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# IS THE PERFORMANCE OF SUSTAINABLE FUNDS SUSTAINABLE? AN ANALYSIS OF BRAZILIAN FUNDS THAT ADOPT ESG PRACTICES

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## ABSTRACT

Environmental, Social, and Governance (ESG) practices can generate several benefits for both firms and society. Consequently, ESG initiatives may provide a basis for investment strategies. In this context, the present study examines the persistence of the risk-adjusted performance of Brazilian mutual funds classified in the sustainability/governance category. Specifically, the objective of this research is to analyze whether the performance of sustainable funds tends to persist over time. As a distinguishing feature compared to previous studies, this research focuses exclusively on this category of funds and employs an eighteen-year time series, allowing for a long-term assessment of performance persistence. Risk-adjusted performance was measured using Jensen's Alpha over the period from January 2005 to December 2022. The research hypothesis was tested through panel data regression analysis. Based on a sample of 50 funds, the main findings indicate that, on average, past fund performance does not have a positive effect on future performance. These results provide additional insights for investors when evaluating assets to be included in their investment portfolios. However, the findings should be interpreted with caution due to certain limitations, including the use of a single performance measure and the relatively small number of funds analyzed, which may limit the generalizability of the results.

**Keywords**: investment funds, sustainability, ESG practices, equity funds, mutual funds.

**Edited in Portuguese and English. Original version in Portuguese.**

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## 1 INTRODUCTION

Social and environmental issues have been prominent in academic and professional debate. When governance factors are also considered, this movement is related to ESG (Environmental, Social, and Governance) practices. Companies are increasingly being held accountable for their sustainability-related practices and thus tend to disclose, through corporate reports, how they adapt to and comply with these guidelines. This scrutiny and debate are part of both the global context and the Brazilian local context.

Paying attention to social and environmental issues represents a factor that can make companies' shares more attractive to external users (Ascari *et al*., 2025). In this context, the assessment of investment decisions becomes more comprehensive. In addition to traditional analyses of market, credit, and liquidity risks, investors are beginning to incorporate ESG variables as an element in this process (Anbima, 2026a). The literature has also shown that companies' market value can be better understood when considering a perspective comprising different factors, including sustainability aspects (Carvalho, 2025).

This movement has been accompanied by representative entities and regulatory bodies. As evidence of this, Resolution 193 of the Brazilian Securities and Exchange Commission (CVM, 2023) provides for the preparation and disclosure of sustainability-related financial information. Along the same lines, Anbima (2026a) has also established guidelines on the subject. In the context of companies' day-to-day operations, it becomes relevant to assess strategies to promote integration between business activities and sustainability practices (Souza et al., 2025), so that sustainability does not remain merely a matter of discourse or reports published by companies.

Furthermore, the literature on ESG and portfolio composition has been growing (Nóbrega et al., 2025). Despite the increasing academic interest in the topic, ESG practices in investment funds remain relatively underexplored in the Brazilian market. Many investment funds do not adequately disclose or describe risks in their financial statements (Campos *et al*., 2019), which may discourage new investments by fund shareholders.

The literature has advanced in investigating the determinants of performance and the effects of ESG practices on performance. However, gaps remain in the literature. In particular, to the best of our knowledge, empirical evidence on the persistence of sustainable fund performance in emerging economies, especially in the Brazilian market, remains scarce, as does evidence on the ability of past performance to predict the future performance of these funds. This aspect is relevant in light of the Efficient Market Hypothesis, since the existence of persistence could indicate the possibility of obtaining superior returns by selecting funds with better historical performance. In this context, the present study seeks to fill this gap by investigating the persistence of the risk-adjusted performance of Brazilian funds classified in the sustainability/governance category.

Thus, this research addresses the risk-adjusted performance of Brazilian funds that adopt sustainable practices. This study seeks to answer the following question: Is the risk-adjusted performance of Brazilian sustainable funds persistent over time? Specifically, this research aims to **analyze whether the performance of sustainable funds tends to persist over time**. Given the growing interest in sustainable investments, as well as the increasing interest among Brazilians in allocating resources to funds, understanding whether past performance can serve as an indicator of future results becomes essential for investors, fund managers, and the general population, reinforcing the practical contribution of the results.

In Brazil, the number of people saving and investing has been increasing; there has also been an increase in the level of knowledge about financial products and portfolio diversification (Anbima, 2026a). Investment funds are among the three most prominent destinations to which Brazilians intend to allocate their investments in 2026, with perceived returns and the security provided being relevant factors (Anbima, 2026b). Thus, there is practical relevance in analyzing

this segment. Also in terms of practical contributions, this study assesses fund characteristics potentially related to risk-adjusted performance, such as net inflows and periods of crisis, which may provide investors with complementary evidence for decision-making regarding resource allocation.

