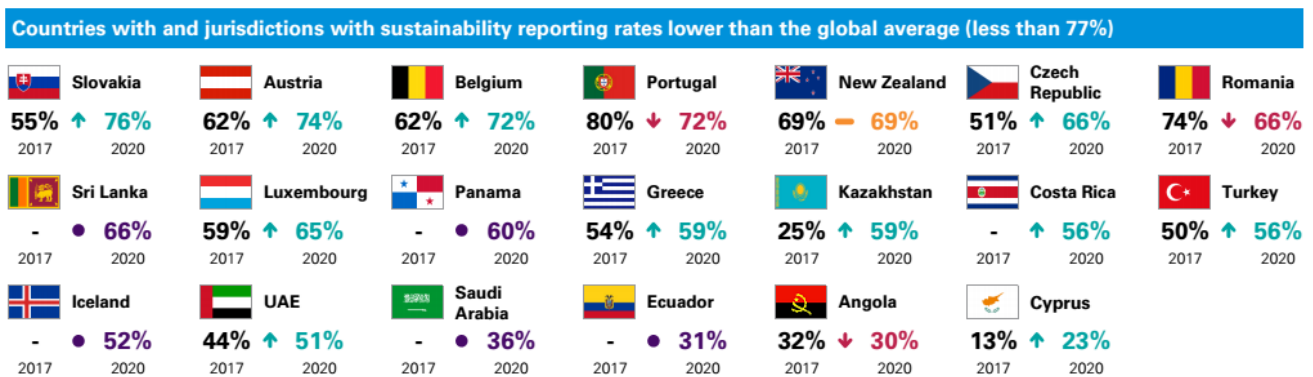


Figure 1 – National rates of sustainability reporting by country, considering N100 companies (top tier above 90%, second tier from 77% to 90% and third tier below 77%), in 2020 and 2017.

Source: KPMG (2020)

Additionally, considering aggregated data, almost all sectors (from a total of 15) in the survey (KPMG, 2020) presented more than 70% of sustainability reporting, with the exception of retail, with 67% (Figure 2). Industries usually linked to environmental aspects, such as mining, automotive, oil and gas, and chemicals, all presented more than 80% of sustainability reporting.

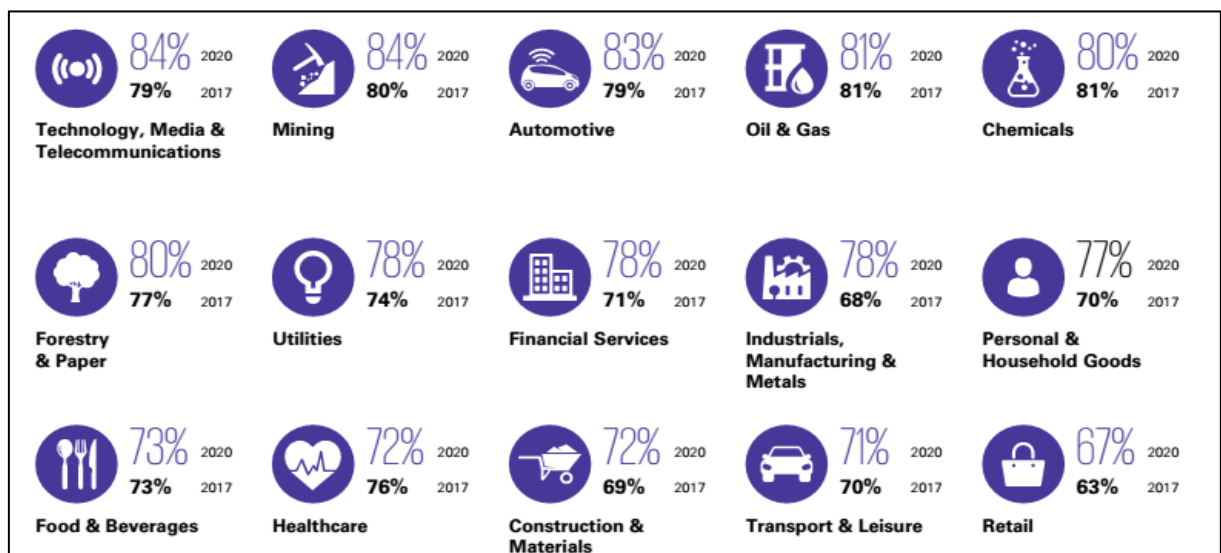


Figure 2 – Percentage of sustainability reporting by sector, considering N100 companies in 52 countries, in 2020 and 2017.

Source: KPMG (2020)

2.1.1. ESG Materiality Concept

Both financial and ESG information reporting use the concept of materiality to format companies' disclosure obligations. However, the term may carry different meanings depending not only on the underlying information, but also on the organization itself (JEBE, 2019).

In the absence of defined rules from the regulators regarding ESG, different classifications of materiality have been adopted in order to design and improve ESG strategies, policies, information disclosure and performance. One of the most debated in the academic literature is the materiality framework provided by the Sustainability Accounting Standards Board ("SASB") (CONSOLANDI; ECCLES; GABBI, 2020).

Many international studies have emphasized that, despite the differences in materiality aspects from financial to ESG information, disclosing material ESG information seems to increase firms equity premium (CONSOLANDI; ECCLES; GABBI, 2020) and stock price (SCHIEHLL; KOLAHGAR, 2020; MADISON; SCHIEHLL, 2021).

2.2. Most Common ESG Metrics: Return and Risk

Most common ESG metrics used for sustainability reporting and ESG generally consist of indicators of companies' ability to either generate long-term value or avoid long-term risks² (Figure 1). There is no consensus on the exact list of subjects that should be reported and their respective materiality, although the major concern focuses on any ESG aspects that could affect value creation. Such topics are increasingly part of intangible assets – even though most of them are not reflected in traditional financial statements (MATOS, 2020).

In general terms, the environmental ("E") dimension aims to quantify a company's impact on the ecosystem, encompassing aspects such as greenhouse gases emissions, the efficient use of natural resources such as power and water; pollution and waste; as well as innovation efforts - mostly regarding product design and cycle.

² Quantitative models in the academic literature generally state risk performance as either: (i) lower volatility (KUMAR et al., 2016); (ii) through systematic risk profile (including metrics such as lower costs of capital); or (iii) through idiosyncratic risk profile (including lower exposures to tail risk) (GIESE et al., 2019).

The social (“S”) dimension covers a company’s relations with its workforce, customers, and society in general. It includes efforts towards workers, such as health and safety, training, development and diversity; satisfying clients and customers (e.g. product quality and safety); as well as including and helping communities where it operates.

The corporate governance (“G”) dimension considers a company’s management system and its ability to act in favor of shareholders, including shareholder rights; board composition, independence, experience and diversity; executive compensation policies; and avoiding illegal practices, such as fraud and bribery (MATOS, 2020).

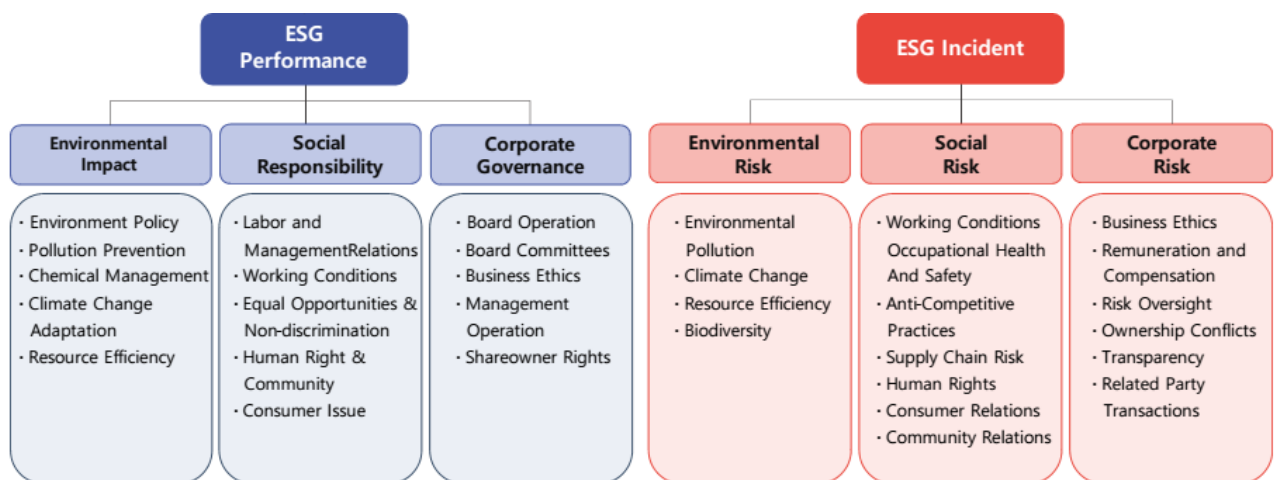


Figure 3 – Most common ESG metrics regarding long-term performance and risk.

Source: Who’s Good (2020)

Considering a framework of 17 Sustainable Development Goals (“SDGs”) set by the United Nations in 2015³, PwC’s survey (2019) has identified the top-ten reporting goals within 1,141 companies in 31 countries (Figure 3).

In this regard, most common goals generally focused on business needs and going-concern patterns. The most prioritized goals referred to: (i) S: promoting sustainable economic growth, with safe and secure working environment for all workers (including gender equality); (ii) E: waste reduction and responsible use of natural resources, including clean and renewable energy; and (iii) E: climate action. From the 17 SDGs list, according to the survey, the least ones mentioned in 2019 were zero hunger (with 25%), life below water (26%) and life on land (37%), indicating that, among the huge ESG concerns list, biodiversity may not be the most prioritized one.

³ Available at: < <https://sdgs.un.org/goals>>, access on Jan.23, 2021.



Figure 4 – Top-ten United Nations Sustainable Development Goals (SDGs)'s goals, considering 1,141 companies in 31 countries.

Source: PwC (2019)

2.3. Most Common ESG Guidelines

Initially, many companies have designed their sustainability standards and goals based on frameworks for sustainability management, such as ISO 26000 CSR guidelines, OECD Guidelines for Multinational Enterprises (“OECD Guidelines”) and the United Nations Guiding Principles on Business and Human Rights (“Guiding Principles”), among other possibilities (HO & PARK, 2019), such as Corporate Social Responsibility (“CSR”)⁴.

⁴ Although there is no clear definition of CSR and the concept may vary from one author to another, it is generally related to voluntary actions, self-governed or self-regulated commitments, through which a company agrees to conduct its operations in accordance with certain environmental, social and economic sustainability principles (LANTOS, 2001). Such programs would primarily aim at positive impact on the social and environmental systems in which a company operates, rather than directly generating profits or improving performance (RANGAN, 2015). Stakeholders and scholars have looked at CSR with skepticism and mistrust for more than a decade, due to lack of reporting and lack of credibility, standardization and understandability in reporting (LOCK & SEELE, 2016).

In the last two decades, however, many private regulators have introduced ESG frameworks. Only a few of these frameworks - such as the Sustainability Accounting Standards Board (“SASB”)’s sector-specific indicators, the International Integrated Reporting Council (“IIRC”)’s integrated reporting framework, the Climate Disclosure Project (“CDP”)’s environmental reporting standards, and the Global Reporting Initiative (“GRI”) - have been designed to actually turn the ESG set into a reporting framework based on materiality concepts (HO & PARK, 2019).

In terms of ESG comparable guidelines, the most prominent one would be from the Global Reporting Initiative (“GRI”) (HO & PARK, 2019). GRI is an international independent organization focused on business impacts related to critical issues such as climate change, human rights and corruption, among others (ARMSTRONG, 2020). It has been used by around 80% of large corporations - although it seems not to satisfy investors’ ESG main concerns and demands (RISSMAN & KEARNEY, 2019).

Still according to Ho and Park (2019), in order to complement public information, more than 100 consulting firms currently send periodic ESG questionnaires to companies worldwide in order to create comparable ESG data, proprietary research and ratings. These reporting frameworks are mostly generated for private use-end and may vary widely in terms of methodology, industry, geography, scope and content, depending on the ultimate research client. Such uncoordinated private approach might be more costly for both companies and investors than public filing.

Among the sundry ESG third-party data providers, the most well-known would be Bloomberg ESG Data Service, Corporate Knights Global 100, Institutional Shareholder Services (“ISS”), MSCI ESG Research, RepRisk, Sustainalytics Company ESG Reports and Thomson Reuters ESG Research Data. Furthermore, relevant asset managers worldwide have developed proprietary ESG-based Exchange Traded Funds (“ETFs”), such as BlackRock, The Vanguard Group, State Street Global Advisors (“SSGA”), BNY Mellon Investment Management, PIMCO, Fidelity Investments, J.P. Morgan Asset Management, Wellington Management Group LLP, and Prudential Financial (HUBER & COMSTOCK, 2017). In this regard, Armstrong (2020) states that there are more than 1500 indices that could be used to measure different aspects of sustainability.

2.4. The ESG Challenge

As indicated in the previous sections, actual programs and available information related to ESG practices may vary greatly, given the fact that disclosure is mostly voluntary worldwide and applicability may vary depending on the portfolio intent.

In the United States of America, for instance, where ESG practices are currently very much demanded by investors and stakeholders, ESG has not been considered as a mandatory disclosure by the Supreme Court, as the Securities Exchange Commission (“SEC”) has presumed environmental, social, and governance information as largely immaterial. Aiming to shield investors, current disclosure rules state that companies are free to overlook any social and/or environmental issues that might overcome or in which they might feel responsible to interfere. Given the costs of accurate and complete disclosure, however, firms are most frequently discouraged from such practices (RISSMAN & KEARNEY, 2019).

Companies generally do not disclose information that could be looked upon unfavorably by stakeholders. However, the dynamic nature of the asset management industry has been providing the transformation of fiduciary market practices into effective regulation (RISSMAN & KEARNEY, 2019).

