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ESG PERFORMANCE IN MUTUAL FUNDS: AN INVESTIGATION TOWARDS SUSTAINABILITY

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Abstract

In the last twenty years, sustainability has become a central topic in corporate dynamics due to international legislative pressures and the growing interest of investors. The three ESG pillars (Environmental, Social and Governance) are now fundamental requirements for companies seeking external financing, as they provide an objective parameter for the qualitative and quantitative assessment of sustainability, including for mutual funds. In this context, the paper aims to analyze the main characteristics of mutual funds considered sustainable, to grasp their logic and behavior. Through a descriptive statistical analysis on a sample of 170 funds – Equity (72), Bond (46), Int'l Global (36) and Balanced (16) – extracted from the authoritative “Sustainable Investment Mutual Funds and ETFs Chart” database, we show that funds classified as sustainable are small to medium-sized (Assets Under Management < \$5.000 millions) and young (< 25 years). Additionally, we propose a study on the performance analysis of each class of funds, providing useful insights for both academic and professional contexts.

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Fondi Comuni di Investimento e performance ESG: un'indagine attraverso la sostenibilità – Sintesi

Nell'ultimo ventennio la sostenibilità è diventata un tema centrale nelle dinamiche aziendali a causa delle pressioni legislative internazionali, nonché come conseguenza del crescente interesse degli investitori. I tre pilastri ESG (Environmental, Social e Governance) sono oggi requisiti fondamentali per le società che cercano finanziamenti esterni, poiché costituiscono un parametro oggettivo di valutazione qualitativa e quantitativa della sostenibilità, anche per i fondi comuni di investimento. In questo scenario, è nostro interesse capire le principali caratteristiche dei fondi comuni di investimento considerati sostenibili per capirne logiche e comportamenti. Attraverso un'analisi statistica descrittiva su un campione di 170 fondi – Equity (72), Bond (46), Int'l Global (36) e Balanced (16) – estratto dal rinomato database “Sustainable Investment Mutual Funds and ETFs Chart”, si dimostra che i fondi classificati come sostenibili sono di piccole e medie dimensioni (Assets Under Management < \$5.000 milioni) e relativamente giovani (< 25 anni). Inoltre, viene proposta un'analisi delle performance di ciascuna classe di fondi, offrendo spunti utili sia in contesti accademici che professionali.

Parole chiave: Fondi Comuni di Investimento; Sostenibilità; ESG; Educazione Finanziaria; Corporate Governance.

Codici JEL: G10; G15; G28.

Keywords: Mutual Funds; Sustainability; ESG; Finance Education; Corporate Governance.

Introduction

Since the second half of the 18th century, mutual funds have globally played a central role, enabling savers without specific financial expertise to invest their capital with the hope of achieving positive returns (Carhart, 1997; Berk and Green, 2004; Barnett and Salomon, 2006; Jin et al., 2023). These entities collect funds from savers, ensuring professional investment management, transparent policies, diversification and a wide range of products tailored to clients' time horizons and risk profiles (Agarwal and Pradhan, 2019). To attract investors' interest, a fund must provide adequate returns and management policies aligned with investors' characteristics (Sehgal and Babbar, 2017). In this context, as we will see throughout the discussion, sustainability plays a fundamental role as a direct interest of savers, alongside the pursuit of profit, guiding their choice towards one fund over another.

As we explore in the literature review section of this contribution, recent research has increasingly focused on how sustainable investments, particularly those integrating Environmental, Social and Governance (ESG) criteria, impact the financial returns of mutual funds (Adam et al., 2014; Akisik and Gal, 2017; Liu et al., 2023). Socially responsible investments, although historically perceived as a niche interest, have gained relevance due to the growing awareness of ethical, social and environmental issues among investors (Spallone and Calosci, 2024). Mutual funds with a strong ESG orientation integrate these criteria into their stock selection process, seeking companies with sustainable and responsible business practices. This shift reflects a broader alignment between financial performance and ethical values (Keddie and Magnan, 2023). Studies show that ESG funds tend to offer higher returns and better risk mitigation, particularly in volatile market conditions (Döttling and Kim, 2022). Consequently, ESG-focused mutual funds are increasingly preferred by investors who prioritize both financial returns and a positive impact on society and the environment (Berg et al., 2022).