From a theoretical perspective, the research may contribute to deepening the understanding of factors related to investment fund performance, with a particular focus on those guided by ESG criteria. Additionally, the study may provide new evidence for the literature on funds that invest in other funds (funds of funds), given the nature of these institutional investors that allocate capital to existing funds in the financial market. Thus, understanding how factors (such as past performance) may affect the future performance of "green" funds may represent new information to be considered in improving empirical tests and quantitative modeling. This analysis is theoretically aligned with the debate on the Efficient Market Hypothesis.

This research is divided into four sections in addition to this introduction. The second section presents a review of the literature and previous studies on investment funds, also addressing investments and sustainability. The third section presents the methodological aspects of the study, followed by the analysis of the results. The fifth and final section presents the concluding remarks, limitations, and suggestions for future research.

## 2 LITERATURE REVIEW

### 2.1 Performance Persistence

Regarding previous research on investment funds, a variety of approaches can be found. Studies have shown interest in analyzing the performance of pension funds (Soares & Campani, 2020), assessing the dynamic exposures of private pension funds (Campani & Brito, 2018), and evaluating the effectiveness of investment fund selection techniques (Paula & Iquiapaza, 2021). Analyses have also examined the influence of the characteristics and behavior of a particular manager on fund choices (Maestri & Malaquias, 2018; Correia et al., 2018), including the possibility of so-called *window dressing* (Marques *et al*., 2020).

There are also studies addressing the influence of periods of crisis/uncertainty (Pimentel & Bossan, 2020; Guimarães & Malaquias, 2022), corruption in the context of companies and funds (Dias & Malaquias, 2022), and the relationship between seasonality and equity funds (Grossi & Malaquias, 2020), in addition to studies measuring the relationship between fund inflows and unobservable information (Amaral & Leal, 2020) and analyses of the determinants of portfolio turnover ratios (Milan & Eid Jr., 2015).

Regarding investment fund management, Grossi and Malaquias (2020) sought to verify the existence of a January seasonality effect on financial flows in equity funds. The results indicated behavioral patterns that could be observed in the fund industry at regular calendar intervals, such as a particular month of the year, with this finding contradicting the postulates of market efficiency.

In the context of pension funds in the Brazilian market, Soares and Campani (2020) used Jensen's Alpha to assess which funds generated positive/negative alphas; they also analyzed alpha in aggressive funds, given that the proposed funds consisted of a mix of fixed-income and equity products. The main results indicated that high management fees may contribute to value destruction; furthermore, larger funds also exhibited higher levels of return.

Silva et al. (2020) analyzed portfolio *turnover* and the performance of equity investment funds in Brazil, observing that if managers possess good information, they trade more in pursuit of higher profits; on the other hand, the authors state that managers may be trading based on irrelevant information or without justification. Thus, it can be observed that the literature seeks to understand the behavior of returns and variables related to investment fund management. Funds represent institutional investors that allocate significant amounts of financial resources.

In summary, the literature has investigated various determinants of investment fund performance, including characteristics of managers, the funds themselves, calendar patterns, and the economic environment. Most of the studies cited in this section focus on traditional funds, highlighting an opportunity for studies specifically dedicated to performance persistence in sustainable funds. Considering the growing relevance of ESG practices in the fund industry, the following subsection was developed to address specific studies on ESG investments.

## 2.2 ESG Investments

The context of sustainability has also gained prominence in the investment field, with ESG practices being considered in resource allocation (Nóbrega *et al*., 2025). According to Silva (2023), the term "corporate sustainability" has been used for decades, although still in a generic manner. The topic of "sustainability" has been on the agenda of various regulatory bodies and associations, highlighting its relevance in both the international and Brazilian contexts.

In a survey analyzing behavioral patterns among asset management firms, banks, and brokerage firms regarding the topic, Anbima observed that sustainability has gained increasing relevance in the financial and capital markets (Anbima, 2026a). Another market initiative is the "ESG Guide" / "ESG Guide II," launched by Anbima, covering "ESG Aspects for Asset Managers and Investment Funds" (Anbima, 2026a). As highlighted in the ESG Guide II, in line with global demand, ESG issues are becoming part of investment decisions, representing an additional analytical component alongside traditional risk factors (Anbima, 2026a).

The involvement of associations, representative entities, and regulatory bodies in this topic is relevant for several reasons. One of them is to seek to ensure that products offered to investors as sustainable are actually related to the practices they claim to consider. According to the ESG Guide II, the new rules aim to provide transparency and prevent *greenwashing*, thereby contributing to the growth of sustainability-related investments in Brazil (Anbima, 2026a). ESG practices, when used as a factor, make it possible to incorporate potential non-financial preferences, as well as market segmentation, into quantitative models (Nóbrega *et al*., 2025).

Qualified investors tend to prioritize stocks associated with good environmental and social practices (Silva, Bastos, et al., 2025). In addition to qualified investors, users external to the organization, including shareholders (*shareholders*) and other interested parties (*stakeholders*), increasingly demand disclosure of performance aligned with ESG practices (Villefort Júnior et al., 2026). However, despite advances in initiatives aimed at transparency and environmental commitment, a gap still exists between corporate discourse and the information quality of the content published by companies on the subject (Silva, Costa, *et al*., 2025).