There are two specific areas where ESG data presents unique challenges: one is company coverage and the other is data quality. *Company coverage* refers to the fact that, while every listed company issues financial statements within a certain schedule, sustainability disclosures are not regulated, as previously mentioned - which creates comparability gaps in terms of availability and timing of reporting. Moreover, financial statements are disclosed within certain existing frameworks – which is not the case for ESG aspects. As so, *quality* of ESG data receives sharp criticism due to the lack of consistency and verification. Lately, this topic has been subject of several academic and market debates (HEENETIGALA et al, 2016; BERTOLOTTI, 2020).

In this regard, and in response to such gap, sundry private standard setters, auditors, investors and firms, together with international organizations and worldwide regulators, have been working to address a new ESG framework, subject to deeper accessibility, reliability, and, especially, comparability of material ESG information among players (HO, PARK, 2019). Among investors that have assisted in formulating the standards are significant groups of

advisers, including six of the ten globally largest asset managers. (RISSMAN & KEARNEY, 2019).

In 2019, the Corporate Reporting Dialogue, a platform that brings together major financial and ESG standard setters, has opened a consultation survey, followed by a series of discussions, aiming to align the main frameworks in sustainability reporting and to foment integration between ESG and financial aspects. Such efforts have culminated in a climate-related report that defined seven principles, with 11 recommended sets and 50 illustrative examples (CORPORATE REPORTING DIALOGUE, 2019). At the same time, sundry discussions were conducted in the European Union, aiming at harmonizing European reporting requirements to ESG practices (KPMG, 2020).

In September of 2020, The World Economic Forum has released a report on suggested common metrics for sustainable value creation, defining a set of critical 21 metrics and disclosures, together with other 34 additional expanded metrics, all settled in four different dimensions: Principles of Governance, Planet, People and Prosperity. Such report was disclosed after a six-month open consultation period and a discussion involving the 120 world's largest companies, which gathered together at the Annual Meeting in Davos, as an attempt to standardize and consolidate ESG metrics as globally comparable and auditable information. Such initiative was supported by the so-called "Big-Four" audit companies - Deloitte Touche Tohmatsu Limited ("Deloitte"), Ernst & Young Global Limited ("EY"), KPMG and PricewaterhouseCoopers ("PwC"), – which collaborated to identify and prepare a set of universal and material ESG metrics that could be disclosed on a consistent basis across industries, sectors and countries, being also capable of verification and assurance, as to enhance transparency, reliability and comparability (WORLD ECONOMIC FORUM, 2020).

Simultaneously, The five major ESG reporting organizations – GRI, SASB, IIRC, CDP and the Climate Disclosure Standards Board ("CDSB") - have published a Statement of Intent, committing to work together towards comprehensive corporate reporting (CDP et al., 2020).

Also, the International Financial Reporting Standards Foundation ("IFRS Foundation") has increasingly been requested to lead a global action in ESG reporting standards. In the second half of 2020, it has issued a consultation set to gather market players view on sustainability reporting and on factors affecting companies' long term cycle. The Exposure Draft from the consultation will be announced in 2021 (KPMG, 2020).

It is still early to state whether such discussions and frameworks will act as a final solution for ESG current challenges – although this might be an interesting development for academic researchers in the near term.

2.5. ESG Indices

As mentioned in items 2.1 and 2.2, there are several methodologies for evaluating companies ESG performance. An approach that enables investors and stakeholders to decision-making processes by turning different ESG aspects comparable within a range of companies is the advent of sustainability and ESG indices on the stock exchange (ORSATO et al., 2015).

Sundry global indices have been designed to measure and report sustainability performance (HEENETIGALA et al, 2016). Sustainability indices aim to guide capital and credit markets, providing investors with theoretical portfolios of companies committed to certain ESG practices and supporting investment analysis, asset allocation, index tracking and structured portfolios composition. Simultaneously, ESG indices highlight companies that consider social and environmental risks in their strategic management (SOBROSA NETO et al., 2020).

Created in 1999, DJSI (nowadays, S&P DJI ESG) is the worldwide most recognized sustainability index and is considered to have been the first one in its category. FTSE4Good was created 2 years later, in 2001, by the London Stock Exchange (SOBROSA NETO et al., 2020). Besides those two indexes, main worldwide ESG indexes would be Domini 400 Social Index, Ethibel Sustainability Indices (“ESI”), Socially Responsible Index (“SRI”), Calvert Social Index and KLD Indices (ORSATO et al., 2015).

2.5.1. Índice de Sustentabilidade Empresarial⁵ (“ISE”)

In the Brazilian market, the Corporate Sustainability Index (ISE) was created in 2005 by São Paulo Stock Exchange – currently, B3 (*Brasil, Bolsa, Balcão*), with a similar purpose of other indices: identifying sustainable companies traded at B3 (ORSATO et al., 2015).

⁵ Translation Note: *Índice de Sustentabilidade Empresarial* (Corporate Sustainability Index)

This index measures the total return of a theoretical portfolio composed by a maximum of 40 stocks, selected by their liquidity and intrinsic sustainability characteristics. The sustainability outlook is given by a questionnaire to be fulfilled by applicant companies. Based on the *triple bottom line* concept, said questionnaire was developed by Centro de Estudos em Sustentabilidade (GVces) of Escola de Administração de Empresas de São Paulo, Fundação Getulio Vargas (FGV EAESP), and covers seven different dimensions: environmental, economic-financial, general, corporate, social and governance, climate change and product nature. Regarding liquidity, in order to be eligible, a stock must be among the 200 stocks with the highest tradability index calculated for the twelve-month period prior to the beginning of the evaluation process and have been negotiated in at least 50% of the trading sessions. Each theoretical portfolio is chosen yearly and becomes effective on the first Monday of January each year (BM&F BOVESPA, 2015; BM&F BOVESPA, [20--]).

The theoretical composition of ISE securities from 2015 to 2020 is displayed at Appendix 1.

The fact that companies are not obliged to fulfil ISE's questionnaire and that sustainability practices and disclosure are voluntary might have some implications in terms of analysis, including potential information asymmetry among players, dissociation of the sundry analyzed dimensions and selection bias, among other potential biases (BROADSTOCK et al., 2018).



Figure 5 – Comparable performance between ISE and IBOV, considering closing quote from 2006 to Oct.2020 (basis 100).

Source: Economatica

In the midst of the growing interest of investors for companies that adopt ESG practices, B3 is currently working on revising ISE methodology - which celebrates its fifteenth anniversary. In 2021, the questionnaire sent to companies during the selection process will include a sectorial focus, aiming at simplifying the process and turn information into a more comparable and transparent guide to current markets demand (DURÃO, 2020).

2.5.2. S&P /B3 Brazil ESG Index

The S&P/B3 Brazil ESG Index (“S&P/B3 Brazil ESG”) was created on August 31, 2020. It was designed to measure the performance of Brazilian securities according to the criteria adopted by S&P DJI ESG Score. The index is score weighted and rebalanced every April 30th. Although it corresponds to a very recent release, its data was backtested, so that historical performance is available since 2014 (S&P DOW JONES, 2020(b)).

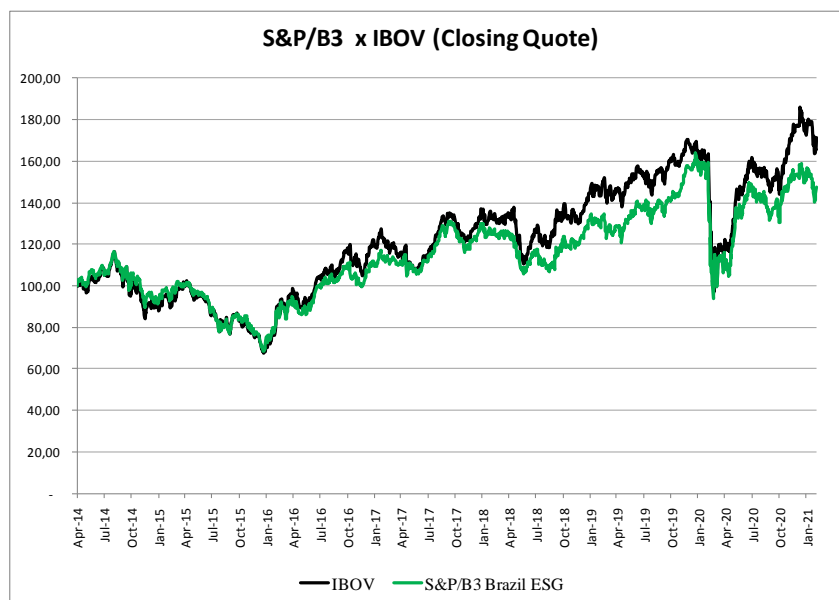


Figure 6 – Comparable performance between S&P/B3 Brazil ESG Index and IBOV, considering closing quote since the Index inception (Apr.14) to Jan.2021 (basis 100).

Source: Bloomberg /Economatica

The theoretical weight balance of S&P/B3 Brazil ESG Index participants is proprietary and only their names are publicly released (as displayed at Appendix 2).

2.5.3. Índice Carbono Eficiente - ICO2 (B3)

Índice de Carbono Eficiente (“ICO2”)⁶ was created in 2010 by São Paulo Stock Exchange – currently, B3 (*Brasil, Bolsa, Balcão*), with the purpose of initiating discussions towards climate change in Brazil. In order to participate from this index, companies must currently be part of the IBrX 100 Index (B3, [20--]).

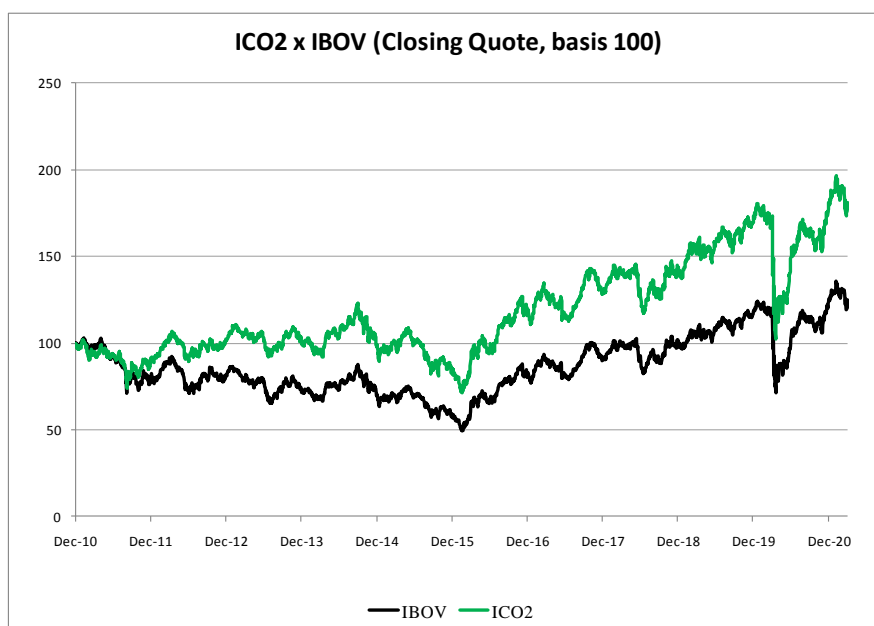


Figure 7 – Comparable performance between **ICO2** and **IBOV**, considering closing quote since the Index inception, from Dec/2010 to Oct.2020 (basis 100).

Source: Economatica

Few studies are available regarding ICO2 efficiency and performance of underlying assets and the ones available have reached the conclusion that joining the index neither improved climate metrics within participants (SOUZA et al., 2018), nor did it evidence better

⁶ Translation note: 2.3.2.Índice Carbono Eficiente (*Carbon Efficient Index*)

environmental practices, as 735 mentions of environmental court sentences were found for the 3-year timeframe and 41 underlying companies (DE LIMA, 2020).

Additionally, studies found no significant relationship between joining the ICO2 and improved participants performance in comparison to the market (SOUZA et al., 2019; HOPATA, RIBEIRO & GERIGK, 2020), although Souza et al. (2019) believe there is a trend that most participants correspond to lower market-risk companies.

2.6. ESG News and Stock Markets Reaction

Capelle-Blancard and Petit (2019) have analyzed positive and negative news regarding one hundred listed companies over the period from 2002 to 2010. The authors believe that firms releasing negative events might experience, on average, a drop in their market value of around 0.1%, whereas companies would not benefit from positive announcements.

Rusu (2020) has used a sequential experiment with sundry investors to investigate their judgement and decision-making process towards sustainability information in different presentation forms. The author also believes that integrating sustainability and responsible business behavior into the firm's strategy does not significantly influence investors' assessment or allocation of resources.

In Taiwan, however, Chen and Yang (2020) have observed that ESG news tend to generate momentum on financial markets, either through good or bad news, interfering in stocks performance in the short run – especially regarding the social dimension.

2.7. Corporate Governance (“G”) and Performance Approaches

In response to the increasing capital market strength and competition in Brazil in the last two decades, as well as to investors' constant demand for superior practices and performance, several authors have evidenced the influence of better corporate governance and accounting practices indicators on the valuation of companies (SILVA & LEAL, 2005; BRAGA-ALVES & SHASTRI, 2011; PERIS et al., 2017; GOINS, 2018; MOURA & NORDEN, 2019; LA TORRE et al., 2020; SAMPAIO et al., 2020).

Many of those authors have used **Tobin's Q** as a valuation mechanism related to market performance in selected groups of companies, compared to control peers or segments (SILVA & LEAL, 2005; BRAGA-ALVES & SHASTRI, 2011; GOINS, 2018; 2020; SAMPAIO et al., 2020).

In this regard, Sampaio et al. (2020) states that the adoption of IFRS practices and the convergence of companies to international accounting practices have proportionally reduced the valuation gap between firms from different corporate governance levels in the Brazilian stock exchange ("B3").

Additionally, some of the authors have reached a positive relationship between Tobin's Q and certain corporate governance practices in Brazil (BRAGA-ALVES & SHASTRI, 2011; GOINS, 2020), although part of the results found were not statistically significant (DA SILVA & LEAL, 2005).