From the scenario just described, it is evident that sustainable funds have

become a significant component of the investment landscape. However, to the best of our knowledge, there is still a lack of clarity in the literature, regarding how these funds are classified and compared based on interconnected parameters (AUM, longevity and multiple annual performances) and according to the classification of their nature (Equity, Bond, Int'l Global and Balanced). As we outline in the literature review section, few studies have examined the performance of sustainable funds over multiple time cycles (such as 1, 3, 5 and 10 years) in a precise division of a relevant sample of funds (170), not only classified as sustainable, but also divided into specific classes (Equity (72), Bond (46), Int'l Global (36) and Balanced (16)). At the same time, the literature does not provide a clear answer on how fund size and age influence performance in the specific context of sustainability, considering all the parameters just described. Given this scenario, we are not aware of studies that have linked all these variables together. With the intent of directing our study toward these specific aspects, we have formulated the following research questions (RQs):

- RQ1. How are sustainable funds ranked by AUM?
- RQ2. What is the activity period of mutual funds considered sustainable?
- RQ3. What is the cycle of average returns (1, 3, 5 and 10 years) realized by sustainable funds?
- RQ4. What is the relationship between returns and classification of funds by AUM and age?

The present study has both theoretical and practical implications. Theoretically, it addresses the gap in understanding the relationship between sustainability and performance in mutual funds, providing statistical evidence that can guide future research. Sustainability, when accurately evaluated and monitored, can enhance transparency and reduce agency theory issues by mitigating information asymmetry. Practically, the study offers statistical analyses that can help fund managers in strategic planning and investors in making

informed decisions about sustainable investments.

The paper is structured as follows. In Section 1 we propose an analysis of the relevant literature, painting a specific picture with respect to the measurement of sustainable performance in mutual funds. In Section 2, to create a clear logical thread between what has just been expressed and the subsequent sections designed to analyze and discuss the data, we have left room for a special section on research methodology. This section, divided into sub-paragraphs, reports the sample section criteria (Sub-section 2.1) and its composition (Sub-section 2.2). Subsequently, we express the results collected in Section 3. Based on these paragraphs, in Section 4, we draw our conclusions, with a specific focus on theoretical and practical implications, limitations and the future research line.

1. Literature Review

Many scholars have focused on how green investments influence financial returns, including within the context of mutual funds (Adam et al., 2014; Akisik and Gal, 2017; Munoz et al., 2020; Liu et al., 2023; Keddie and Magnan, 2023). Socially Responsible Investments (SRI) are not a new concept in financial markets, but for a long time, investment firms viewed them as a niche interest among investors (Spallone and Calosci, 2024). However, in the last decade, growing awareness of environmental, social, and ethical issues among most investors has led to a global trend of adding sustainable investments to portfolios (Klinkowska and Zhao, 2023).

A socially responsible mutual fund stands out as a financial vehicle that goes beyond traditional investment criteria by incorporating ESG factors into its stock selection process, rather than relying solely on financial indicators (Klinkowska and Zhao, 2023). This approach reflects a commitment to align financial goals with broader societal concerns and ethical issues (Keddie and Magnan, 2023). By integrating ESG criteria, these funds aim to invest in

companies that demonstrate responsible and sustainable business practices, considering their environmental impact, social responsibility and governance structures (Berg et al., 2022; Bellandi et al., 2023). This means that a socially responsible mutual fund evaluates potential investments not only for their financial performance, but also considers how these companies manage environmental resources, treat their employees, engage with communities and maintain ethical governance practices (Soler-Domínguez et al., 2021).

The recent “boom” in the sustainable investment industry has also led to an expanding literature on SRI and ESG investments, with several studies assessing the performance of SRI funds and the relationship between their performance and sustainability ratings. In this context, the incorporation of ESG factors has grown exponentially in recent years (Abate et al., 2021; Becker et al., 2022; Bofinger et al., 2022; Carlsson Hauff and Nilsson, 2023; Dikolli et al., 2022; Liu et al., 2023). According to Liu et al. (2023), since mutual funds have always been responsive to investor preferences, they were among the first players to recognize the importance of integrating sustainability into investment choices.

According to the USSIF report (2022), the integration of sustainability related to asset ownership by professional investors represented \$0 billion in the United States in 1995. Subsequently, by 2012, this value had steadily risen to approximately \$2 trillion. The assets under management of U.S. funds that incorporated ESG factors increased tenfold between 2007 and 2016 (Ghoul and Karoui, 2021). In this sense, the USSIF report (2022) revealed that assets linked to sustainable investment strategies had reached \$12 trillion by early 2018, a 38% increase from \$8.7 trillion at the beginning of 2016. From the 2012 value to 2020, the growth was enormous, jumping from \$2 trillion to \$17 trillion, an increase of 150%. Twenty-two percent of this amount in assets was managed by registered investment companies, mainly including mutual funds (USSIF, 2022).