Adverse environmental, social, or ethical events may affect the risk perceived by investors (Carvalho, 2025). Thus, it becomes relevant to understand how ESG practices may relate to business risk, with implications for resource allocation. Villefort Júnior et al. (2026) analyzed the risk, represented by the beta coefficient, of publicly traded Brazilian companies with good ESG practices. ESG data were collected from Refinitiv Eikon. The main results indicated that companies with ESG disclosure exhibited higher levels of risk. The authors argue that the sample contains many companies already operating in sectors with higher risk levels, which may be related to the results obtained.

## 2.3 Performance of ESG Funds

Cunha and Samanez (2014) analyzed the historical performance of sustainable investments in the Brazilian stock market, considering the period from December 2005 to December 2010. The results indicated that the financial performance of these investments was not satisfactory during the period. Guimarães and Malaquias (2022) analyzed the risk-adjusted performance of 3,840 funds linked to the ESG perspective from 2006 to 2020. considering periods of financial

constraints. The authors highlighted that investments linked to ESG practices are expected to continue growing. According to their analysis, the performance of funds linked to ESG practices was not superior to the performance of the other funds evaluated by the authors (Guimarães & Malaquias, 2022).

Casartelli *et al*. (2025) assessed risk-return dynamics in ESG funds using data from five countries: Brazil, Chile, India, Mexico, and South Korea. They observed that factors such as macroeconomic characteristics and oil price shocks affect fund performance, although the effects are heterogeneous across the countries analyzed (Casartelli et al., 2025). Furthermore, the results indicated that ESG funds do not necessarily consistently outperform less sustainable funds (Casartelli et al., 2025).

Based on a sample comprising 155 valid responses from a structured questionnaire administered to qualified investors, Silva R. R. *et al*. (2025) analyzed investors' perceptions of ESG initiatives. The descriptive analysis indicated that investors tend to agree that ESG criteria are important to their investment decisions (Silva R. R. *et a*l., 2025). In the tests performed, the authors found that "companies' social and environmental initiatives affect qualified investors' intention to invest in stocks considered ESG" (Silva R. R. *et al*., 2025, p. 12).

Following the same methodological approach, the results obtained by Baione *et al*. (2025), in which responses were obtained directly from investors, are also noteworthy. In a sample comprising 145 investors, predominantly individual investors, Baione *et al*. (2025) observed gender differences in perceptions of the importance of ESG aspects. According to the results, female respondents tended to exhibit greater sensitivity in assessing the three pillars than the male respondents who participated in the study (Baione *et al*., 2025).

Vasconcelos et al. (2019), considering the period from 2010 to 2014, showed that sustainable investments (SI) exhibit a defensive characteristic, with returns above the market only during periods of crisis and below the market during periods of economic growth; furthermore, they showed that SI have positive risk-adjusted performance. Silva and Iquiapaza (2017), analyzing whether there are performance differences between socially responsible investment (SRI) funds and conventional funds, observed that SRI funds and conventional equity investment funds have similar performance (Jensen's alpha); however, from 2009 to 2012, SRI funds exhibited a better risk-return relationship (based on the Sharpe Ratio). Considering that performance across the categories assessed using Jensen's alpha was equivalent, Silva and Iquiapaza (2017) attribute the growth of SRI funds to the non-financial utility that may be provided to their investors. According to the authors, the superior performance between 2009 and 2012 based on the Sharpe Ratio may be attributed to an upward trend observed during the period (Silva & Iquiapaza, 2017).

## 2.4 Development of the Research Hypothesis

Studies on investment funds in the financial market usually adopt the Efficient Market Hypothesis as their theoretical foundation (Fama, 1970; 1991). According to this theory, asset prices in the financial market would reflect the available information, making it difficult to consistently generate abnormal returns. It is worth highlighting the three classifications of market efficiency: weak-form efficiency, semi-strong-form efficiency, and strong-form efficiency.

Following this line of reasoning, when investment fund managers consistently generate abnormal returns, particularly through active management, this may contradict the Efficient Market Hypothesis (Malaquias & Eid Jr., 2013). This article analyzes the performance of sustainability-related funds, as well as the persistence of this performance, which may provide additional evidence for assessing Market Efficiency in Brazil from the perspective of sustainable investments.

Although the literature provides evidence regarding the performance of sustainable investments and its determinants, as well as comparisons with conventional investments, a gap remains regarding the persistence of the performance of these funds. The empirical analysis proposed in this study will therefore make it possible to assess whether past performance represents an indicator for predicting future performance in the context of sustainable funds. Accordingly, the following research hypothesis (**H1**) is proposed: past performance (at "t-1") of sustainable funds is positively related to future performance (at "t").