Moreover, some studies have compared operational performance in selected companies to corporate governance practices by using return indicators as dependent variables, such as **Return on Assets** ("ROA") and **Return on Equity** ("ROE"). In this regard, Da Silva and Leal (2005) found strong evidence that firms with better corporate governance have significantly higher performance in terms of ROA, whereas other studies found no conclusive evidence (PERIS et al., 2017) or no significant relationship (BRAGA-ALVES & SHASTRI, 2011) that superior corporate governance practices would influence financial results in selected Brazilian publicly-held companies.

2.8. ESG Parameters and Performance Approaches

Only a few firms seem to be relying on ESG aspects to actually deliver alpha to investors – as dictated by a conventional asset management performance measure. In this regard, ESG firm strategies must compete with non-ESG management, which, as so, do not bear the intrinsic costs and expenditures of ESG programs. This fact turns any mathematical comparison or approach for measuring ESG performance even more challenging (CAPPUCCI, 2018).

As highlighted in section 2.3, ESG parameters (especially related to environmental (E) and social (S) aspects) are new and more controversial than corporate governance practices (G).

Still, some international authors have been using similar methodologies to study the relationship of ESG factors to market valuation and financial performance of firms.

In this sense, La Torre et al. (2020) have used a two-step model, considering macro indicators, to analyze the performance of companies included in the Eurostoxx50 index between 2010 and 2018. The authors found that stock performance does not seem to be affected by the companies' efforts in terms of ESG commitment.

Lopez-de-Silanes, McCahery and Pudschedl (2020) have presented a cross-country study considering volatility and annual total return as dependent variables, together with Tobin's Q, Bloomberg ESG Score⁷, Sustainalytics ESG Ranking⁸ and other indicators of the firms size, indebtedness and industry as control variables. They have analyzed firms from the United States, as well as United Kingdom, Japan, Switzerland, Australia and France, generally concluding that ESG scores have little or no impact on risk-adjusted financial performance, albeit suggesting that a better disclose of ESG information is correlated to decreased risk perception.

Sahut and Pasquini-Descomps (2015) have also tested the influence of ESG scores on stocks monthly returns in the United States and United Kingdom, reaching an understanding that the variation of ESG scores was only significant in the United Kingdom, and that sub-categories of said scores (such as governance, environment and labor, among others) could impact performance only during limited periods of time for certain sectors and countries. Additionally, the authors believe that the connection between the stocks' performance and related ESG score might be non-linear, due to ESG information disclosure intrinsic characteristics.

On the other hand, Mervelskemper and Streit (2017) have concluded, through a valuation model that includes market value and dividend yield as dependent variables, that ESG practices on IIRC pilot firms seem to indeed generate stronger value to those firms, as do integrated reporting.

In India, Dalal and Thaker (2019) have used Tobin's Q and ROA as indicators of economic performance for Indian firms listed on the NSE 100 ESG Index. Their findings indicate that

⁷ As explained in section 2.2, Bloomberg ESG Data Service is a proprietary service of information which rates companies worldwide based on their level of ESG disclosure.

⁸ As explained in section 2.2, Sustainalytics Company is a consulting firm specializing in ESG that rates companies based on their ESG practices.

ESG practices apparently enhance financial performance evaluated both through market-based and accounting-based measures.

Ionescu et al. (2019) have analyzed the travel and tourism industry worldwide through a model using Tobin's Q as the dependent variable, ROA as a control parameter and indices for E, S and G dimensions, concluding that governance was the only factor to influence market value, regardless of the selected geographical regions.

In China, Broadstock et al. (2020) have examined the role of ESG performance on the Chinese CSI300 companies during the financial crisis triggered by the COVID-19 global pandemic. Using cumulative raw returns and cumulative abnormal stock returns models, the authors show that portfolios with higher ESG standards generally outperform portfolios with lower ESG standards; and that ESG performance tend to mitigate financial risk during a financial crisis.

In Brazil, fewer studies have investigated ESG concepts using statistical treatment, being most of them related to ISE index.

By using indicators of liquidity, indebtedness and cash generation, Vital et al. (2009) suggested that Companies that were not part of ISE presented better financial performance in 2009.

Cunha and Samanez (2013), on their turn, have compared ISE to IBOVESPA Index's portfolio through Sharpe, Treynor, and Sortino ratios, concluding that, although sustainable investments might present higher liquidity, no correlation to financial performance was found in the analyzed period (from 2005 to 2010). Consistent with this idea, Sobrosa Neto et al. (2020) used return indicators (ROA, ROE and Return on Invested Capital, "ROIC") and described a neutral relationship between financial performance and sustainable development from 2014 to 2018.

On the other hand, Rossi (2009) applied Tobin's Q as a market performance indicator between 2005 and 2007, and found that firms that were part of ISE were then traded at a premium when compared to the other publicly-held firms. Additionally, Orsato et al. (2015), suggested, through a two-phased correlation study, that voluntary environmental initiatives would have created intangible value - such as reputational gain.

3. DATA AND METHODOLOGY

This study was performed by using a quantitative approach, aiming at a better understanding of how ESG practices impact securities' performance in Brazil.

The selected variables and models used, together with the limitations of analyzed period and scope are described in the next sub-sections.

3.1. Selected Dependent Variables

Variables were selected based on the academic literature (as cited in items 2.8 and 2.9), which relates corporate governance and/or ESG parameters to performance.

Data from publicly-held companies was extracted from the Economatica system for the period from 2015 to 2019. Table 1 presents the selected variables description, together with their respective references in academic research.

Table 1 - Selected dependent variables description, acronym and respective reference.

Variable	Acronym Used	Description	Reference
Tobin's Q	TQ	(Book value of debt + market capitalization) / (book value of assets)	Da Silva & Leal (2005); Braga-Alves & Shastri (2011); Goins (2018); Dalal & Thaker (2019); Lopez-de-Silanes, McCahery & Pudschedl (2020).
Return on Assets (%)	ROA	Net profit ₍₁₎ / book value of assets ₍₀₎	Da Silva & Leal (2005); Braga-Alves & Shastri (2011); Peris (2017); Goins (2018); Dalal & Thaker (2019); Sobrosa Neto (2020).

Source: the Author.

3.2. ESG Measurement

In order to measure firm-level ESG criteria and due to availability of information towards Brazilian securities, we have used *Refinitiv ESG Scores* ("Refinitiv"). Refinitiv verifies reported information from the public domain and analyses a subset of 186 comparable data

points to process scoring through boolean questions, considering materiality, data availability and industry relevance by topic.

The data points are then distributed across three pillars (E, S and G), subdivided under 10 ESG category: resource use, emissions, innovation, workforce, human rights, community, product responsibility, management, shareholders and CSR Strategy (Figure 8). Each category is outlined as a separated performance rate, which composes the ESG Score (Figure 9).

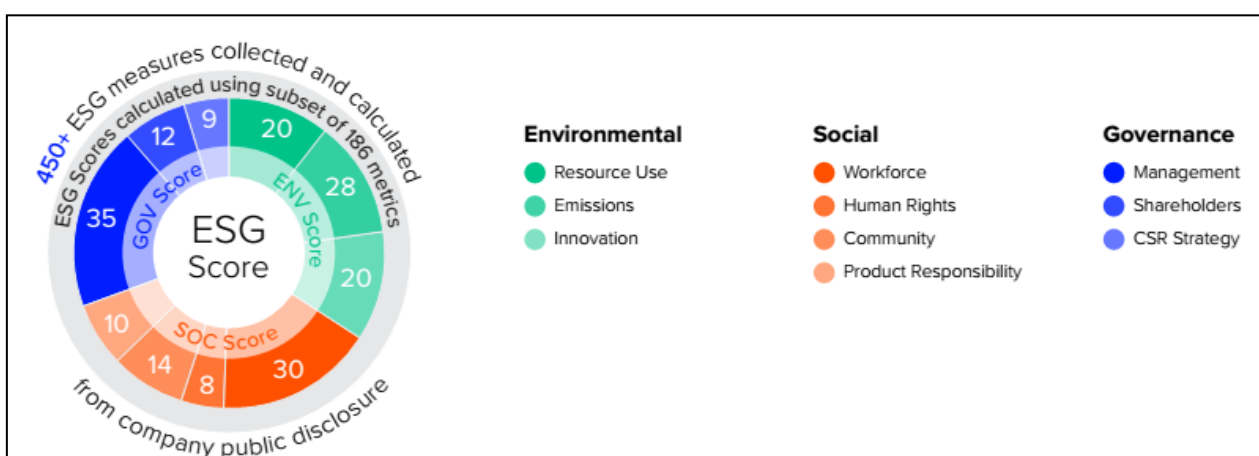


Figure 8 – ESG Pillars and topics from Revinitiv ESG Scores, based on 186 metrics.

Source: Refinitiv

The main aspects considered in each category are listed as follows:

Environmental (“ESG_E”)

- **Resource use (“ESG_E_RU”)**: (i) policies and targets on resource reduction, water and energy efficiency, sustainable packaging, supply chain; (ii) energy use, purchase, production and loss; (iii) water use, withdrawal, recycling; (iv) land impact; (v) coal production and use; (vi) green buildings; and (vii) supply chain features.
- **Emissions (“ESG_E_Em”)**: (i) policies and targets; (ii) biodiversity impact; (iii) CO₂, CO₂ equivalent and carbon credits; (iv) ozone-depleting substances; (v) NO_x and SO_x emissions; (vi) particulate matter emissions; (vii) total and recycled waste; (viii) water discharging and water pollutant emissions; (ix) environment expenditures,

provisions, investments, partnerships; (ix) accidental spills; (x) self-reported fines; (xi) certificates; (xii) environment restoration initiatives.

- **Innovation (“ESG_E_Inn”)**: (i) environmental, eco-designed, green, organic, labeled products; (ii) research and development expenditures and environmental projects financing; (iii) noise reduction; (iv) fuel consumption, hybrid vehicles; (v) ESG assets under management; (vi) Equator principles; (vii) labeled wood use; (viii) agrochemicals and animal testing use; (ix) water and renewable energy products, fossil fuel divestment; (x) real estate sustainability certifications.

Social (“ESG_S”)

- **Workforce (“ESG_S_W”)**: (i) health and safety policies for employees and for the supply chain, health and safety teams, training, improvements; (ii) policies for training and development, skills training, career development; (iii) policies and targets for diversity and opportunity; (iv) employee satisfaction; (v) salary gap, salaries and wages reporting; (vi) voluntary and involuntary turnover and layoffs, employee length of service; (vii) gender pay gap, women managers, new women employees; (viii) flexible working hours, daycare services; (ix) injuries, accidents, occupational diseases, fatalities, lost working days; (x) HIV-AIDS program; (xi) training hours, training investments, internal promotions.
- **Human rights (“ESG_S_HR”)**: (i) policies for human rights, freedom of association, child labor, forced labor; (ii) human rights contractor and breaches; (iii) ethical trading initiative.
- **Community (“ESG_S_C”)**: (i) policies for fair compensation, bribery and corruption, business ethics, community involvement; (ii) tools for business ethics maintenance; (iii) whistleblower channel, protection; (iv) donations, community lending and investments; (v) political and lobbying contributions; (vi) employee engagement in voluntary work; (vii) corporate responsibility awards; (viii) product sales at discount to emerging markets; (ix) crisis management.

- **Product responsibility (“ESG_S_Prod”):** (i) policies for customer health and safety, data privacy, cyber security, responsible marketing, fair trade; (ii) product responsibility monitoring, quality management systems; (iii) ISO 9000, Six Sigma, QMS certification; (iv) customer satisfaction; (v) product access; (vi) healthy food or products; (vii) embryonic stem cell research; (viii) revenues from alcohol, gambling, tobacco, armaments, nuclear, pornography, contraceptives, cluster bombs, landmines, abortifacients, firearms; (ix) obesity risk; (x) pork products; (xi) animal well-being.

Governance (“ESG_G”)

- **Management (“ESG_G_Man”):** (i) policies for Board functions, structure, size, independence, diversity, experience, executive compensation performance, executive ESG compensation performance, executive retention; (ii) Board attendance and number of meetings, independent Board members, Board structure, size, background, skills, diversity (including cultural and gender), tenure, term duration; (iii) Corporate Governance Board Committee, Nomination Board Committee, Audit Board Committee, Compensation Board Committee and respective independence, expertise meetings attendance; (iv) Internal Audit Department reporting; (v) succession plan; (vi) executive total and individual compensation, highest remuneration package, CEO compensation, board member compensation and incentives; (vii) chief diversity officer; (viii) shareholders approval on stock compensation plan.
- **Shareholders (“ESG_G_Sh”):** (i) policies on shareholders rights, equal voting rights, shareholders engagement, confidential voting; (ii) equal voting rights, voting cap, minimum number of shares to vote, veto power, golden share; (iii) director election majority requirement, shareholders vote on executive pay; (iv) public availability of corporate statutes; (v) anti-takeover devices, poison pill, golden parachute; (vi) state owned enterprise; (vii) classified or staggered board structure, supermajority of voting required; (viii) limitations on shareholders’ right to call meetings, director liabilities, approval on significant transactions, removal of directors, written consent requirements; (ix) litigation expenses; (x) audit fees ratio and auditor tenure.

- **CSR Strategy (“ESG_G_CSR”)**⁹: (i) CSR Sustainability Committee; (ii) integrated strategy; (iii) Global Compact signatory; (iv) stakeholder engagement; (v) sustainability reporting, reporting scope, ESG period update, GRI, sustainability reporting auditing; (vi) SDGs signatory (out of the 17 goals).

