



DO BRAZILIAN ESG/SRI INDICES HAVE HIGHER RETURNS AND LOWER RISK? A COMPARISON USING ISE, IGCT, IBOVESPA, AND IBRX

ÍNDICES ESG/SRI BRASILEIROS TÊM MAIORES RETORNOS E RISCOS MENORES? UMA COMPARAÇÃO UTILIZANDO ISE, IGCT, IBOVESPA E IBRX ÍNDICES ESG/SRI BRASILEÑOS TIENEN MAYORES RETORNOS Y RIESGOS MENORES? UNA COMPARACIÓN UTILIZANDO ISE, IGCT, IBOVESPA Y IBRX

DOI: 10.5212/Admpg.v.14.23188.008

Anderson Rocha de Jesus Fernandes¹
Sabrina Espinele Silva²
Simone Evangelista Fonseca³

Abstract

Socially Responsible Investments (SRI) are a part of the broader concept of Environmental, Social and Governance (ESG), a set of institutional practices that aggregate the activities of a company with the responsibility with its social and environmental surroundings. Markets and investors are increasingly interested in such good practices, the reason why stock exchanges have developed indices composed of companies with differentiated initiatives of sustainability and governance (Liang & Renneboog, 2020). This paper aims to investigate whether two of the B3 ESG/SRI indices, ISE and IGCT, outperform in the mean-variance (return and risk) dimension the most famous B3 broad indices, Ibovespa and IBrX. We used parametric and non-parametric tests of equal mean and equal/homogeneity variances to address our research question. Results show that Brazilian ESG/SRI indices are not statistically different from broad indices in returns, i.e., they have, on average, equal means. However, there is evidence that ESG/SRI indices are less risky than the Ibovespa and IBrX indices.

Keywords: ESG/SRI; Indices; Sustainability; Returns; Risk.

Resumo

Investimentos Socialmente Responsáveis (SRI) fazem parte do conceito mais amplo que engloba Meio Ambiente, Sociedade e Governança (ESG), um conjunto de práticas que agregam às atividades de uma companhia à responsabilidade com o seu meio social e ambiental. Mercados e investidores estão cada vez mais interessados nessas boas práticas de tal forma que bolsas de valores desenvolveram índices compostos por companhias com iniciativas diferenciadas no que tange à sustentabilidade e à governança (Liang & Renneboog, 2020). Este artigo tem o objetivo de investigar se dois dos índices ESG/SRI da B3, ISE e IGCT, apresentam melhor performance na dimensão de média e variância (retorno e risco) que os principais índices amplos da B3, o Ibovespa e o IBrX. Nós usamos testes paramétricos e não paramétricos de igualdade de médias e de homogeneidade de variâncias a fim de responder nossa pergunta de pesquisa. Resultados mostram que os índices ESG/SRI brasileiros não são estatisticamente diferentes dos índices amplos em termos de retornos, ou seja, eles têm, em média, retornos iguais. Entretanto, há evidências de que os índices ESG/SRI têm nível de risco menor que os índices Ibovespa e IbrX.

¹ Centro Federal de Educação Tecnológica de Minas Gerais- CEFET-MG - Brasil - andersonrjf@gmail.com

² Universidade Federal de Minas Gerais - UFMG - Brasil - sabrinaespinele@gmail.com

³ Universidade Federal de Ouro Preto - UFOP - Brasil - simone_fonseca16@hotmail.com

Resumen

Inversiones Socialmente Responsables (SRI) hacen parte del concepto más amplio que engloba Medio Ambiente, Sociedad y Gobernanza (ESG), un conjunto de prácticas que agregan a las actividades de las empresas la responsabilidad con su medio social y ambiental. Mercados e inversores están cada vez más interesados en estas buenas prácticas de tal modo que bolsas de valores han desarrollado índices compuestos por compañías con iniciativas diferenciadas en lo que toca la sustentabilidad y la gobernanza (Liang & Renneboog, 2020). Este artículo tiene el objetivo de investigar se dos de los índices ESG/SRI de B3, ISE y IGCT, tienen mejor performance en la dimensión de media y varianza (retorno y riesgo) que los principales índices amplios de B3, Ibovespa y IBrX. Nosotros utilizamos testes paramétricos y no paramétricos de igualdad de medias y homogeneidad de varianzas con la finalidad de responder nuestra pregunta de inversión. Resultados muestran que los índices ESG/SRI brasileños no son estadísticamente diferentes de los índices amplios en términos de retornos, o sea, tienen, promedio, retornos iguales. Sin embargo, hay evidencias de que los índices ESG/SRI tienen niveles de riesgo inferiores que los índices Ibovespa y IBrX.