## 3 METHODOLOGICAL ASPECTS

The objective of this research is to analyze whether the performance of sustainable funds tends to persist over time. According to Anbima (2026a, p. 20), "despite the growing interest, it is difficult to quantify the exact amount invested in sustainability-related funds in the Brazilian market." Therefore, selecting funds that can be characterized as sustainable requires methodological decisions, since these institutional investors may allocate resources to various assets, including assets with good ESG practices. Considering this scenario, Brazilian funds classified as most closely aligned with sustainable practices were selected for the sample; in this case, based on previous studies (e.g., Silva & Iquiapaza, 2017), equity funds in the sustainability/governance subcategory were selected. Overall, the sample comprised 50 funds.

The analysis period begins in January 2005 and ends in December 2022, totaling eighteen years of observations. The adoption of this time interval makes it possible to incorporate episodes of high uncertainty in financial markets, which, according to previous studies (Pimentel & Bossan, 2020), may affect the performance of equity funds. In this regard, the period analyzed encompasses events of economic and financial instability, such as the 2008 Global Financial Crisis, the Covid-19 pandemic, and episodes of political instability, allowing for the inclusion of control variables for periods of crisis.

During the period, daily return data were collected. Using daily data, a risk-adjusted performance measure was calculated each month for each fund; that is, for each month of the analysis period, a risk-adjusted performance measure was obtained for each fund. The performance measure used was Jensen's (1968) Alpha, as presented in Equation 1. According to previous studies, Jensen's Alpha is a widely used measure for evaluating investment funds (Pimentel & Bossan, 2020).

$$R_i - R_f = \alpha_i + \beta_i * (R_m - R_f) + \varepsilon_i \quad (1)$$

In Equation 1. Ri represents the daily return of fund "i"; Rf represents the risk-free rate; αi represents Jensen's Alpha; Rm represents the market return, in this case, the daily return of the Ibovespa; εi represents the model's error term.

After estimating the parameters of Equation 1. control variables were also collected for the funds in the sample, namely: fund size, monthly net inflows, fund age, and a *dummy* variable indicating exclusive funds, in addition to the inclusion of a control variable for periods of crisis. Regarding the control variable for periods of crisis, based on previous studies (Pimentel & Bossan, 2020; Guimarães & Malaquias, 2022), a *dummy* variable was constructed that took a value of 1 in the following years: 2008, due to the Global Financial Crisis; 2015 and 2016, due to the political and economic crisis in Brazil; and 2020. due to the initial effects related to the Covid-19 pandemic. In the remaining years, the crisis variable took a value of zero.

Regarding the other control variables, fund size was included based on the argument that larger funds tend to perform better than smaller funds (Silva & Iquiapaza, 2017; Pimentel & Bossan, 2020). Size was measured by the Natural Logarithm of the fund's net assets at the beginning of each month; the Natural Logarithm was used to eliminate the effects of scale

differences among the research variables. A review of the literature (Silva & Iquiapaza, 2017; Guimarães & Malaquias, 2022) indicates that fund age may be negatively related to performance. Thus, fund age, in years, was calculated at the beginning of each year and included in the model as a control variable.

Monthly net inflows were also included as a control variable, given that inflows of resources may increase the fund's investment capacity and portfolio management capabilities, whereas substantial net outflows or unexpected redemptions may generate liquidity constraints and affect its performance. Accordingly, monthly net inflows represent total contributions minus total redemptions received by the fund during the month, weighted by the fund's net assets. In Brazil, there is a specific category of investment funds known as exclusive funds, usually established to serve a single shareholder (Grossi & Malaquias, 2020). Due to their characteristics, these funds may adopt more customized management strategies, which may potentially influence their performance relative to other funds. Therefore, a *dummy* variable was included to identify exclusive funds, taking a value of 1 for funds belonging to this category and 0 for the remaining funds. Table 1 summarizes the variables used in the study.

**Table 1**
*Summary of the Variables Used in the Study*

| Model Variable | Definition / Measurement | Expected Sign | Main References |
|---|---|---|---|
| Past Performance | Risk-adjusted performance of the fund in the previous period. | + | . |
| Fund Age | Represents the length of time the funds have been in existence, in years, calculated at the beginning of each year. | – | Silva and Iquiapaza (2017) Guimarães and Malaquias (2022) |
| Crisis Periods | *Dummy* variable indicating periods of financial crisis. | – | Pimentel and Bossan (2020) Guimarãe sand Malaquias (2022) |
| Exclusive Funds | Specific category of Brazilian fund, usually established to serve a single shareholder. | + | Grossi and Malaquias (2020) |
| Net Inflows | Difference between contributions and redemptions made during the month. | + | Grossi and Malaquias (2020) |
| Size | Size was measured by the Natural Logarithm of the fund's net assets. | + | Silva and Iquiapaza (2017) Pimentel and Bossan (2020) |

The database, comprising monthly observations of risk-adjusted performance for a set of investment funds, combines characteristics of *cross-sectional* observations distributed over time. In other words, the quantitative tests can be conducted using panel data analysis. Equation 2 presents the research model, with the main parameter of interest represented by β1 (the parameter corresponding to performance lagged by one period).