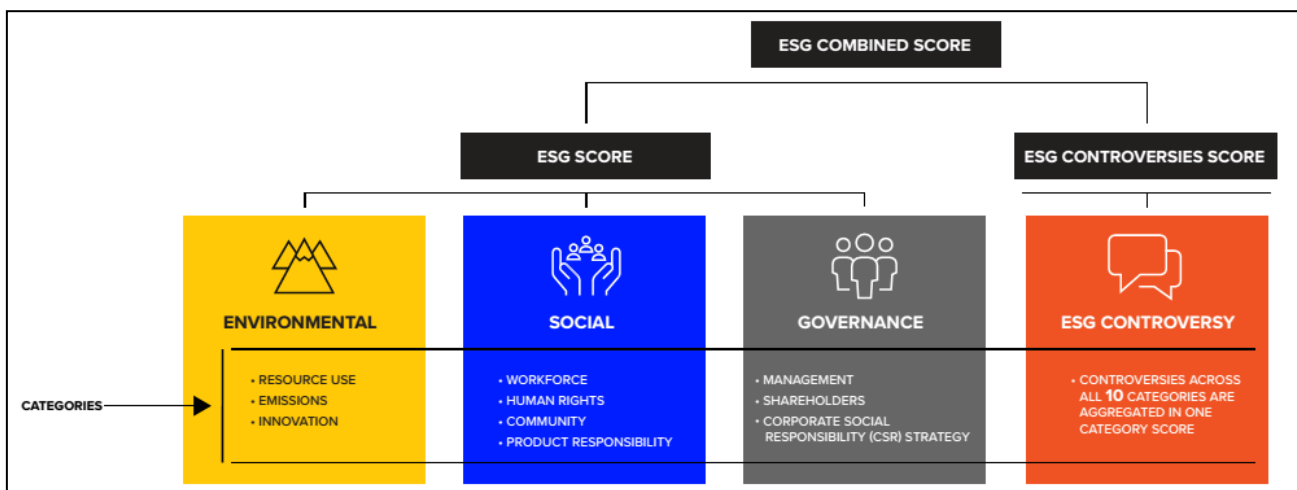


Figure 9 – Refinitiv ESG Score (“ESG”) and ESG Combined Score composition.

Source: Refinitiv

Apart from the main ESG categories, the ESG Controversies Category Score (“ESG_C”) is calculated based on 23 ESG controversial topics, including: (i) human rights, working conditions, child labor, employees health and safety; (ii) strikes, freedom of association; (iii) business ethics, tax frauds, anti-competition, insider trading; (iv) bribery, fraud, money laundry, corruption; (v) intellectual property; (v) public health; (vi) customer health and safety, customer complaints, responsible marketing, product access, data privacy; (vii) accounting, auditor resignation, earnings restatement, profit warnings; (viii) shareholders rights, executive compensation; (ix) environmental. This score is automated and filters the *market cap bias* - as large companies tend to attract more media attention than smaller companies. The ESG metrics added to the ESG Controversies Score composes the ESG Combined Score (Figure 9).

⁹ Please refer to section 2.5 for CSR definition and considerations.

3.3. Securities Sample

All securities analyzed in this study corresponded to traded, publicly-held companies. We have analyzed a total sample of 106 companies¹⁰, whose information is available in the Refinitiv ESG Scores system. All the companies analyzed are listed companies and were either part or eligible to the main Brazilian sustainability indices, including: (i) ISE; and/or (ii) S&P / B3 Brazil ESG. Information was collected for the period from 2015 to 2019, with a total of 406 observations (among the 106 companies mentioned).

We understand that this methodology could present a degree of selection bias, given the fact that ESG reporting in Brazil is not mandatory and many companies either do not release ESG information, or have started releasing it only in the few last years. However, we understand it corresponds to the best approach we could reach regarding ESG information collection.

The complete sample of securities is displayed in Appendix 1.

3.4. Descriptive Statistics and Correlations

Descriptive statistics by panel were performed. Additionally, Pearson's correlations were also calculated for the selected dependent and ESG variables, also considering companies' size, in order to have a better overview of the sample.

3.5. Estimation Approach

The herein proposed estimation approach was adapted from similar modeling used in the literature to measure the impact of corporate governance and ESG factors on performance, as referenced in items 2.8, 2.9 and 3.1. As so, the analysis was performed in cross-sectional time-series (panel data), considering annual data from 2015 to 2019 (five years). Such timeframe was designed based on the fact that ESG metrics became more widely prominent in the investment industry as of 2016, with many companies starting to release ESG information only in the last few years.

¹⁰ Note: The Refinitiv system does not disclose how many companies are included in the ESG Brazilian score. However, we have analyzed a total of 175 companies within the scope mentioned, out of which 69 companies do not present any ESG information. Additionally, many of the selected companies have only started to present ESG information in the most recent years.

In order to evaluate if ESG would respond for performance in the analyzed assets, we have used a layer disposition, starting by the broader ESG concept of ESG and tapering to more specific metrics (Figure 10). This methodology allowed us to explore which concepts within each of the three dimensions (E, S and G) could be more relevant.

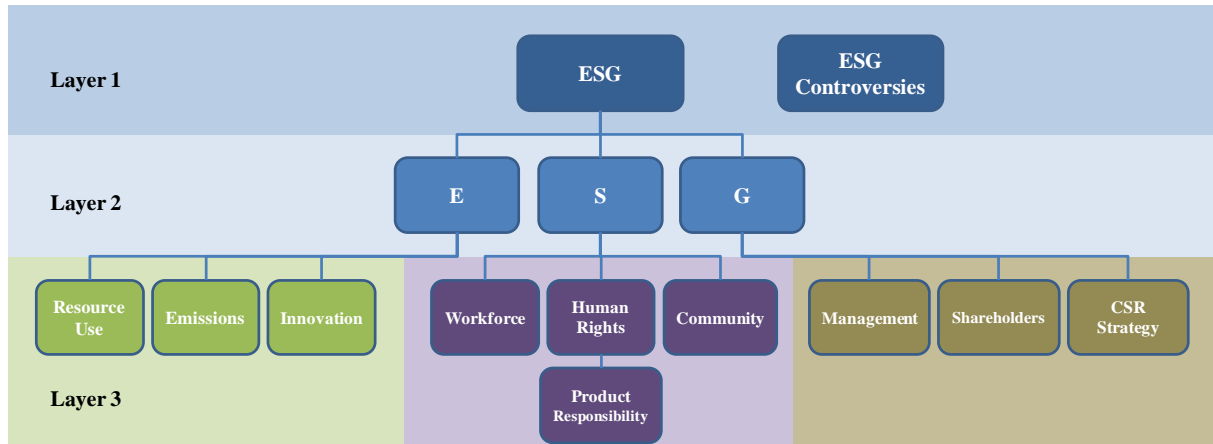


Figure 10 – Layer view of regression testing: from the broader ESG concept to specific metrics in each dimension (E, S and G).

Source: the Author

3.5.1. Fixed Effects (“FE”) Estimator Model

According to Crisci, D’Ambra and Palleta (2014), fixed effects models always bring statistically consistent results in panel data, although they might not be the most efficient sort of model to run in each case. As long as a random effects model is statistically justifiable, it might return better p-values.

However, recent research indicate that fixed-effect estimators are more appropriate and straightforward when analyzing panel data in corporate finance subjects (FLANNERY & HANKINS, 2013; OSTERRIEDER, PALIA and WU, 2020). As so, we have followed a FE *within regression estimator* model for all variables testing (TORRES-REYNA, 2007). The analysis was performed using *Stata* software, through *xtreg, [fe]* command.

The estimator regression considers the following general equation:

$$y_{it} = \alpha + \beta_1 x_{1it} + \beta_2 x_{2it} + \dots + \beta_n x_{nit} + \eta_i + \varepsilon_{it}$$

where:

y_{it} = financial performance for Company i at year t

x_{1it} = ESG independent variable 1 for Company i at year t

x_{2it} = ESG independent variable 2 for Company i at year t

[...]

x_{nit} = ESG independent variable n for Company i at year t

η_i = Fixed effect of the Company

As explained in item 3.1, for the purpose of testing performance, we have used as dependent variables (y_{it}):

- (i) **Tobin's Q** (DA SILVA & LEAL, 2005; BRAGA-ALVES & SHASTRI, 2011; GOINS, 2018; DALAL & THAKER, 2019; LOPEZ-DE-SILANES, MCCAHERY & PUDSCHEDL, 2020); and
- (ii) **ROA** (DA SILVA & LEAL, 2005; BRAGA-ALVES & SHASTRI, 2011; PERIS, 2017; GOINS, 2018; DALAL & THAKER, 2019; SOBROSA NETO, 2020).

Additionally, ESG independent variables used (x_{nit}) considered ESG metrics from Refinitiv ESG Score system, including:

- (i) ESG;
- (ii) Controversies;
- (iii) E;
- (iv) S;
- (v) G; and
- (vi) E, S and G submetrics.

Based on the general equation for the estimator regression, ten different estimations were developed for the purpose of this study, with their respective dependent (y_{it}) and independent (x_{nit}) variables displayed in Table 2. Acronyms were used as defined in items 3.1 and 3.2 and colors follow the layers analysis pattern proposed in item 3.5 (Figure 10).

Table 2 – Variables used for FE estimation purposes. (ESG_C = controversies; ESG_E = Environmental aspects; ESG_S = social aspects; ESG_G = governance aspects; ESG_E_RU = resources use; ESG_E_Em = emissions; ESG_E_Inn = innovation; ESG_S_W = workforce; ESG_S_HU = human rights; ESG_S_C = communities; ESG_S_Prod = product responsibility; ESG_G_Man = management; ESG_G_Sh = shareholders; ESG_G_CSR = CSR Strategy).

	Dependent Variable	Independent Variable 1	Independent Variable 2	Independent Variable 3	Independent Variable 4
[Eq. 1]	TQ	ESG	ESG_C	-	-
[Eq. 2]	TQ	ESG_E	ESG_S	ESG_G	-
[Eq. 3]	TQ	ESG_E_RU	ESG_E_Em	ESG_E_Inn	-
[Eq. 4]	TQ	ESG_S_W	ESG_S_HR	ESG_S_C	ESG_S_Prod
[Eq. 5]	TQ	ESG_G_Man	ESG_G_Sh	ESG_G_CSR	-
[Eq. 6]	ROA	ESG	ESG_C	-	-
[Eq. 7]	ROA	ESG_E	ESG_S	ESG_G	-
[Eq. 8]	ROA	ESG_E_RU	ESG_E_Em	ESG_E_Inn	-
[Eq. 9]	ROA	ESG_S_W	ESG_S_HR	ESG_S_C	ESG_S_Prod
[Eq. 10]	ROA	ESG_G_Man	ESG_G_Sh	ESG_G_CSR	-

Source: the Author.

3.6. Timeframe, Framework and Scope Limitations

As previously mentioned, ESG metrics and reporting discussions gained traction only within the last few years. This study has encompassed a period of five years – from 2015 to 2019. Taking into account that sustainability concepts are believed to be effective in the long run (MERVELSKEMPER & STREIT, 2017) and that effect might not be linear, due to ESG information disclosure intrinsic characteristics (SAHUT & PASQUINI-DESCOMPS, 2015), said period might not be sufficient to evidence performance related to ESG reporting.

Additionally, for quantitative analysis, we have chosen to work with Refinitiv ESG Scores, which represent only one among many consulting firms that provide ESG data. As there is still no clear definition on ESG metrics, standards and weights, other ESG scores or indices could possibly be investigated and might provide different insights or results.

Another limitation of the present study is the possibility that other variables - such as macroeconomic factors, industry and business environment, could impact ESG investments and/or financial performance (DALAL & THAKER, 2019). These indicators may be included in future research.

4. EMPIRICAL RESULTS

4.1. Sample Profile

Regarding the profile of the analyzed companies (Fig. 11), the sample comprises sundry segments, with the majority (11.3%) coming from real estate and construction companies, followed by financial services (9.4%), retail (8.5%), energy (8.5%) and banks (7.5%).

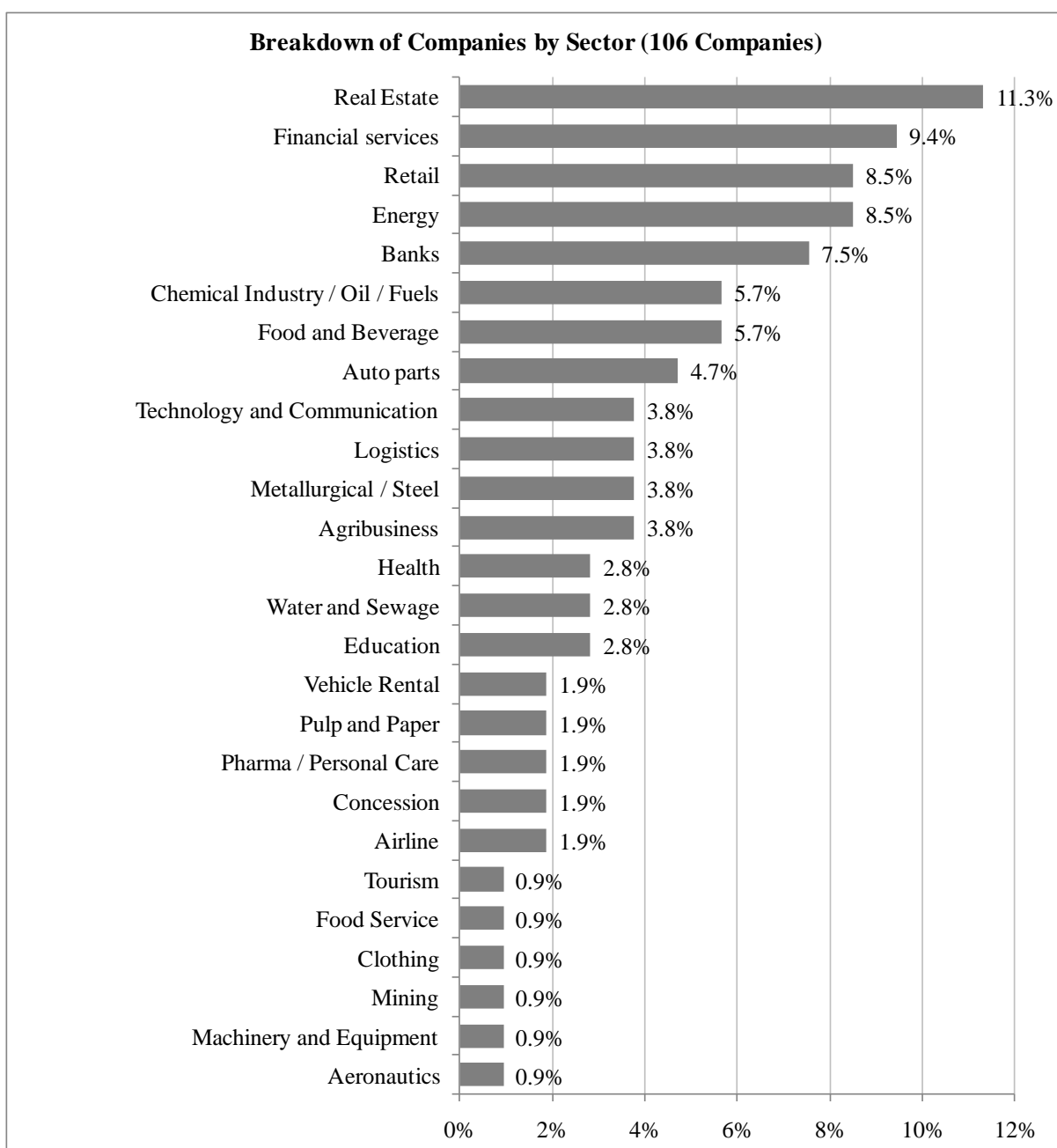


Figure 11 – Distribution of the 106 analyzed companies by sector.