Palabras-clave: : ESG/SRI; Índices; Sustentabilidade; Retornos; Riesgo.

1. Introduction

Socially Responsible Investments (SRI) are an integrated organizational strategy that combine economic and financial interests with social and environmental issues (Gillan, Koch & Starks, 2021). Therefore, it is constituted by a bunch of companies that along with their normal activities (production of goods and services), also act on improving the community where they are located (Liang & Renneboog, 2020; Widyawati, 2020). In a broader perspective, one argues that the SRIs are important to the so-called Sustainable Development Goals (SDG), created in 2015 by the United Nations (UN, 2023).

In fact, public and private companies have been seeking to perform good practices due to the development of different demands from consumers and markets in the direction of a large participation in terms of an efficient use of resources and a more humanized process of production (Cunha et al., 2019; Durand, Paugam & Stolowy, 2019). Therefore, the SRI is associated with many of the SDGs, because companies can drive their social actions in numerous directions. However, SRIs are directly related to objectives number 8 (decent work and economic growth), 9 (industry, innovation, and infrastructure) and 12 (responsible consumption and production).

Shortly, these objectives promote technological expansion and the necessity of higher quality jobs, infrastructure, and good use of resources as a decisive condition to a Sustainable Development (UN, 2023). We can also mention other objectives,

such as gender equality (5), reduced inequalities (10), and climate action (13), as important fields of action for organizations that aim to be considered socially responsible.

The SRI is also part of a broader concept, the Environmental, Social, Governance (ESG) investing. The ESG is a series of procedures and criteria endorsed by investors to evaluate a company or a group as socially and environmentally responsible, as well as its level of transparency (Liang & Renneboog, 2020; Gillan, Koch & Starks, 2021; Elouidani, Outouzzalt & El Ouidani, 2022; Meng-Tao et al., 2023).

As demand for this type of investment has increased around the world, financial markets developed measures to classify companies that claim themselves to be sustainable and/or responsible (Cunha et al., 2019). Many stock exchanges created the so-called sustainable indices, which are theoretical portfolios constituted by companies that adopt higher levels of transparency and governance and take actions on the protection of environmental and social communities (Fernandes, Fonseca & Cunha, 2018; Cunha et al., 2019). As an example, Fernandes, Fonseca, and Cunha (2018) listed the Corporate Sustainability Index (ISE) created by B3, the Brazilian Stock Exchange, the Dow Jones Sustainability Index (DJSI) of the New York Stock Exchange (NYSE), the FTSE4Good of the London Stock Exchange, and the JSE SRI Index, created by the Johannesburg Stock Exchange.

The idea behind ESG/SRI indices is the measurement of the average performance of assets and shares of companies that make up their portfolios (Durand, Paugam & Stolowy, 2019; B3, 2023). Theoretically, these indices should represent better long-term investments because of their characteristics of social and environmental protection and disclosure, transparency, and governance of firms that are categorized as responsible in these aspects (Torres & Enciso, 2017; Ndione, 2020).

The literature on the investigation of ESG/SRI practices is extensive. There is no conclusive evidence that it increases the value of a company; however, it is more certain that it contributes to risk reduction (Gillan, Koch, & Starks, 2021). According to Meng-Tao et al. (2023), transparency of ESG improves stock liquidity of Chinese enterprises, but Larrinaga (2023) argues that ESG reports can be just a means of disguising real social and environmental problems. Durand, Paugam, and Stolowy (2019) argue that ESG practices do not impact the price or the trading level of stocks but draw the attention of individual and institutional investors who seek this kind of investment in a long-term perspective.