$$Alfa_{it} = \alpha_i + \beta_1 * Alfa_{it-1} + \beta_2 * Age + \beta_3 * Crisis_t + \beta_4 * Exclusive_{it} + \beta_5 * NetInflows + \beta_6 * Size_{it} + \varepsilon_{it} \quad (2)$$

In Equation 2, Alfait represents the risk-adjusted performance (Jensen's Alpha) of fund "i" in month "t"; Alfait-1 represents the risk-adjusted performance (Jensen's Alpha) of fund "i" in month "t-1"; Idadeit represents the Fund Age of fund "i", in years, in month "t"; Criset represents a *dummy* variable for Crisis Periods that takes the value of 1 for the years 2008, 2011. 2013, 2014, and 2015, and 0 for the remaining periods; Exclusivoit is a *dummy* variable that takes the value of 1 when fund "i" is classified as exclusive in month "t", and 0 for the remaining funds/cases; CaptaçãoLíquidait indicates the total contributions and redemptions received by fund "i" in month "t", divided by the net assets of fund "i" in month "t"; Sizeit represents the Natural Logarithm of

the net assets of fund "i" at the beginning of month "t"; αit, β1. β2, β3, β4, β5, β6, εit represent the model parameters.

To select the most appropriate model to be used (Pooled Data, Fixed Effects, or Random Effects), the Hausman, Chow, and Breusch-Pagan tests were performed. Table 2 below presents the results of these tests.

**Table 2**
*Results of the tests for panel model selection*

| Tests Performed | Signif. |
|---|---|
| Hausman | 0.000 *** |
| Chow | 0.000 *** |
| Breusch-Pagan | 0.000 *** |

Based on the results obtained, the Fixed Effects model was selected. In addition to the statistical evidence, this choice has an economic rationale consistent with the characteristics of the database. The performance of equity funds may be influenced by unobservable factors associated with the characteristics of each fund, such as management quality, investment strategy, asset selection ability, and internal processes. These characteristics tend to remain relatively stable over time and may be correlated with the explanatory variables in the model, such as fund Size. In this context, the Fixed Effects model allows for more consistent estimates of the determinants of performance.

Furthermore, the Breusch-Pagan / Cook-Weisberg test was performed, indicating that heteroscedasticity could introduce some bias into the results. Therefore, the models were estimated using robust standard errors. Additionally, a multicollinearity test was performed using the VIF (*Variance Inflation Factor*) statistic. The results are presented in Table 3.

**Table 3**
*Results of the multicollinearity analysis*

| Variables | VIF | 1/VIF |
|---|---|---|
| Fund Net Assets (Size) | 1.100 | 0.907 |
| Fund Age | 1.080 | 0.928 |
| Exclusive Funds | 1.050 | 0.956 |
| Jensen's Alpha (t-1) | 1.040 | 0.957 |
| Crisis Periods | 1.040 | 0.959 |
| Monthly Net Inflows | 1.030 | 0.975 |
| VIF (Mean) | 1.060 | - |

According to the results presented in Table 3, there is no evidence of multicollinearity problems among the explanatory variables considered in the study, since the mean VIF was below 5 (as were the VIF values for the other variables). The results obtained from testing the study hypothesis are described in the next section. In an additional analysis to test the robustness of the results, funds with net assets below R$5 million, as well as funds that were 2 years old or less, were excluded, in line with the literature that considers incubation bias. This procedure aims to assess whether the results could be affected by the inclusion of small or newly established funds that, because they are at an early stage, may have management characteristics that differ from those of funds already established in the market.

It is worth highlighting a limitation related to the methodological choice adopted in this study, concerning the classification of the sample funds in the sustainability/governance category. Although this classification is already available in the database and is consistent with market practices, there may be equity funds classified in other categories that also consider ESG practices in resource allocation and the development of their activities. On the other hand, the study results

maintain a specific focus on funds already classified in this subcategory, thereby avoiding the need to make additional inferences to classify other funds as being associated or not associated with ESG practices. This limitation, however, creates opportunities for further comparative studies on the subject, considering alternative methodologies and criteria for identifying ESG funds.