Source: B3

Regarding the distribution of the 406 observations related to the ESG rating obtained through Refinitiv system (Figure 12), we have observed that the mode corresponds to rating C+ (22.2%).

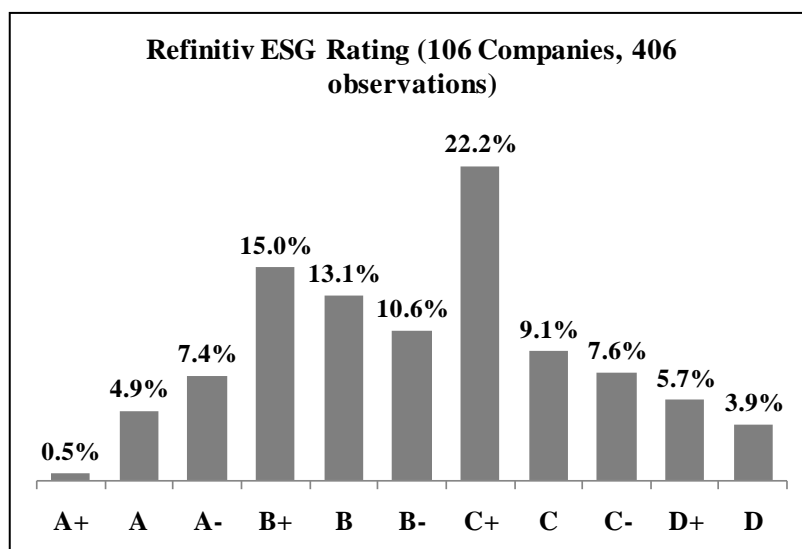


Figure 12 – Distribution of the 406 ESG observations obtained through Refinitiv.

Source: Refiniv

4.2. Descriptive Statistics

Table 3 shows the comparable descriptive statistics for the dependent and independent variables by panel, as well as asset size – for sample analysis purposes only. Acronyms were used as defined in items 3.1 and 3.2.

Table 3 – Comparable descriptive statistics for the dependent and independent variables, by panel (from 2015 to 2019).

2019	N	mean	sd	p50	min	max
TQ	90	0.80	0.38	0.78	0.05	2.22
ROA	90	0.05	0.06	0.04	(0.13)	0.45
ESG_E	90	5.30	2.51	5.00	2.14	9.28
ESG_S	90	6.07	2.24	5.71	2.14	10.00
ESG_G	75	5.80	2.12	5.71	2.14	10.00
ESG_C	90	0.09	0.29	-	-	1.00
Total Assets (R\$ 000)	90	99,655	300,101	16,779	1,769	1,738,713

2018	N	mean	sd	p50	min	max
TQ	86	0.71	0.37	0.73	0.06	2.95
ROA	86	0.06	0.06	0.05	(0.10)	0.26
ESG_E	86	5.64	2.47	5.71	2.14	9.28
ESG_S	86	6.47	2.04	6.42	2.14	10.00
ESG_G	86	6.14	1.99	6.42	2.14	10.00
ESG_C	86	0.09	0.29	-	-	1.00
Total Assets (R\$ 000)	86	100,981	290,344	22,396	1,537	1,649,613
2017	N	mean	sd	p50	min	max
TQ	82	0.69	0.43	0.68	0.18	3.69
ROA	82	0.06	0.07	0.05	(0.05)	0.36
ESG_E	82	5.76	2.40	6.42	2.14	9.28
ESG_S	82	6.43	2.09	6.42	2.14	10.00
ESG_G	82	6.04	1.98	6.42	2.14	10.00
ESG_C	82	0.06	0.24	-	-	1.00
Total Assets (R\$ 000)	82	96,748	277,053	19,118	1,270	1,503,503
2016	N	mean	sd	p50	min	max
TQ	74	0.70	0.39	0.68	0.19	2.84
ROA	74	0.06	0.08	0.04	(0.14)	0.33
ESG_E	74	5.80	2.30	6.07	2.14	10.00
ESG_S	74	6.43	2.14	7.14	2.14	10.00
ESG_G	74	6.31	1.89	6.42	2.14	10.00
ESG_C	74	0.15	0.36	-	-	1.00
Total Assets (R\$ 000)	74	102,705	285,553	19,831	1,082	1,425,639
2015	N	mean	sd	p50	min	max
TQ	74	1.51	0.99	1.17	0.31	6.23
ROA	74	0.04	0.10	0.04	(0.41)	0.37
ESG_E	74	5.58	2.31	5.71	2.14	9.28
ESG_S	74	6.28	2.20	6.42	2.14	10.00
ESG_G	74	6.13	1.91	6.42	2.14	9.28
ESG_C	74	0.04	0.20	-	-	1.00
Total Assets (R\$ 000)	74	101,118	276,566	18,343	1,177	1,401,129

Source: Economatica / Refinitiv, elaborated by the Author.

Based on the data presented, it is worth noting that:

- From 2015 to 2019, there has been an increment in companies that started reporting ESG metrics (from 74 in 2015 to 90 in 2019, with raise as of 2017);

- In terms of companies' size, mean variation from year to year was not significant (around R\$ 100 million), but there has been some variation in standard deviation (around R\$ 277 million in 2015, compared to around R\$ 300 million in 2019) and in median (from around R\$ 18 million in 2015, to around R\$ 22 million in 2018 and R\$ 17 million in 2019). This fact seems to indicate that smaller companies are starting to release ESG information;
- In average, higher scores were observed for the S dimension than for E and G (except for 2018); and
- In terms of ESG metrics, mean has generally raised from 2015 to 2016 (when there was no variation on the number of companies that presented data), but generally decreased in the following years. At this point, it is not possible to infer whether decrease in ESG metrics mean along the panels would correspond to: (a) new entrants in the sample, with lower scores; or (b) macroeconomic conditions and political crisis in Brazil, which could eventually lead to generally lower investments in ESG.

4.3. Analysis of Person's Correlation

The correlation of the selected variables by panel for analyzed dataset is displayed in Table 4, as below. Acronyms were used as defined in items 3.1 and 3.2.

Table 4 – Overview of correlations among selected variables, considering the total sample of 406 observations. (*) corresponds to 5% significance level and SIZE refers to ln of total assets.

	TQ	ROA	ESG_E	ESG_S	ESG_G	ESG_C	SIZE
TQ	1.0000						
ROA	0.1046*	1.0000					
ESG_E	(0.0197)	(0.2396)*	1.0000				
ESG_S	(0.1086)*	(0.1695)*	0.7756*	1.0000			
ESG_G	(0.0598)	(0.1215)*	0.4123*	0.5038*	1.0000		
ESG_C	0.0492	(0.1091)*	0.2146*	0.1894*	0.1953*	1.0000	
SIZE	(0.0627)	(0.2886)*	0.5317*	0.5487*	0.2141*	0.3232*	1.0000

Source: Economatica / Refinitiv, elaborated by the Author.

Based on the presented analysis, we have generally observed that:

- Regarding performance indicators, Tobin's Q presented significant positive (but weak) correlation with ROA;
- Tobin's Q had inverse (weak) correlation with E, S and G metrics, with S being the only statistically significant variable;
- ROA presented statistically significant inverse (weak) correlation with all of E, S, G and controversies metrics;
- Strong (positive) correlations were only found between E and S indicators, although all of E, S, G and controversies variables were statistically significant among themselves; and
- Size presented positive and statistically significant correlation with all proposed independent ESG variables – which seems to indicate that larger companies would have better ESG scores.

4.4. Estimation Results

Results from performance estimations are displayed in Tables 5 and 6.

Based on the estimations, we have generally observed that:

Tobin's Q:

- In Equation 1 (Table 5), ESG is statistically significant (at 1% level) with a negative coefficient of -0.159 – which means, at first, that when looking at the complete dataset, ESG practices have negatively impacted market performance in the magnitude of around 16%;
- On the other hand, Controversies score (statistically significant at 10% level) presented a positive coefficient of 0.247, which indicates that reputation seems to be responsible for a considerable positive impact (of around 25%) on the analyzed securities;

Table 5 – Performance estimators considering Tobin’s Q (TQ) and ROA as dependent variables, for ESG metrics (following equations 1, 2, 6 and 7, as proposed in Table 2). Each column represents a different regression. Acronyms were used as defined in items 3.1 and 3.2. All regressions were estimated using FE, through *xtreg* command in *Stata*. Robust standard errors indicated by (*), (**) and (***) denote 10%, 5% and 1% significance levels, respectively. T-statistics are reported in brackets. F-statistic and Rho are reported as a diagnostic.

	[Eq. 1]	[Eq. 6]		[Eq. 2]	[Eq. 7]
	TQ	ROA		TQ	ROA
ESG	-0.159 *** [-3.8]	-0.006 [-1.27]	ESG_E	-0.054 [-1.09]	-0.003 [-0.53]
ESG_C	0.247 * [1.87]	-0.021 ** [-2.55]	ESG_S	-0.111 ** [-2.35]	-0.002 [-0.47]
Constant	2.445 *** [7.92]	0.074 *** [2.67]	ESG_G	-0.014 [-0.64]	-0.005 [-1.62]
Number of obs	406	406	Constant	2.590 *** [5.57]	0.090 *** [3.4]
F stat	8.760	2.340			
Prob > F	-	0.036			
R2 (within)	0.402	0.051	Number of obs	391	391
Rho	0.479	0.579	F stat	7.870	1.650
			Prob > F	-	0.129
			R2 (within)	0.405	0.051
			Rho	0.509	0.594

Source: Economatica / Refinitiv, elaborated by the Author.

Table 6 – Performance estimators considering Tobin’s Q (TQ) and ROA as dependent variables, for ESG sub-metrics (following equations 3, 4, 5, 8, 9 and 10, as proposed in Table 2). Each column represents a different regression. Acronyms were used as defined in items 3.1 and 3.2. All regressions were estimated using FE, through the *xtreg* command in *Stata*. Robust standard errors indicated by (*), (**) and (***) denote 10%, 5% and 1% significance levels, respectively. T-statistics are reported in brackets. F-statistic and Rho are reported as a diagnostic.

	[Eq. 3]	[Eq. 8]		[Eq. 4]	[Eq. 9]		[Eq. 5]	[Eq. 10]
	TQ	ROA		TQ	ROA		TQ	ROA
ESG_E_RU	-0.065 [-1.47]	-0.005 [-1.38]	ESG_S_W	-0.079 [-1.3]	0.002 [0.67]	ESG_G_Man	-0.009 [-0.37]	-0.003 [-1.15]
ESG_E_Em	-0.038 [-1.23]	0.001 [0.25]	ESG_S_HR	0.005 [0.19]	-0.004 [-1.59]	ESG_G_Sh	0.021 [0.76]	-0.006 [-1.61]
ESG_E_Inn	0.032 [1.05]	0.002 [1.2]	ESG_S_C	-0.044 [-1.57]	-0.002 [-0.65]	ESG_G_CSR	-0.067 ** [-2.45]	-0.004 * [-1.65]
Constant	2.022 *** [6.98]	0.056 *** [3.13]	ESG_S_Prod	0.009 [0.45]	0.000 [0.01]	Constant	1.818 [6.97]	0.112 [3.81]
			Constant	2.257 *** [6.03]	0.056 ** [2.53]			
Number of obs	406	406	Number of obs	406	406	Number of obs	406	406
F stat	8.410	1.470	F stat	7.010	1.710	F stat	8.010	1.660
Prob > F	-	0.186	Prob > F	-	0.105	Prob > F	-	0.127
R2 (within)	0.386	0.045	R2 (within)	0.403	0.048	R2 (within)	0.381	0.055
Rho	0.453	0.579	Rho	0.448	0.580	Rho	0.453	0.609

Source: Economatica / Refinitiv, elaborated by the Author.