Regarding the examination of market indices, Fernandes, Fonseca, and Cunha (2018) show that sustainability indices around the world does not follow a random walk, but they can present a lower variance when compared to broad indices. Cunha et al. (2019) have similar results, indicating heterogeneities in SRI performance in different countries, however they offer good risk-adjusting opportunities to investors. Torres and Enciso (2017) find that for the Mexican financial market, ESG/SRI indices outperform the broad market portfolio in the mean-variance dimension.

This paper aims to examine the homogeneity in terms of mean (return) and variance (risk) of Brazilian ESG/SRI indices comparing it with broad indices. Shortly, we want to assess whether the mean and the variance of the returns of the Corporate Sustainability Index (ISE), and of the Corporate Governance Trade Index (IGCT) differ from the mean and variance of the Ibovespa Index and the Brazil Index (IBrX). The following are the hypotheses of this study: i) ESG/SRI indices offer higher returns than the market in general; and ii) ESG/SRI indices offer lower risk than the market in general.

The mean-variance domain is the base for

the portfolio theory, developed by Markowitz (1952), which says that a diversified investor should combine assets that minimize risk and maximize returns of its portfolio with the aim of a positive gain in the future. In terms of the proposed analysis, one can verify how an ESG/SRI portfolio allow diversification as a result of a risk-return optimization. So, the contribution of this paper is to assess the real situation of ESG/SRI in the Brazilian stock market, observing if it offers better returns and lower risk to investors since it is characterized by deep levels of disclosure, transparency, and governance.

In the following section, we discuss the data and the methods adopted in this study. Next, we discuss the results. The last section brings the main conclusions and limitations.

2. Data and Methods

Our data consists of indices' daily prices collected from B3 (Brasil, Bolsa, Balcão), the Brazilian stock exchange. We selected two ESG/SRI indices, the Corporate Sustainability Index (ISE), and the Corporate Governance Trade Index (IGCT), and two broad indexes, that represent the financial market, Ibovespa Index, and the Brazil Index (IBrX).

For Ibovespa and IBrX data ranges from January 1998 to December 2022. For ISE, it ranges from November 2005 to December 2022. For IGCT data begins in December 2005. The period coverage is full of macroeconomic occurrences that caused some impact on the financial market, such as the subprime crisis in 2008 and the Covid-19 pandemic in 2020-21 (Figure 2).

Our main variable is the daily return of the price of the index. We calculated the returns by taking the natural logarithm of prices as displayed in Equation 1. This represents the rate of change in a continuous basis which we chose due to the considerable number of observations we have.

$$R_t = \ln\left(\frac{P_t}{P_{t-1}}\right) \quad (1)$$

Where: R_t is the return in day t ; P_t the price of the index in day t ; and $P_{(t-1)}$ is the price of the index in day $t-1$.

The analysis consists of testing whether the mean and the variance of the ESG/SRI indices (ISE and IGCT) statistically differ from the mean and the variance of the broad indices. We do such

procedure under the hypothesis that ESG/SRI indices offer higher levels of return (mean) and a lower level of risk (variance).

After analyzing the normality of returns (Jarque-Bera test), we used a parametric t-Student test and a nonparametric Wilcoxon test for equal mean (μ) under the following test of hypothesis. We compared each ESG/SRI index with each broad index at a time.

$$H_0: \mu_{ESG} = \mu_{Mkt}$$

$$H_1: \mu_{ESG} \neq \mu_{Mkt}$$

As we did for the mean, we performed a parametric F test and a nonparametric homogeneity Levene test for the variance of the returns to understand whether there is a difference between the degree of risk of a sustainable portfolio and a non-sustainable portfolio. Both tests consider the ratio of the variances and verify if it is statistically equal to one. We reproduce the test of the hypothesis as follows.

$$H_0: \sigma_{ESG}^2 = \sigma_{Mkt}^2$$

$$H_1: \sigma_{ESG}^2 \neq \sigma_{Mkt}^2$$

3. Results

3.1 Descriptive statistics

Figure 1 displays the series of prices of the investigated indices. It shows the daily evolution of Ibovespa and IBrX from 1998 to 2022. Data for ISE and IGCT starts in 2005. Due to many factors such as amount of negotiation, number of assets in the theoretical portfolio, existence, popularity, etc., Ibovespa shows a higher-level price performance.