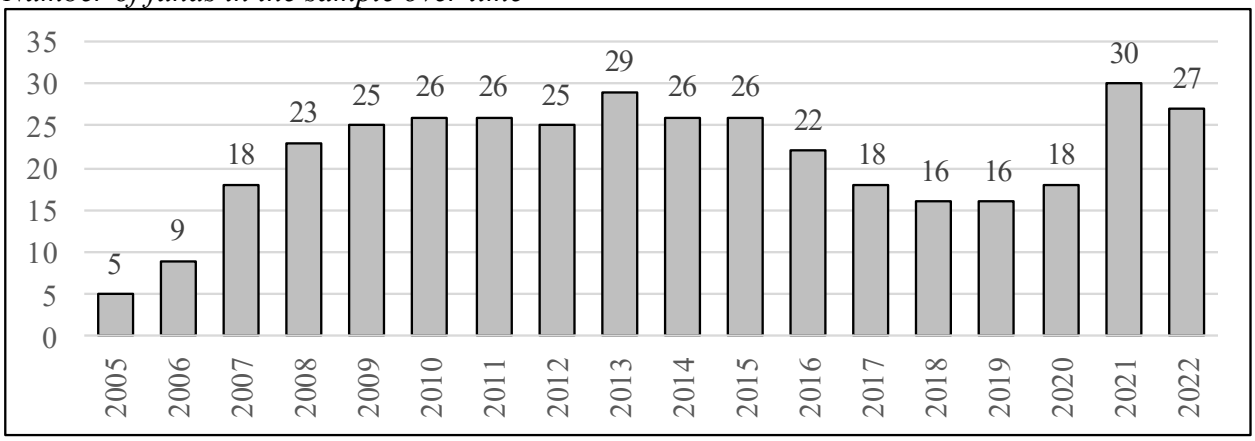
## 4 RESULTS

### 4.1 Descriptive Analysis

Initially, Figure 1 is presented, showing the number of funds in the sample over the research period. To construct the graph, the number of funds in December of each year of the study was considered, covering the period from 2005 to 2022.

**Figure1**

*Number of funds in the sample over time*




As shown in Figure 1, the number of funds in the sample varied over time, with the most recent periods (2021 and 2022) and the year 2013 presenting the largest numbers of observations. Figure 1 also shows that the database includes funds that began operating during the period, as well as funds that were terminated; thus, the results are not subject to survivorship bias. As indicated in the study methodology, the sample comprised a total of 50 funds. It is important to emphasize that all the funds represented in Figure 1 are classified in the sustainability/governance fund category.

Table 4, presented below, shows the descriptive statistics for the study variables. The performance of the funds in the sample, assessed using Jensen's Alpha, was negative on average. The funds in the sample are, on average, 15 years old, with approximately 3.6% of the observations corresponding to Exclusive Funds. On average, monthly Net Inflows were positive, suggesting that monthly contributions received exceeded redemption requests.

**Table 4**

*Descriptive statistics of the study variables*

| Variables | n | Mean | Std. Dev. | Min. | Max. |
|---|---|---|---|---|---|
| Jensen's Alpha | 4,614 | -0.0002 | 0.0010 | -0.0040 | 0.0032 |
| Jensen's Alpha (t-1) | 4,614 | -0.0001 | 0.0010 | -0.0040 | 0.0032 |
| Fund Age | 4,614 | 15.3403 | 3.8820 | 1.0000 | 18.0000 |
| Crisis Periods | 4,614 | 0.2365 | 0.4250 | 0.0000 | 1.0000 |
| Exclusive Funds | 4,614 | 0.0360 | 0.1863 | 0.0000 | 1.0000 |
| Monthly Net Inflows | 4,614 | 0.0002 | 0.0799 | -0.2072 | 0.4377 |
| Fund Net Assets (Size) | 4,614 | 16.9050 | 1.7345 | 9.7224 | 21.0194 |

*Notes.* The research period begins in January 2005 and ends in December 2022; however, to allow the assessment of lagged performance while maintaining the same number of observations for all Variables, the analyses were conducted using a database beginning in February 2005 (with the same end date: December 2022). Therefore, the number of observations is the same for Jensen's Alpha at "t" and Jensen's Alpha at "t-1". Number of funds in the sample in this analysis: 50 funds.

## 4.2 Regression Analysis

The results related to the objective of the study are reported in Table 5. As explained in the study methodology, the Fixed Effects model was used for the quantitative analysis, following the Hausman, Chow, and Breusch-Pagan tests. It can be observed that the results for the Fund Age variable were omitted from the model, possibly due to the nature of its behavior over time.

**Table 5**

*Results of the panel data regression analysis*

| Variables | Coef. | Rob. Std. Err. | t | P>t | |
|---|---|---|---|---|---|
| Jensen's Alpha (t-1) | -0.00643 | 0.01257 | -0.510 | 0.611 | |
| Fund Age | *(omitted)* | | | | |
| Crisis Periods | -0.00044 | 0.00004 | -11.200 | 0.000 | *** |
| Exclusive Funds | -0.00003 | 0.00002 | -2.220 | 0.031 | ** |
| Monthly Net Inflows | 0.00108 | 0.00025 | 4.240 | 0.000 | *** |
| Fund Net Assets (Size) | 0.00003 | 0.00002 | 1.520 | 0.135 | |
| Constant | -0.00054 | 0.00032 | -1.660 | 0.103 | |
| No. of Obs. = | 4,614 | | | | |
| R- Squared (within) = | 0.042 | | | | |
| (between) = | 0.016 | | | | |
| (overall) = | 0.039 | | | | |

*Notes.* Number of funds in the sample in this analysis: 50 funds.