- From Equations 2 (Table 5) to 5 (Table 6), the social dimension (ESG_S) was considered statistically significant at a 5% level, as well as CSR strategy (ESG_G_CSR);
- In Equation 2 (Table 5), all three dimensions (E, S and G) pointed towards negative coefficients. However, S had a more representative negative coefficient than E and G (-0.111, compared to -0.054 and -0.014, respectively);
- From layer 3 metrics (Table 6), negative results on the S dimension (Equation 4) seems to have been driven by Workforce (ESG_S_W) and Community (ESG_S_C) indicators, whereas Human Rights (ESG_S_HR) and Product (ESG_S_Prod) presented slightly positive impacts (with coefficients of -0.079, -0.044, 0.005 and 0.009, respectively);
- On the E dimension (Table 6, Equation 3), Resources Use (ESG_E_RU) and Emissions (ESG_E_Em) showed negative coefficients (of -0.065 and -0.038, respectively), whereas Product Innovation (ESG_E_Inn) indicated positive impact (of 0.032);
- Regarding G (Table 6, Equation 5), Management (ESG_G_Man) and CSR coefficient (ESG_G_CSR) seem to negatively affect market results (with coefficients of -0.009 and -0.067, respectively), whereas Shareholders practices (ESG_G_Sh) was positive (at 0.021).

ROA:

- In Equation 6 (Table 5), ESG was not statistically significant for ROA. Its coefficient was negative at -0.006, which might be read as practically neutral;
- Controversies score was significant at 10% level and presented a negative coefficient (of -0.021);
- Although neither E, S nor G were statistically relevant, the breakdown of metrics in Equation 7 (Table 5) points towards a slightly negative impact from all dimensions, but with very low coefficients (of -0.003, -0.002 -0.005, respectively – which could be read as practically null);
- From layer 3 metrics (Table 6), CSR strategy (ESG_G_CSR) only was statistically significant (at 10% level);
- Additionally, no single coefficient was higher than 0.006 (in module), which could also be considered as practically null.

5. DISCUSSION

The current study aimed to: (i) investigate whether ESG metrics could affect financial performance in Brazil; and (ii) test whether indicators within each of the three dimensions (E, S and G) could have significant impact on the performance of Brazilian securities and Companies's results.

Such contribution could be an important tool to: (i) companies and professionals interested in expanding sustainability practices and ESG metrics; (ii) financial analysts, portfolio managers and individual investors, who may include specific metrics in their respective assessments; as well as (iii) policy makers and regulators that consider the feasibility of future reporting standards and obligations; and, finally, (iv) society as a whole, which benefits from ESG practices.

The underlying research was performed by analyzing 106 selected Brazilian companies, all listed in B3¹¹. Such investigation was made through a quantitative study based on ESG annual firm-level indicators – extracted from *Refinitiv ESG Scores* – as independent variables, for a five-year panel analysis (from 2015 to 2019).

In relation to the sample profile, by means of this study only, we cannot infer if the higher percentage of companies in the sectors of real estate, financial institutions and financial services relates to a higher disclosure of ESG information by these specific sectors, or if such profile would actually correspond to a market characteristic of the population of listed companies in Brazil. Either way, in our opinion, the expanded spectrum of: (i) market sectors; and (ii) distribution of ESG ratings in the underlying observations; highlight the diversity and the broad range of the subject sample.

Regarding descriptive statistics, it is worth pointing out that there has been an increment in companies that started reporting ESG metrics in the last few years (21.6% increase in number of companies in our data profile). Based on the descriptive statistics, it is also possible to suppose that smaller companies are starting to release ESG metrics information, and such new entrants in the sample could be driving general ESG metrics means downwards along panels (especially from 2017 to 2019). Furthermore, the fact that ESG metrics present positive and

¹¹ B3 (*Brazil, Bolsa, Balcão*) corresponds to the Brazilian Stock Exchange.

statistically significant correlation to companies size seem to corroborate the idea that larger companies would have better ESG scores - which could be explained not only by the availability of investments and resources for ESG practices, but also by the perspective that larger companies could be carrying ESG programs and releasing ESG metrics information for longer than smaller companies.

In terms of accounting performance (measured through ROA), all coefficients were very close to null, generally indicating little or no impact from ESG metrics.

Moreover, in terms of market performance (measured through Tobin's Q), ESG practices seem to have negatively affected securities in around 16%, whereas reputation (represented by the controversies indicator) could respond for a positive impact in the magnitude of 25%.

When looking at E, S and G separately, all dimensions indicated a negative impact, with S presenting a higher negative coefficient (of around 11%). When looking at the S dimension breakdown, the inverse effect seems to have been driven by Workforce (ESG_S_W, with a negative impact of around -8%) and Communities (ESG_S_C, around -4% impact) metrics.

As so, we are not stating that workforce and community-related practices would not be relevant to companies' results. We might consider, though, that such indicators: (i) could present returns in a longer term, which were not supported by the applied scopes of time and framework; (ii) could present returns to other stakeholders and/or to society as a whole, which would not be captured in the estimators used in this specific study; and/or (iii) could be considered risk mitigators (against employees, individual, collective or public inquiries, lawsuits, claims, actions, investigations or probes), thus intangible assets - not necessarily priced in market expectations, nor registered as a gain in accounting results.

Resource use metrics (ESG_E_RU), from the E dimension, also presented a negative impact on Tobin's Q of around 7%. As so, we are neither stating that resource use efficiency would not be relevant to our planet and to companies. It might, though: (i) require higher expenditures (when compared to other E metrics) and present returns in a longer term, which were not supported by the applied estimations; and/or (ii) be also considered a risk mitigator, thus not priced in market expectations, nor registered as a gain in accounting results. Regarding the latter, according to IBAMA (2021), the aggregate amount of fines and penalties for environmental infraction notice in Brazil recognized in 2019 corresponded to around R\$ 2.8 billion, whereas in 2018 it corresponded to R\$ 2.9 billion.

6. CONCLUSION

As previously mentioned, ESG discussions gained traction and proportion only in the last few years – as so, many players still question the actual use and implication of such concepts (BERTOLOTTI, 2020).

In this scenario, the current research aimed to: (i) investigate whether ESG metrics in Brazil could affect companies' performance; and (ii) test whether indicators within each of the three dimensions (E, S and G) could have significant impact on the performance of Brazilian securities and Companies's results.

Such contribution could be an important tool to: (i) companies and professionals interested in expanding sustainability practices and ESG metrics; (ii) financial analysts, portfolio managers and individual investors, who may include specific metrics in their respective assessments; as well as (iii) policy makers and regulators who might consider the feasibility of future reporting standards and obligations; and, finally, (iv) society, which benefits from ESG practices.

Although few studies have investigated ESG concepts in Brazil using statistical treatment, some authors have demonstrated that such concepts could be relevant as: (i) sensitive Brazilian industries may be positively affected by ESG practices (MIRALLES-QUIRÓS; MIRALLES-QUIRÓS; GONÇALVES, 2018); (ii) ESG investment strategies in Brazil may result in better risk-adjusted long-term returns (JUKEMURA, 2019); and (iii) ESG may have a moderating effect on financial performance when considering geographic international diversification and financial performance (DUQUE-GRISALES; AGUILERA-CARACUEL, 2019).

Following results from previous international research (SAHUT; PASQUINI-DESCOMPS, 2015; IONESCU et al., 2019; LA TORRE et al., 2020; LOPEZ-DE-SILANES, MCCAHERY; PUDSCHEDL, 2020), as well as research in the Brazilian market (CUNHA; SAMANEZ, 2013; SOBROSA NETO et al., 2020) relating ESG metrics to performance, the present study corroborates that ESG practices in Brazil seem to have a neutral relationship to accounting results from the companies' perspective.

Additionally, our study indicates that ESG metrics seem to actually negatively affect market results (measured through Tobin's Q) from Brazilian companies. Fewer studies have

presented such approach; Fatemi, Glaum and Kaiser (2018), for instance, have stated that ESG disclosure, per se, seems to decrease firms valuation, whereas Vital et al. (2009) suggested that Companies that were not part of ISE presented better financial performance.

On the other hand, reputation seems to play an important role in market results for Brazilian companies, as already indicated by previous research in the international scenario (CAPELLE-BLANCARD; PETIT, 2019; NIRINO; SANTORO; MIGLIETTA, 2021).

According to Dalal and Thaker (2019), in terms of academic research, though, ESG reporting, indexation and related performance is still a subject in its infancy. In this regard, the lack of standardization across such an amount of indicators, dimensions, information suppliers and platforms, together with different frameworks for sundry stakeholders, might distort results, as: (i) ESG scores may not reflect the actual practices within companies; (ii) different scores may lead to different perceptions or analysis results; and (iii) the impact of ESG on corporate financial performance may be captured only in the long run - which could require longer periods of study.

The present analysis was based in a single chosen score – and could be replicated in the future for other scores or frameworks in Brazil, as well as in a compared view to other countries. Moreover, it did not take into direct account macroeconomic factors and industry specification – which could be encompassed in future research. Additionally, a period of only five years was studied – from 2015 to 2019, - and sustainability concepts could be more effective in a longer run, as mentioned.

Finally, as the ESG concept is still under consolidation throughout the global markets, new mandatory reporting practices for ESG metrics are likely to emerge and might create space and demand for more research on the subject.

7. REFERENCES

- Armstrong, A. Ethics and ESG. *Australasian Accounting, Business and Finance Journal*, v. 14, n. 3, p. 6-17, 2020. DOI: 10.14453/aabfj.v14i3.2.
- B3. Índice Carbono Eficiente (ICO2 B3) [homepage]. [20—]. Available at: <http://www.b3.com.br/pt_br/market-data-e-indices/indices/indices-de-sustentabilidade/indice-carbono-eficiente-ico2.htm>, access on Nov. 14, 2020.
- Barros, L.A.B.C.; Bergmann, D.R.; Castro, F.H.; Silveira, A.D.M. Endogeneity in panel data regressions: methodological guidance for corporate finance researchers. *Revista Brasileira de Gestão de Negócios*. São Paulo, v.22, Special Issue. pp. 437-461. 2020.
- Bertolotti, A. Effectively managing risks in an ESG portfolio. *Journal of Risk Management in Financial Institutions*, V.13, n.3, pp. 202–211, 2020.
- BM&F Bovespa. *Índice de Sustentabilidade Empresarial – ISE*. [20--]. Available at: <https://edisciplinas.usp.br/pluginfile.php/1066543/mod_resource/content/0/ISE2-Metodologia.pdf>, access on Nov.01, 2020.
- BM&F Bovespa. *Metodologia do Índice de Sustentabilidade Empresarial (ISE)*. Apr. 2015. Available at: <<http://www.b3.com.br/data/files/B2/F2/C9/24/98E615107623A41592D828A8/ISE-Metodologia-pt-br.pdf>>, access on Nov.01, 2020.
- Braga-Alves, M.V.; Shastri, K. Corporate governance, valuation, and performance: evidence from a voluntary market reform in Brazil. *Financial Management*, v.40, n.1, pp. 139-157, 2011. DOI: 10.1111/j.1755-053X.2010.01137.x
- Broadstock, D.C.; Collins, A.; Hung, L.C.; Vergos, K.. Voluntary disclosure, greenhouse gas emissions and business performance: Assessing the first decade of reporting. *The British Accounting Review*, v. 50, n. 1, p. 48-59, 2018. DOI: 10.1016/j.bar.2017.02.002
- Broadstock, D.C.; Chan, K.; Cheng, L.T.W.; Wang, X. The role of ESG performance during times of financial crisis: Evidence from COVID-19 in China. *Finance research letters*, p. 101716, 2020. DOI: /10.1016/j.frl.2020.101716.
- Câmara dos Deputados. *Projeto pune quem submeter criança ou adolescente a trabalho perigoso*. 2020. Available at: < <https://www.camara.leg.br/noticias/691530-projeto-pune-quem-submeter-crianca-ou-adolescente-a-trabalho-perigoso/>>, access on Mar.06, 2020.
- Capelle-Blancard, G.; Petit, A. Every little helps? ESG news and stock market reaction. *Journal of Business Ethics*, v.157, n.2, pp. 543-565, 2019.
- Cappucci, M. The ESG Integration Paradox. *Journal of Applied Corporate Finance*, V.30, n.2, 2018.
- CDP; CDSB; GRI; IR; SASB. *Statement of Intent to Work Together Towards Comprehensive Corporate Reporting*: Summary of alignment discussions among leading sustainability and integrated reporting organisations CDP, CDSB, GRI, IIRC and SASB. Facilitated

by the Impact Management Project, World Economic Forum and Deloitte. Sep.2020. Available at: <<https://29kjwb3armds2g3gi4lq2sx1-wpengine.netdna-ssl.com/wp-content/uploads/Statement-of-Intent-to-Work-Together-Towards-Comprehensive-Corporate-Reporting.pdf>>, access on Jan.23, 2021.

Chen, H.Y.; Yang, S.S. Do Investors exaggerate corporate ESG information? Evidence of the ESG momentum effect in the Taiwanese market. *Pacific-Basin Finance Journal*, v. 63, p. 101407, 2020. DOI: 10.1016/j.pacfin.2020.101407.

CME Group. Why ESG Is Outperforming The S&P 500. *Accretive Capital LLC dba – Benzinga.com*. May 2020. Available at: <<http://news-business.vlex.com.sproxy.fgv.br/vid/why-esg-is-outperforming-844830977>>, access on Sep.19, 2020.

Consolandi, C.; Eccles, R.G.; Gabbi, G. How material is a material issue? Stock returns and the financial relevance and financial intensity of ESG materiality. *Journal of Sustainable Finance & Investment*, p. 1-24, 2020. DOI: 10.1080/20430795.2020.1824889

Corporate Reporting Dialogue. *Driving Alignment in Climate-related Reporting: Year One of the Better Alignment Project*. 2019. Available at: <https://corporatereportingdialogue.com/wp-content/uploads/2019/09/CRD_BAP_Report_2019.pdf>, access on Jan.23, 2021.