Figure 1 – Evolution of the prices of B3 broad indices, Ibovespa and IBrX, and the ESG / SRI indices, ISE and IGCT, from 1998 to 2022

Source: Brasil, Bolsa, Balcão (B3, 2023).

Source: Brasil, Bolsa, Balcão (B3, 2023).

Visually, it also seems to have a greater level of variance compared to the other indices. IBrX has some price evolution characteristics with Ibovespa, since it is a broad index, composed of the 100 most valued companies. For this reason, it appears to respond with less intensity to economic crises such as the 2008-2009 subprime and the Covid-19 pandemic in 2020-21.

Due to differences in the scales (levels of prices) and the fact that they are more recent indices, one barely sees oscillations in the evolution of ISE and IGCT in Figure 1. We perform the analysis of the returns bellow; however, it is worth noting that the ESR/SRI indices are also impacted by externalities. The remaining question is whether these economic effects on intensity differ from the effects on the broad indices.

Figure 2 shows the daily returns of the indices, calculated from their prices according to Equation 1. From this perspective, we can observe that all four indices have in common a temporal behavior, which would be something like a random walk, except for the fact that they are clearly affected by periods of crisis.

However, their variances seem to be constant in the long term. Again, it remains to be seen whether their variances differ from each other. Before we discuss those details, we discuss some other characteristics of the data. Table 1 displays descriptive statistics of prices (panel A) and returns (panel B) of the indices investigated. The table corroborates the differences in scale among the index's prices: while Ibovespa has average price higher than 50.000 points, IBrX does not reaches 20.000 points. ISE and IGCT have average values at the level of 2.500.

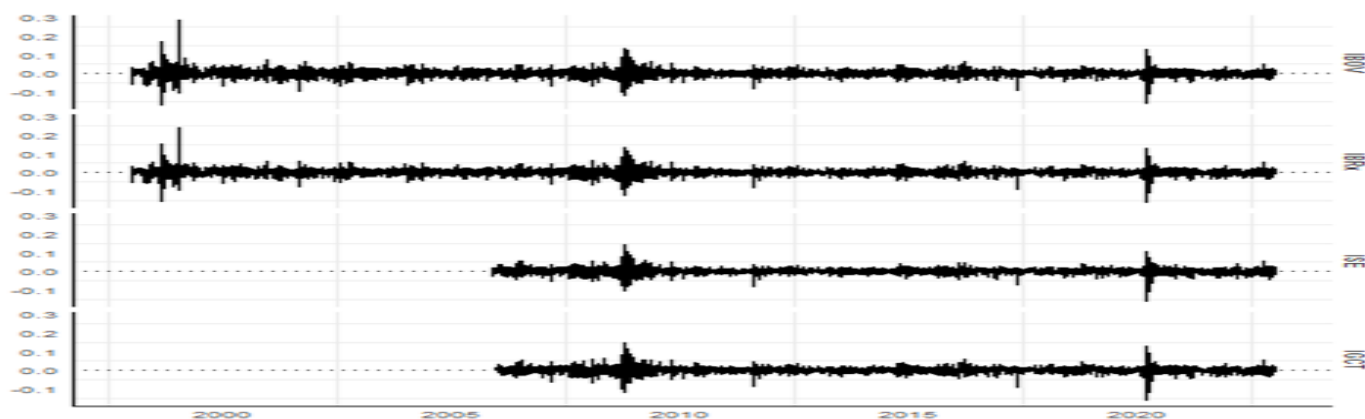


Figure 2 – The evolution of returns of broad indices, Ibovespa and IBrX, and ESG/SRI indices, ISE and IGCT, from 1998 to 2022

Source: Brasil, Bolsa, Balcão (B3, 2023).