According to the main results of the study (Table 5), Past Performance of the funds (Jensen's Alpha at "t-1") did not have a statistically significant effect on contemporaneous performance (Jensen's Alpha at "t"); therefore, the research hypothesis (H1) was not supported. This suggests that, on average, for the funds in the sample and according to the evaluation criteria used, funds with better performance at "t-1" did not necessarily maintain better performance at "t"; likewise, on average, funds with unfavorable performance at "t-1" may have recovered their performance in the subsequent period (at "t").

Regarding the control Variables, the Crisis Periods considered in the study had a negative and statistically significant effect on the performance of the funds in the sample. This result is consistent with previous studies (Pimentel & Bossan, 2020; Guimarães & Malaquias, 2022), indicating that, even among funds linked to ESG practices, episodes of crisis and greater financial constraints may negatively affect performance. The results also suggest that periods of high economic and financial uncertainty may affect managers' ability to generate superior returns, reinforcing the importance of risk monitoring by investors during periods of greater market turbulence.

Regarding Exclusive Funds, their performance was, on average, lower than that of traditional funds. This result suggests that funds usually established for a single shareholder, even within the subgroup of funds with good ESG practices, did not outperform the other funds in the sample. One possible explanation is that the more customized management of these funds may prioritize specific investor objectives rather than the maximization of risk-adjusted returns.

Although a positive effect of Size on performance was expected, the observed relationship was not statistically significant. In other words, fund Size was not found to be a factor associated with risk-adjusted performance within the analyzed subgroup of sustainable funds. This result differs from the evidence reported by previous studies (Silva & Iquiapaza, 2017; Pimentel & Bossan, 2020) and may indicate that potential economies of scale associated with larger funds do

not necessarily translate into better performance among funds adopting ESG practices, whose investment strategies and asset selection constraints may reduce the benefits traditionally attributed to larger size.

Fund Net Inflows had a positive and statistically significant effect on performance. This result indicates that funds receiving greater net inflows of resources also tended to exhibit better risk-adjusted performance. One possible explanation is that the additional availability of resources increases the capacity to implement investment strategies and reduces potential liquidity constraints. From a managerial perspective, the results also suggest the importance of properly managing resource inflows and outflows, since unexpected redemptions may require changes to the investment portfolio and compromise previously adopted strategies, with potential negative effects on fund performance.

An additional robustness test was performed to determine whether the results would persist after excluding funds with net assets below R$5 million, as well as funds that were 2 years old or less. This procedure was performed to eliminate any potential incubation bias. As shown in Table 6, the results remained equivalent. In other words, even among funds more than 2 years old and funds with net assets exceeding R$5 million, Past Performance (at "t-1") did not have a significant effect on contemporaneous performance (at "t").

**Table 6**
*Robustness test considering incubation bias*

| **Variables** | **Coef.** | **Rob. Std. Err.** | **t** | **P>t** | |
|---|---|---|---|---|---|
| Jensen's Alpha (t-1) | -0.00915 | 0.01511 | -0.610 | 0.549 | |
| Fund Age | *(omitted)* | | | | |
| Crisis Periods | -0.00043 | 0.00004 | -9.810 | 0.000 | *** |
| Exclusive Funds | -0.00003 | 0.00002 | -1.820 | 0.077 | * |
| Monthly Net Inflows | 0.00140 | 0.00034 | 4.170 | 0.000 | *** |
| Fund Net Assets (Size) | 0.00003 | 0.00003 | 1.130 | 0.265 | |
| Constant | -0.00055 | 0.00047 | -1.180 | 0.247 | |
| No. of Obs. = | 3,612 | | | | |
| R- Squared (within) = | 0.043 | | | | |
| (between) = | 0.214 | | | | |
| (overall) = | 0.039 | | | | |

*Notes.* Number of funds in the sample in this analysis: 40 funds.

The absence of a statistically significant relationship between Past Performance and the contemporaneous performance of the funds can be interpreted in light of the Efficient Market Hypothesis (Fama, 1970; 1991). The results suggest that the information contained in past performance does not have sufficient predictive ability to identify, in the short term, the funds that will exhibit superior performance. Thus, the findings suggest an absence of performance persistence among the funds analyzed and are therefore consistent with the assumptions of the Efficient Market Hypothesis.

It is important to interpret the results with caution, since the estimated coefficients reflect average relationships among the Variables analyzed. Thus, because they represent average effects observed across a set of funds, the results may not capture fund-specific characteristics and heterogeneity.

## 5 FINAL CONSIDERATIONS

This research was conducted with the objective of analyzing whether the performance of sustainable funds tends to persist over time. The database comprised daily data from January 2005 to December 2022, which allowed the monthly calculation of Jensen's Alpha for each fund in the

sample. The relationship between Past Performance (Jensen's Alpha at "t-1") and contemporaneous performance (Jensen's Alpha at "t") was tested using panel data regression analysis. Additionally, the VIF statistic suggested that there were no biases arising from multicollinearity based on the Variables considered in the quantitative tests. Therefore, the objective was achieved through a quantitative analysis of a sample comprising sustainability-related funds.