Crisci, A.; D'Ambra, A.; Palleta, A. A Panel data approach to evaluate the Passenger Satisfaction of a Public Transport Service. *Procedia Economics and Finance*, v. 17, pp. 231-237, 2014. DOI: 10.1016/S2212-5671(14)00708-4

Cunha, F.A.F.C.; Samanez, C.P. Performance analysis of sustainable investments in the Brazilian stock market: a study about the corporate sustainability index (ISE). *Journal of business ethics*, v. 117, n. 1, p. 19-36, 2013. DOI: 10.1007/s10551-012-1484-2

Da Silva, A.L.C.; Leal, R.P.C. Corporate governance index, firm valuation and performance in Brazil. *Brazilian Review of Finance*, v. 3, n. 1, pp. 1-18, 2005. DOI: 10.12660/rbfin.v3n1.2005.1143

Dalal, K. K.; Thaker, N. ESG and corporate financial performance: a panel study of Indian companies. *IUP Journal of Corporate Governance*, v.18, n.1, pp.44-59, 2019.

De Lima, A.T.F.; Mota, R.H.G., Prado, A.G.S.; Oliveira, M.F. Análise do disclosure ambiental das empresas listadas no Índice Carbono Eficiente (ICO2): Participantes potencialmente poluidores. *Revista de Contabilidade da UFBA*, v. 14, n. 2, p. 33-50, 2020. DOI: 10.9771/rc-ufba.v14i2.35190

Druker, D.M. An introduction to GMM estimation using Stata. German Stata Users Group Meeting, Berlin, Jun.2010. Available at: <https://www.stata.com/meeting/germany10/germany10_drukker.pdf>, access on Mar.28, 2021.

Duque-Grisales, E.; Aguilera-Caracuel, J. Environmental, social and governance (ESG) scores and financial performance of Multilatinas: Moderating effects of geographic

international diversification and financial slack. *Journal of Business Ethics*, p. 1-20, 2019.

Durão, M. Bolsa de Valores mudará índice de sustentabilidade criado há 15 anos. *O Estado de São Paulo*. São Paulo, 29 Aug. 2020. Available at:

<<https://economia.estadao.com.br/noticias/governanca,bolsa-mudara-indice-de-sustentabilidade-criado-ha-15-anos-atras,70003417627>>, access on Nov.01, 2020.

Eccles, R.G.; Strohle, J.C. *Exploring social origins in the construction of ESG measures*. University of Oxford. Available at SSRN 3212685, 2018.

Elkington, J. 25 years ago I coined the phrase “triple bottom line.” Here’s why it’s time to rethink it. *Harvard Business Review*, v. 25, p. 2-5, 2018.

Fatemi, A.; Glaum, M.; Kaiser, S. ESG performance and firm value: The moderating role of disclosure. *Global Finance Journal*, v. 38, p. 45-64, 2018. DOI: 10.1016/j.gfj.2017.03.001.

Flannery, M. J.; Hankins, K. W. Estimating dynamic panel models in corporate finance. *Journal of Corporate Finance*, v. 19, p. 1-19, 2013. DOI: 10.1016/j.jcorpfin.2012.09.004

Foubert, A.L. ESG Data Integration by Asset Managers : Targeting Alpha, Fiduciary Duty & Portfolio Risk Analysis. *Opimas*. 17 Jun.2020. Available at: <<http://www.opimas.com/research/570/detail/>>, accessed on Nov.03, 2020.

Frölich, M. Parametric and nonparametric regression in the presence of endogenous control variables. *International Statistical Review*, v. 76, n. 2, p. 214-227, 2008. DOI: 10.1111/j.1751-5823.2008.00045.x

Garcia, A. S.; Mendes-da-Silva, W.; Orsato, R.J. Corporate sustainability, capital markets, and ESG performance. In: *Individual Behaviors and Technologies for Financial Innovations*. Springer, Cham, 2019. p. 287-309.

Giese, G. et al. Foundations of ESG investing: How ESG affects equity valuation, risk, and performance. *The Journal of Portfolio Management*, v. 45, n. 5, p. 69-83, 2019. DOI: 10.3905/jpm.2019.45.5.069

Goins, S. *Corporate Governance and Firm Valuation in Brazil*. 2018. Dissertação (Mestrado em Economia) - Escola de Economia de São Paulo da Fundação Getúlio Vargas, São Paulo, 2018.

Heenetigala, K.; De Silva Lokuwaduge, C.; Armstrong, A.; Ediriweera, A. *Investigation of criteria used for assurance practices of sustainability reporting in Australian listed companies*. Early Career Research Grant 2015, Central Research Grant Scheme, Victoria University Melbourne: Victoria University, 2016. Available at: <<http://vuir.vu.edu.au/32840/1/Report%2520on%2520Investigation%2520of%2520Criteria%2520used%2520for%2520Assurance%2520Practices%2520of%2520Sustainability%2520Reporting%2520in%2520Australian%2520%2520-%2520Final%2520%25281%2529.pdf>>, access on Nov.08, 2020.

- Ho, V.E.H.; PARK, S. ESG Disclosure in Comparative Perspective: Optimizing Private Ordering in Public Reporting. *University of Pennsylvania Journal of International Law*, v. 41, n. 2, 2019.
- Hopata, A.C.; Ribeiro, F.; GERIGK, W. Participação no Índice de Sustentabilidade e Valor de Mercado: Evidências em Instituições Financeiras de Capital Aberto. *Revista Eletrônica do Alto Vale do Itajaí*, v. 9, n. 14, p. 097-114, 2020.
DOI:10.5965/2316419009142020097
- Huber, B.M.; Comstock, M. ESG Reports and Ratings: What They Are, Why They Matter? *The Corporate Governance Advisor*, V.25, n.5, Set.- Oct.2017.
- Ibama. Dados Abertos – Autos de Infração. 2021. Available at: <<http://dadosabertos.ibama.gov.br/dataset/fiscalizacao-infracao/resource/651feed4-cacb-4316-9353-49f571875fb6>>. access on Mar. 06, 2020.
- Índice de Sustentabilidade Empresarial (ISE B3). Boletim Informativo ISE. Apr.2015 – Apr.2020. Available at: <http://www.b3.com.br/pt_br/market-data-e-indices/indices/indices-de-sustentabilidade/boletim-informativo.htm>. access on Nov. 01, 2020.
- Ionescu, G.H.; Firoiu, D.; Pirvu, R.; Vilag, R.D. The impact of ESG factors on market value of companies from travel and tourism industry. *Technological and Economic Development of Economy*, v. 25, n. 5, p. 820-849, 2019. DOI: 10.3846/tede.2019.10294.
- ISE B3. Lista de Empresas Elegíveis - 2020/2021. 2020. Available at: <https://iseb3-site.s3.amazonaws.com/Lista_de_empresas_eleg%C3%ADveis_site_-_ISE_2020.pdf>, Access on Nov.08, 2020.
- Jebe, R. The convergence of financial and ESG materiality: Taking sustainability mainstream. *American Business Law Journal*, v. 56, n. 3, p. 645-702, 2019. DOI: 10.1111/ablj.12148
- Jukemura, P.K. Why ESG investing seems to be an attractive approach to investments in Brazil. *ING - Scuola di Ingegneria Industriale e dell'Informazione*. 2019. Available at: <<https://www.politesi.polimi.it/handle/10589/148575>>, Access on Jun.20, 2021.
- KPMG. *The time has come: The KPMG Survey of Sustainability Reporting 2020*. KPMG Impact. Dec.2020. Available at: <home.kpmg/sustainabilityreporting>, Access on Jan.23, 2021.
- Kumar, N. C. A. et al. ESG factors and risk-adjusted performance: a new quantitative model. *Journal of Sustainable Finance & Investment*, v. 6, n. 4, p. 292-300, 2016. DOI: 10.1080/20430795.2016.1234909
- La Torre, M.; Mago, F.; Cafaro, A.; Leo, S. Does the ESG Index Affect Stock Return? Evidence from the Eurostoxx50. *Sustainability 2020*, v.12, n.16, pp. 1-12, 2020. DOI:10.3390/su12166387.
- Lantos, G.P. The Boundaries of Strategic Corporate Social Responsibility. *Journal of consumer marketing*, 2001. DOI: 10.1108/07363760110410281

- Lock, I.; Seele, P. The credibility of CSR (corporate social responsibility) reports in Europe: Evidence from a quantitative content analysis in 11 countries. *Journal of Cleaner Production*, v. 122, 2016. pp.186-200. DOI: 10.1016/j.jclepro.2016.02.060.
- Lokuwaduge, C.S. S.; Heenetigala, K. Integrating environmental, social and governance (ESG) disclosure for a sustainable development: An Australian study. *Business Strategy and the Environment*, v. 26, n. 4, p. 438-450, 2016. DOI: 10.1002/bse.1927
- Lopes, A.C.B.; Leinioski, A.C.; Ceccon, L. Testes t para comparação de médias de dois grupos independentes. Universidade Federal do Paraná – UFPR, 2015. Available at: <http://www.leg.ufpr.br/lib/exe/fetch.php/disciplinas:ce001:bioestatistica_testes_t_para_comparacao_de_medias_de_dois.pdf>, access on Nov.14, 2020.
- Lopez-de-Silanes, F.; McCahery, J.A.; Pudschedl, P.C. ESG performance and disclosure: A cross-country analysis. *Sing. J. Legal Stud.*, pp. 217-241, 2020.
- Madison, N.; Schiehl, E. The Effect of Financial Materiality on ESG Performance Assessment. *Sustainability*, v. 13, n. 7, p. 3652, 2021. DOI: 10.3390/su13073652
- Matos, P. ESG and Responsible Institutional Investing Around the World: A Critical Review. *CFA Institute Research Foundation*. 2020.
- Mervelskemper, L.; Streit, D. Enhancing market valuation of ESG performance: Is integrated reporting keeping its promise? *Business Strategy and the Environment*, v.26, n.4, pp. 536-549, 2017. DOI: 10.1002/bse.1935
- Miralles-Quirós, M. M.; Miralles-Quirós, J. L.; Gonçalves, L. M. V. The value relevance of environmental, social, and governance performance: The Brazilian case. *Sustainability*, v. 10, n. 3, p. 574, 2018. DOI: 10.3390/su10030574
- Moura, L.; Norden, L. Does good corporate governance pay off in the long-run? Evidence from stock market segment switches in Brazil. *Revista Brasileira de Finanças (Online)*, Rio de Janeiro, V.17, N.3, pp. 1–25, Sep 2019. DOI: 10.2139/ssrn.3243023.
- Nirino, N.; Santoro, G.; Miglietta, R. Corporate controversies and company's financial performance: Exploring the moderating role of ESG practices. *Technological Forecasting and Social Change*, v. 162, p. 120341, 2021. DOI: 10.1016/j.techfore.2020.120341.
- Orsato, R.J.; Garcia, A.; Mendes-da-Silva, W.; Simonetti, R.; Monzoni, M. Sustainability indexes: why join in? A study of the ‘Corporate Sustainability Index (ISE)’ in Brazil. *Journal of Cleaner Production*, v. 96, p. 161-170, 2015. DOI: 10.1016/j.jclepro.2014.10.071.
- Osterrieder, D.; Pallia, D.; Wu, G. An Efficient Fixed-Effects Estimator for Corporate Finance. Available at SSRN 3168947, 2020. DOI: 10.2139/ssrn.3168947
- Peris, R.W.; Contani, E.; Savoia, J.R.F.; Bergmann, D.R. Does better corporate governance increase operational performance? *Corporate Governance: The International Journal of Business in Society*, v. 17, n 3, pp. 524-537, 2017. DOI: 10.1108/CG-03-2016-0063

- PwC. *SDG Challenge 2019: Creating a strategy for a better world*. 2019. Available at: <<https://www.pwc.com/gx/en/sustainability/SDG/sdg-2019.pdf>>, Access on Mar.06, 2021.
- Rangan, V.K.; Chase, L.; Karim, S. The Truth About CSR: Most of these programs aren't strategic – and that's ok. *Harvard Business Review*. Jan.-Feb. 2015. Available at: <<https://hbr.org/2015/01/the-truth-about-csr>>, Access on Jan.24, 2021.
- Rissman, P.; Kearney, D. Rise of the shadow ESG regulators: Investment advisers, sustainability accounting, and their effects on corporate social responsibility, *Envtl. L. Rep. News & Analysis*, v.49, p.10155, 2019.
- Roodman, D. How to do xtabond2: An introduction to difference and system GMM in Stata. *The Stata Journal*, v.9, n.1, pp.86-136, 2009.
- Rossi, J.L. What is the value of corporate social responsibility? An answer from the Brazilian sustainability index. 2009. Available at SSRN: <https://ssrn.com/abstract=1338114>, on Oct 30, 2020. DOI: 10.2139/ssrn.1338114.
- Rusu, D.I. The Impact of Environmental, Social and Governance Factors on Investor's Behavior – an Experimental Study in the Realm of Sustainable Investments.. *Journal of Public Administration, Finance and Law*, n.17, pp.301-319, 2020.
- S&P Dow Jones Indices. A S&P Dow Jones Indices e B3 S.A. lançam o Índice
- S&P/B3 Brasil ESG. A S&P Dow Jones Indices e B3 S.A. lançam o Índice S&P/B3 Brasil ESG. Comunicado de Imprensa. Set.2020(a). Available at: <<https://portugues.spindices.com/indices/equity/sp-b3-brazil-esg-index-brl>>, access on Nov.01, 2020.
- S&P Dow Jones Indices. Equity: S&P/B3 Brazil ESG Index. Oct.2020(b). Available at: <<https://portugues.spindices.com/indices/equity/sp-b3-brazil-esg-index-brl>>, access on Nov.01, 2020.
- Sahut, J.M.; Pasquini-Descomps, H.. ESG impact on market performance of firms: International Evidence. *Gestão Internacional*, v.19, n.2, pp. 40-63, 2015. DOI: 10.7202/1030386ar.
- Sampaio, J.; Gallucci, H.; Silva, V.A.B.; Schiozer, R.F. Adoção Obrigatória de IFRS, Governança Corporativa e Valor Da Firma. *Revista de Administração de Empresas*, v.60, n. 4, pp. 284-298, 2020. DOI: 10.1590/S0034-759020200405.
- Schiehl, E.; Kolahgar, S. Financial materiality in the informativeness of sustainability reporting. *Business Strategy and the Environment*, 2020. DOI: 10.1002/bse.2657
- Slaper, T.F.; Hall, T.J. The triple bottom line: What is it and how does it work. *Indiana business review*, v. 86, n. 1, p. 4-8, 2011. Available at: <<http://web.mit.edu/afs.new/athena/course/2/2.813/www/readings/TripleBottomLine.pdf>>, access on Nov.02, 2020.
- Sobrosa Neto, R.C.; Lima, C.R.M.; Bazil, D.G.; Veras, M.O.; Salgueirinho, J.B.; Guerra, O.A. Sustainable development and corporate financial performance: A study based on the

Brazilian Corporate Sustainability Index (ISE). *Sustainable Development*, v.28, n.4, pp. 960-977, 2020. DOI: 10.1002/sd.2049.