	IBOVE SPA	IBRX	ISE	IGCT
Panel A: Prices				
n	6,187	6,187	4,226	4,205
Mean	51,954.45	19,523.89	2,463.06	2,697.07
Standard Deviation	31,898.96	14,315.62	810.47	1,291.64
Median	52,806.22	19,858.69	2,371.22	2,139.94
1 st quartile	21,531.47	5,872.37	1,923.51	1,870.94
3 rd quartile	67,729.41	24,535.19	2,960.09	3,546.61
Skewness	0.4436	0.6485	0.4126	0.8801
Kurtosis	-0.6314	-0.4154	-0.5150	-0.5022
Maximum	130,776.27	56,006.73	4,399.74	5,910.71
Minimum	4,760.58	923.41	974.44	846.42
Panel B: Returns				
Mean	0.0004	0.0005	0.0003	0.0004
Standard Deviation	0.0195	0.0179	0.0160	0.0168
Median	0.0008	0.0008	0.0005	0.0007
1 st quartile	-0.0095	-0.0083	-0.0076	-0.0078
3 rd quartile	0.0109	0.0100	0.0086	0.0092
Skewness	0.2315	0.0067	-0.4580	-0.4478
Kurtosis	14.7390	13.5216	10.8113	10.9617
Maximum	0.2882	0.2412	0.1449	0.1496
Minimum	-0.1723	-0.1612	-0.1587	-0.1618
Jarque-Bera (p-value)	0.0000	0.0000	0.0000	0.0000

Table 1 – Descriptive statistics of prices and returns of Brazilian broad indices, Ibovespa and IBrX, and ESG/SRI indices, ISE and IGCT, 1998-2022

Source: Brasil, Bolsa, Balcão (B3, 2023).

Prices also range in a different spectrum. Ibovespa is much more volatile than the others, which can be interpreted as a first indication that ESG/SRI indices are less risky than market portfolios. However, we must perform a further analysis to confirm this. The other values presented in panel A of Table 1 allow us to argue that prices are not normally distributed, since, all indices, they are slightly asymmetric to the right (skewness > 0,03) and platykurtic (kurtosis < 0).

Most analyses in finance use returns as the main variable. Panel B of Table 1 shows that the returns of the indices do not differ much in absolute values. However, again Ibovespa has a higher standard deviation, while ISE and IGCT seem to vary in a lesser extent.

Since we aim to compare the mean and variance of the returns, we tested whether they are normally distributed because parametric tests of equal mean and equal variance assume normality. According to the p-values

of the Jarque-Bera test, we must reject the null hypothesis that the returns of the indices follow a normal distribution. For this reason, we also run the Wilcoxon nonparametric test for equal mean and the nonparametric Levene variance normality test. We discuss the results in the next section.

3.2 Mean and variance differences in ESG/SRI indices

Although we have evidence that the returns are not normally distributed, we chose to perform and show the results of parametric tests of equal mean and variance. Table 2 shows the results for the mean. We took each ESR/SRI index and compared it with each of the broad indices (Ibovespa and IBrX) under the null hypothesis of equal mean.

Panel A of Table 2 displays the results of the parametric t-Student test. For all comparisons there is no evidence that the mean returns of ESG/SRI indices are statistically different from the

returns of broad indices. The same conclusion is taken when analyzing the results of the Wilcoxon test, we do not reject the null hypothesis of equal mean. It has some implications for the examination of the performance of ESG/SRI portfolios: some evidence suggests that there is a positive effect on the value of the firms that take ESG actions, others say the contrary (Gillan, Koch, & Starks, 2021).

column of the ratio, we see that the returns of the broad indices have higher variance (> 1) than the ESG/SRI indices in all comparisons. In the first panel we reject the null hypothesis of equal variance.

Panel B corroborates the finding that ESG/SRI practices result in a lower variance of the returns, i.e., lower risk levels. Levene's nonparametric test indicates the same thing, rejecting the hypothesis