Based on the methodological procedures adopted, the main results indicated an absence of persistence in the performance of sustainable funds. In other words, funds that exhibited superior performance at "t-1" did not necessarily maintain that performance at "t," just as funds with unfavorable performance at "t-1" did not necessarily remain among the worst-performing funds in the subsequent period. It is important to emphasize that this evidence refers to the average behavior of the funds analyzed and is consistent with the notion that past performance has limited ability to predict future performance.

Regarding the control Variables, funds that received greater inflows of resources during the period were found, on average, to exhibit better performance. Furthermore, Crisis Periods had a negative effect on the performance of the funds in the sample. These results indicate that resource allocation decisions involving sustainable investment funds may benefit from considering fund characteristics, such as Net Inflows, and macroeconomic conditions, rather than relying exclusively on Past Performance.

These results have practical and theoretical implications. In practical terms, the absence of performance persistence suggests that information on past performance, when considered in isolation, has limited ability to identify the funds that will perform better in the subsequent period. Furthermore, the positive effect of Net Inflows highlights the relevance of communication and relationship strategies between fund managers and their shareholders in order to mitigate abrupt redemption movements, particularly during Crisis Periods or periods of greater market uncertainty. These initiatives may contribute to greater stability in resource flows during periods of uncertainty, allowing managers to implement their investment strategies with less need for adjustments resulting from unexpected redemptions. For regulators and representative entities, the results reinforce the importance of continuously improving the criteria for classifying funds and ensuring transparency regarding the ESG practices they adopt, thereby promoting greater comparability among products and reducing potential information asymmetries for investors.

From the perspective of the Efficient Market Hypothesis, the results indicate that any superior performance achieved by some funds does not tend to be systematically maintained over time, possibly due to the inherent difficulties in continuously identifying investment opportunities capable of generating abnormal returns. Thus, although some funds exhibit superior performance during certain periods, this advantage was not found to persist, on average, throughout the sample analyzed. Additionally, the study contributes to the literature by expanding the evidence on potential determinants of sustainable fund performance in emerging economies, a context that remains relatively underexplored in ESG investment research.

Indirectly, the research results may also indicate that shareholders of sustainable funds consider factors beyond risk-adjusted performance in their investment decisions. In this regard, investors may consider aspects related to the practices adopted by the funds, such as criteria for allocating resources to assets with better sustainability indicators, better corporate governance practices, and investments in companies committed to social issues and reducing inequalities. The effects of these initiatives may require a longer time horizon to become fully observable, creating opportunities for further research on the relationship between ESG practices and the persistence of fund performance.

Regarding the limitations, this research uses only one measure of risk-adjusted performance (Jensen's Alpha). Although this measure is widely used in the literature, further research may be conducted using other performance measures. The criteria adopted to define Crisis

Periods may also represent a limitation of the research, since different time frames may produce different evidence. Furthermore, the classification of sustainable funds was based on the sustainability/governance category provided by Anbima, which may not fully reflect the actual incorporation of ESG practices by the funds, as differences may exist between formal classification and the strategies effectively implemented by fund managers. Additionally, although econometric procedures consistent with the research objectives were adopted, some degree of endogeneity bias cannot be completely ruled out, which may be further explored in future studies on the topic.

Another limitation concerns the fact that the analysis was conducted exclusively using data from the Brazilian market, without considering international comparisons or funds with significant allocations to foreign assets. Therefore, caution is recommended when generalizing the results to other markets, particularly developed markets, whose fund industry characteristics and ESG environments may differ significantly from those observed in Brazil.

Further studies are suggested comparing the performance of sustainable funds with that of funds that are not classified in the sustainable fund category but adopt investment practices based on ESG criteria. Qualitative studies are also recommended to better understand the resource allocation strategies adopted by sustainable funds. Additionally, future research may conduct comparative analyses between emerging and developed markets, seeking to identify similarities and differences in the determinants of sustainable fund performance. Finally, research is recommended on the impacts of specific regulations related to ESG practices in the context of investment funds, in order to understand how regulatory changes may affect these funds' resource allocation strategies and/or performance.

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## CONFLICT OF INTERESTS

The authors declare that there is no conflict of interest.

## DATA AVAILABILITY

The complete dataset supporting the findings of this study is available from the authors upon reasonable request.

## AUTHOR CONTRIBUTIONS

| Roles | 1st author | 2nd author |
|---|---|---|
| Conceptualization | ♦ | ♦ |
| Data Curation | ♦ | |
| Formal Analysis | ♦ | |
| Funding Acquisition | ♦ | |
| Investigation | ♦ | ♦ |
| Methodology | ♦ | |
| Project Administration | ♦ | |
| Resources | ♦ | |
| Software | ♦ | |
| Supervision | ♦ | |
| Validation | ♦ | ♦ |
| Visualization | ♦ | ♦ |
| Writing – Original Draft Preparation | | ♦ |
| Writing – Review & Editing | ♦ | ♦ |

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