Souza, A.L.R.; Gomes, S.M.S.; Andrade, J.C.S.; Eugénio, T. Porque as empresas participam em iniciativas empresariais em clima no Brasil?. *AIDIS de Ingeniería y Ciencias Ambientales*: Investigación, desarrollo y práctica, v. 11, n. 1, p. 61-84, 2018. Available at: <<https://iconline.ipleiria.pt/handle/10400.8/3399>>, access on Nov.14, 2020.

Souza, A.L.R.; Silva Junior, A.F.; Andrade, J.C.; Fernandes, M.E.. Retorno das Ações e Sensibilidade ao Risco de Mercado das Empresas Participantes do Índice Carbono Eficiente (ICO2) da B3 SA: Um estudo comparativo. *Revista Universo Contábil*, v. 14, n. 2, p. 30-60, 2019. DOI: 10.4270/RUC.2018210

The Global Compact. *Who cares wins: Connecting financial markets to a changing world*. New York, 2004. Available at: <https://d306pr3pise04h.cloudfront.net/docs/issues_doc%2FFinancial_markets%2Fwho_cares_who_wins.pdf>, access on Nov.02, 2020.

Torres-Reyna, O. *Panel Data Analysis: Fixed and Random Effects using Stata* (v. 4.2). Princeton University. Dec.2007. Available at: <<http://dss.princeton.edu/training/>>, access on Nov.02, 2020.

Vital, J.T.; Cavalcanti, M.M.; Dalló, S.; Moritz, G.O.; Costa, A.M. A Influência da Participação no Índice de Sustentabilidade Empresarial (ISE) no Desempenho Financeiro das Empresas. *Revista de Ciências da Administração*, v.11, n.24, pp.11-40, May/Aug 2009. DOI: 10.5007/2175-8077.2009v11n24

Who's Good. *Does ESG Affect Fundamentals?* Dec.2020. Available at: <www.whosgood.org>, Access on Jan.23, 2021.

World Economic Forum. *Measuring Stakeholder Capitalism Towards Common Metrics and Consistent Reporting of Sustainable Value Creation*. Sep.2020. Available at: <http://www3.weforum.org/docs/WEF_IBC_Measuring_Stakeholder_Capitalism_Report_2020.pdf>, access on Nov.07, 2020.

APPENDIX

Appendix 1 – Selected Securities (Based on the availability in the Refinitiv ESG Score system, as explained in section 3.3)

Company	Sector	Company	Sector
ABCB4	Banks	KLBN11	Pulp and Paper
ABEV3	Food and Beverage	LAME4	Retail
AZUL4	Airline	LCAM3	Retail
B3SA3	Financial services	LEVE3	Auto parts
BBAS3	Banks	LIGT3	Energy
BBDC4	Banks	LINX3	Technology and Communication
BBSE3	Financial services	LOGG3	Logistics
BEEF3	Food and Beverage	LREN3	Retail
BIDI4	Banks	MDIA3	Food and Beverage
BKBR3	Food Service	MGLU3	Retail
BPAC11	Banks	MOVI3	Vehicle Rental
BRAP4	Financial services	MRFG3	Food and Beverage
BRDT3	Chemical Industry / Oil / Fuels	MRVE3	Real Estate
BRFS3	Food and Beverage	MULT3	Real Estate
BRKM5	Chemical Industry / Oil / Fuels	MYPK3	Auto parts
BRML3	Real Estate	NTCO3	Pharma / Personal Care
BRPR3	Real Estate	ODPV3	Health
BRSR6	Banks	PCAR3	Retail
BTOW3	Retail	PETR4	Chemical Industry / Oil / Fuels
CCRO3	Concession	POMO3	Auto parts
CIEL3	Financial services	PRIO3	Chemical Industry / Oil / Fuels
CMIG4	Energy	PSSA3	Financial services
COGN3	Education	QUAL3	Health
CPFE3	Energy	RADL3	Retail
CPLE6	Energy	RAIL3	Logistics
CSAN3	Agribusiness	RAPT3	Auto parts
CSMG3	Water and Sewage	RENT3	Vehicle Rental
CSNA3	Metallurgical / Steel	RLOG3	Logistics
CVCB3	Tourism	RSID3	Real Estate
CYRE3	Real Estate	SANB11	Banks
DIRR3	Real Estate	SAPR11	Water and Sewage
DTEX3	Agribusiness	SBSP3	Water and Sewage
ECOR3	Concession	SEER3	Education
EGIE3	Energy	SLCE3	Agribusiness
ELET6	Energy	SMLS3	Financial services
EMBR3	Aeronautics	SMT03	Agribusiness
ENAT3	Chemical Industry / Oil / Fuels	STBP3	Logistics
EQL3	Energy	SULA11	Financial services
EVEN3	Real Estate	SUZB3	Pulp and Paper
EZTC3	Real Estate	TAE11	Energy
FLRY3	Health	TEND3	Real Estate
GFSA3	Real Estate	TIMP3	Technology and Communication
GGBR4	Metallurgical / Steel	TOTS3	Technology and Communication
GOAU4	Metallurgical / Steel	TRPL4	Energy
GOLL4	Airline	TUPY3	Auto parts
GRND3	Clothing	UGPA3	Chemical Industry / Oil / Fuels
HGTX3	Retail	USIM5	Metallurgical / Steel
HYPE3	Pharma / Personal Care	VALE3	Mining
IGTA3	Real Estate	VIVT4	Technology and Communication
IRBR3	Financial services	VLID3	Financial services
ITSA4	Financial services	VVAR3	Retail
ITUB4	Banks	WEGE3	Machinery and Equipment
JBSS3	Food and Beverage	YDUQ3	Education

Source: The author

ATTACHMENTS

Attachment 1 – ISE Composition (2015-2020), including the securities tickers and initial weight (in %, designated in the first trade day of each January)

ISE	2015	ISE	2016	ISE	2017	ISE	2018	ISE	2019	ISE	2020
BBAS3	1.180	BBAS3	0.992	BBAS3	1.769	BBAS3	1.617	BBAS3	2.348	BBAS3	2.008
BBDC3	1.240	BBDC3	1.127	BBDC3	1.087	BBDC3	1.068	BBDC3	1.106	BBDC3	1.056
BBDC4	4.575	BBDC4	3.882	BBDC4	3.972	BBDC4	4.117	BBDC4	4.735	BBDC4	3.812
BICB4	0.021	BRFS3	15	BRFS3	13.436	BRKM5	4.565	BRKM5	4.915	BRDT3	-
BRFS3	14.437	BRKM5	2.701	BRKM5	3.274	BTOW3	1.199	BTOW3	2.512	BRFS3	-
BRKM5	0.908	BTOW3	0.621	BTOW3	0.455	CCRO3	7.252	CCRO3	4.9	BRKM5	3.004
BTOW3	0.313	CCRO3	3.995	CCRO3	4.966	CIEL3	10.589	CIEL3	3.902	BTOW3	2.46
CCRO3	3.851	CESP6	0.901	CIEL3	9.358	CLSC4	0.249	CMIG3	0.446	CCRO3	8.053
CIEL3	7.976	CIEL3	9.592	CLSC4	0.121	CMIG4	2.667	CMIG4	5.271	CIEL3	3.552
CMIG3	0.709	CMIG4	1.681	CMIG4	2.125	CPFE3	0.416	CPLE6	1.211	CMIG3	0.637
CMIG4	2.642	CPFE3	1.731	CPFE3	2.723	CPLE6	0.979	DTEX3	0.604	CMIG4	2.286
COCE5	0.191	CPLE6	0.907	CPLE6	0.919	DTEX3	1.007	ECOR3	1.268	CPLE3	-
CPFE3	1.461	DTEX3	0.571	DTEX3	0.667	ECOR3	0.921	EGIE3	6.073	CPLE6	1.515
CPLE3	0.137	ECOR3	0.374	ECOR3	0.592	EGIE3	2.914	ELET3	0.717	DTEX3	1.739
CPLE6	0.934	ELET3	0.574	EGIE3	2.373	ELPL3	1.101	ELET6	0.1	ECOR3	1.06
DTEX3	0.533	ELET6	0.848	ELET3	1.979	ENBR3	1.664	ELPL3	1.637	EGIE3	2.213
ECOR3	0.561	ELPL4	0.288	ELET6	1.968	FIBR3	4.42	ENBR3	3.3	ELET3	2.1
ELET3	0.321	EMBR3	8.214	ELPL4	0.348	FLRY3	3.658	FLRY3	2.401	ELET6	1.477
ELET6	0.408	ENBR3	1.035	EMBR3	4.244	ITSA4	1.732	ITSA4	2.042	ENBR3	1.099
ELPL4	0.221	EVEN3	0.313	ENBR3	1.037	ITUB3	0.447	ITUB3	0.441	FLRY3	3.542
EMBR3	4.895	FIBR3	4.264	FIBR3	2.644	ITUB4	5.526	ITUB4	6.369	ITSA4	1.723
ENBR3	0.562	FLRY3	0.391	FLRY3	1.991	KLBN11	3.472	KLBN11	3.681	ITUB3	0.338
EVEN3	0.259	ITSA4	1.906	ITSA4	1.616	LAME3	0.895	LAME3	1.042	ITUB4	4.782
FIBR3	2.198	ITUB3	0.567	ITUB3	0.489	LAME4	4.102	LAME4	4.836	KLBN11	4.465
FLRY3	0.231	ITUB4	6.083	ITUB4	5.481	LIGT3	0.656	LIGT3	0.632	LAME3	0.805
GETI3	0.208	KLBN11	4.321	KLBN11	2.841	LREN3	8.803	LOGG3	0.149	LAME4	3.658
GETI4	0.577	LAME3	0.729	LAME3	0.855	MRVE3	1.74	LOGG3	-0.459	LIGT3	1.235
GGBR3	0.226	LAME4	3.047	LAME4	3.224	NATU3	2.292	LREN3	10.759	LREN3	8.923
GGBR4	2.39	LIGT3	0.357	LIGT3	0.564	SANB11	0.493	MRVE3	1.415	MOV13	-
GOAU3	0.108	LREN3	4	LREN3	5.321	TIET11	1.528	NATU3	3.042	MRVE3	2.4
GOAU4	0.804	NATU3	1.493	MRVE3	1.091	TIMP3	4.262	SANB11	0.603	NTCO3	5.148
ITSA4	1.898	OIBR3	0.461	NATU3	1.431	VIVT4	8.123	TIET11	1.171	SANB11	0.488
ITUB3	0.513	OIBR4	0.021	SANB11	0.585	WEGE3	5.526	TIMP3	3.754	TIET11	0.818
ITUB4	5.87	SANB11	0.442	SULA11	1.565			VIVT4	7.526	TIMP3	4.813
JSLG3	0.182	SULA11	1.656	TIET11	0.843			WEGE3	5.092	VIVT4	9.028
KLBN11	1.644	TBLE3	2.524	TIMP3	2.287					WEGE3	9.763
LAME3	0.554	TIET11	0.967	VIVT4	6.564						
LAME4	1.917	TIMP3	2.05	WEGE3	3.192						
LIGT3	0.366	VIVT4	6.23								
LREN3	2.858	WEGE3	3.141								
NATU3	1.273										
SANB11	0.339										
SBSP3	1.545										
SULA11	0.841										
TBLE3	1.826										
TIMP3	2.583										
VALE3	6.228										
VALE5	8.071										
VIVT3	0.364										
VIVT4	3.709										
WEGE3	2.342										

Source: Índice de Sustentabilidade Empresarial (ISE B3). *Boletim ISE*. Apr.2015 – Apr.2020

Attachment 2 – S&P/B3 Brazil ESG Index Composition (2020)

S&P/B3 Brazil ESG Portfolio (2020)							
ABEV3	BRSR6	CVCB3	GRND3	LINX3	RENT3	VIVT3	Top 10
ALPA4	BTOW3	CYRE3	GUAR3	MDIA3	SANB11	VVAR3	LREN3
ALUP11	CCRO3	DTEX3	HAPV3	MGLU3	SAPR11	YDUQ3	BBAS3
ARZZ3	CESP6	ECOR3	HGTX3	MRFG3	SBSP3		NTCO3
AZUL4	CIEL3	EGIE3	HYPE3	MRVE3	SMT03		ITSA4
B3SA3	CMIG3	EMBR3	IGTA3	MULT3	STBP3		ITUB4
BBDC3	COGN3	ENGI11	IRBR3	NEOE3	SULA11		BBDC4
BBSE3	CPFE3	EQTL3	ITUB3	ODPV3	SUZB3		CMIG4
BEEF3	CPLE3	EZTC3	ITUB4	PCAR3	TAE11		WEGE3
BPAC11	CPLE6	FLRY3	JSLG3	PRI03	TIMP3		BRKM5
BRAP3	CRFB3	GGBR4	KLBN11	PSSA3	TOTS3		VIVT4
BRAP4	CSAN3	GNDI3	LAME3	QUAL3	TRPL4		
BRML3	CSMG3	GOAU4	LAME4	RADL3	UGPA3		
BRPR3	CSNA3	GOLL4	LIGT3	RAIL3	USIM5		

Source: S&P DOW JONES INDICES, 2020(a).