	BROAD INDEX MEAN	ESG/SRI INDEX MEAN	STATISTIC	P-VALUE	95% INF. CI	95% SUP. CI
Panel A: t-Student test						
Ibovespa VS ISE	0.0004	0.0003	0.3078	0.7582	-0.0006	0.0008
IBrX VS ISE	0.0005	0.0003	0.6828	0.4948	-0.0004	0.0009
Ibovespa VS IGCT	0.0004	0.0004	0.0048	0.9962	-0.0007	0.0007
IBrX VS IGCT	0.0005	0.0004	0.3569	0.7212	-0.0006	0.0008
Panel B: Wilcoxon test						
Ibovespa VS ISE	-	-	13,156,458	0.5566	-	-
IBrX VS ISE	-	-	13,232,522	0.2744	-	-
Ibovespa VS IGCT	-	-	13,014,958	0.9363	-	-
IBrX VS IGCT	-	-	13,082,478	0.5962	-	-

Table 2 – Parametric and non-parametric tests for equal mean (returns) between Brazilian broad indices, Ibovespa and IBrX, and ESG/SRI indices, 1998-2022

Source: Brasil, Bolsa, Balcão (B3, 2023).

This result indicates that ESG/SRI practices do not influence the returns of Brazilian firms and, further, that they are like those of the market as a whole. Since, sustainability and governance imply disclosure, transparency, and other good practices that are valued by investors, one would expect higher levels of returns of the so-called green investments (Gillan, Koch & Starks, 2021).

Now we discuss whether the risk of ESG/SRI indices is equal to that of the market. Table 3 shows the results of the F-test for equal (panel A) and greater (panel B) variance, and the non-parametric Levene' test (panel C). Observing the

of homogeneous variances (marginally in the comparison between IBrX and IGCT).

This result also has implications for the analysis of socially responsible investments, since its assumed higher level of disclosure and transparency is directly related to a higher level of certainty in what is expected of these firms. It follows international evidence that ESG/SRI practices reduce the risk and firm's cost of capital which increases investor's confidence as discussed by Gillan, Koch and Starks (2021).

	RATIO	VALUE	P-VALUE	95% INF. CI	95% SUP. CI
Panel A: F-test for equal variance					
Ibovespa VS ISE	1.4753	1.4753	0.0000	1.3957	1.5590
IBrX VS ISE	1.2417	1.2417	0.0000	1.1747	1.3121
Ibovespa VS IGCT	1.3394	1.3394	0.0000	1.2670	1.4155
IBrX VS IGCT	1.1273	1.1273	0.0000	1.0663	1.1913
Panel B: F-test for greater variance					
Ibovespa VS ISE	1.4753	1.4753	0.0000	1.4082	-
IBrX VS ISE	1.2417	1.2417	0.0000	1.1852	-
Ibovespa VS IGCT	1.3394	1.3394	0.0000	1.2784	-
IBrX VS IGCT	1.1273	1.1273	0.0000	1.0759	-
Panel C: Levene's test for homogeneity of variance					
Ibovespa VS ISE	-	94.1060	0.0000	-	-
IBrX VS ISE	-	57.0140	0.0000	-	-
Ibovespa VS IGCT	-	27.9780	0.0000	-	-
IBrX VS IGCT	-	9.6621	0.0019	-	-

Table 3 – Parametric and non-parametric tests for comparison of variances (risk) of Brazilian broad indices, Ibovespa and IBrX, and ESG/SRI indices, ISE and IGCT, 1998-2022

Source: Brasil, Bolsa, Balcão (B3, 2023).

4. Conclusions

Environmental issues, social responsibility, and corporate governance are subjects that are increasingly taking the attention of companies, governments, and individuals due to the necessity of an efficient and respectful use of natural and social resources (UN, 2023). Therefore, terms such as sustainability and SRI are gaining some space in economic and financial discussions (Liang & Renneboog, 2020; Ndione, 2020; Widyawati, 2020).

Stock exchanges have developed measures to publicize companies' good practices and to incorporate them into the day by day of negotiations. Investors, in their turn, prices those practices in the long run (Durand, Paugam & Stolowy, 2019). The most common market indicator for environmental, social, and governance (ESG) and SRI practices are the indices, such as the Corporate Sustainability Index (ISE) created by B3 in Brazil or the Dow Jones Sustainability Index (DJSI) of the New York Stock Exchange (NYSE).

This paper aimed to evaluate the performance of two Brazilian ESG/SRI indices, ISE (sustainability) and IGCT (governance) compared to the two main broad indices, Ibovespa and IBrX, in the mean-variance domain. In essence, we tested the hypothesis that the ESG/SRI indices have the same mean (returns) and the same variance (risk) as the market as a whole. This analysis implies a deep understanding of how the market value all the criteria (disclosure, governance, etc.) imposed to the so-called green companies.

Our results show that ESG/SRI indices do not have statistically different returns from the broad indices, which could imply that those good practices do not produce higher values for firms or portfolios that is composed by such firms, as discussed by Fernandes, Fonseca, and Cunha (2018) and Gillan, Koch, and Starks (2021). However, ESG/SRI returns have lower variance, that is, they have low levels of risk, perhaps due to a higher degree of transparency.

One of the main implications of this result is the possible mismatch between the expenses taken by firms to frame on the ESG/SRI requirements and the lack of result on its value or on the returns to its shareholders. It rises the following questions i) are ESG/SRI investments a real issue or just an empty label? and ii) how serious and

consistent are the criteria that companies are subjected to constitute ESG/SRI indices in the Brazilian stock exchange? Further investigation should address these issues in order to offer a better comprehension on the role of sustainability and governance indices on financial markets.

References

- BRASIL, BOLSA, BALCÃO (B3). Índice de Sustentabilidade Empresarial (ISE B3). Brasil, Bolsa, Balcão, 2023.
- CUNHA, F.A.F.S.; OLIVEIRA, E.M.; ORSATO, R.J.; KLOTZLE, M.C.; OLIVEIRA, F.L.C.; CAIADO, R.G.G. Can sustainable investments outperform traditional benchmarks? Evidence from global stock markets. *Business Strategy and the Environment*, v. 29, p. 682-697, 2020.
- DURAND, R.; PAUGAM, L.; STOLOWY, H. Do investors actually value sustainability indices? Replication, development, and new evidence on CSR visibility. *Strategic Management Journal*, v. 40, p. 1471-1490, 2019.
- ELOUIDANI, A.; OUTOUZZALT, A.; EL OUIDANI, R. L'effect des criteres ESG sur decisions d'investissement. *Revue des Études Multidisciplinaire en Sciences Économiques et Sociales*, n.2, p. 44-64, 2022.
- FERNANDES, A.R.J.; FONSECA, S.E.; CUNHA, C.L. Responsabilidade social e influências sobre retornos de cotações: um estudo acerca do desempenho de índices de sustentabilidade. *Revista de Administração em Diálogo*, v. 20, n. 1, p. 25-39, 2018.
- GILLAN, S.L.; KOCH, A.; STARKS, L.T. Firms and social responsibility: a review of ESG and CSR research in corporate finance. *Journal of Corporate Finance*, v. 66, 101889, 2021.
- LARRINAGA, C. Contabilidade sustentável: as abordagens ESG não são suficientes. *Revista de Contabilidade e Finanças*, v. 34, n. 91, e9042, 2023.
- LIANG, H.; RENNEBOOG, L. Corporate Social Responsibility and Sustainable Finance: a review of the literature, ECGI Working Paper Series in Finance. Working Paper nº 701, 2020.
- MARKOWITZ, H. Portfolio selection. *The Journal of Finance*, v. 7, n. 1, p. 77-91, 1952.
- MENG-TAO, C.; DA-PENG, Y.; WEI-QI, Z.; QI-JUN, W. How does ESG disclosure improve stock

liquidity for enterprises – empirical evidence from China. *Environmental Impact Assessment Review*, v. 98, 106926, 2023.

NDIONE, M. Déclarations ESG des entreprises du marché boursier Français. *Revue du Contrôle et de l'Audit*, v. 4, n. 2, p. 815-830, 2020.

TORRES, O.T.; ENCISO, M.I.M.T. Is socially investment useful in Mexico? A multi-factor and ex-ante review. *Contaduría y Administración*, v. 62, p. 222-238, 2017.

UNITED NATIONS (UN). What are the Sustainable Development Goals? United Nations Development Programme, 2023.

WIDYAWATI, L. A systematic literature review of socially responsible investment and environmental social governance metrics. *Business Strategy and the Environment*, v. 29, p. 619-637, 2020.