Much of this growth, according to the report, was driven by asset managers who now see ESG criteria as a driver of investor interest (Muñoz et

al., 2021). In 2020, of the \$51.4 trillion managed by professional investors, about \$17 trillion was invested in sustainable assets as a direct consequence of the growing interest in ESG pillars (Fang and Parida, 2022; Klinkowska and Zhao, 2023). Based on this evidence, mutual fund managers have an incentive to make significant efforts to incorporate ESG factors into their investment methodology.

At the same time, given the large amount of capital moved by funds, they can influence the ESG policies of the entities they invest in. Chen et al. (2023) also found that socially responsible mutual funds improve the CSR position of companies, demonstrating that mutual funds are sensitive to social issues and play a significant role in the CSR outcomes of the companies in which they invest (Alda, 2022; Matallín-Sáez and Soler-Domínguez, 2023). In fact, social performance is increasingly a focus for retail investors. These individuals, who play a role in selecting mutual funds in which to invest their assets, also incorporate pro-social attitudes, the desire to “do good”, and individual preferences regarding financial performance and the desire to “earn” (Carlsson Hauff and Nilsson, 2023). This commitment has justified exponential growth from 1995 to 2020, ensuring significant performance.

Other benefits associated with a high level of sustainability are directly related to risk mitigation (Liu et al., 2023). The broad emphasis on risk mitigation leads sustainability-oriented mutual funds to avoid investing in “irresponsible” companies. The idea that sustainable investment helps reduce fund risk is, however, a recent concept. In recent years, the debate on the performance of sustainable funds has shifted in this direction, considering them as a potential risk mitigation strategy, especially in asset allocation (Maxfield and Wang, 2021).

Some recent studies have found a positive correlation between sustainability and corporate financial performance (María Gómez-Bezares, 2020; Soler-Domínguez et al., 2021). According to Döttling and Kim (2022), funds with high ESG ratings can attract more investors compared to funds with low ESG ratings. Despite numerous studies highlighting the potential benefits

associated with adopting sustainable practices, the relationship between ESG ratings and investor attractiveness is not without debate. According to some authors, the added value of high ESG ratings may vary depending on factors such as investment strategy, economic context and investors' preferences (María Gómez-Bezares, 2020; Soler-Domínguez et al., 2021). Therefore, the relationship between sustainability and fund flows requires further analysis that considers not only financial aspects, but also market dynamics and the evolving social and ethical preferences of investors. To assess fund flows, it is therefore essential to directly control for various characteristics related to size (AUM), expenses, performance, style, longevity and ratings, analyzed individually or in combination (Bilbao-Terol et al., 2023; Dikolli et al., 2022).

Specifically, AUM provides a useful insight into market dynamics, highlighting how capital is allocated toward sustainable investments. This can reveal relevant trends for investors and policymakers, as fund size is often associated with performance, stability and long-term resilience (Bauer et al., 2005; Tao et al., 2022). This gap in the literature, regarding a specific and systematic analysis of the relationship between sustainability and AUM size, exists because studies often focus more on general financial performance than on the structure and characteristics of the funds themselves (Revelli and Viviani, 2015; Coelho et al., 2023).

Similarly, the existing literature has focused on the efficiency of sustainable funds, but few studies have examined the relationship between performance, sustainability and the operational longevity of the funds. Some studies have touched on related aspects, highlighting that sustainable funds tend to survive better in times of financial turmoil due to their portfolio structure, focused on social and environmental responsibility (Nofsinger and Varma, 2014; Khan, 2022). However, few works directly examine the operational duration of these funds and how sustainability affects their ability to remain competitive in the long term, through performance evidence over 1, 3, 5 and 10 years and in relation to their nature (Equity, Bond, Int'l Global and Balanced).

As previously stated, these reflections guided the composition of our study's

RQs. In parallel, they underpin our empirical study, having shaped the data collection methodology, the commentary on the results and the subsequent implications.

2. Methodology

Our study is based on a qualitative-quantitative methodology that uses a mixed approach. We used this type of method because one of the most obvious advantages of mixed methods is to observe the phenomenon studied in an in-depth and complete manner (Tashakkori and Teddlie, 1998; Ceci, 2024). This, in fact, is possible through the parallel study of the data obtained from various qualitative studies, with data of a quantitative nature (Mackey and Bryfonski, 2018). The use of both types of sources, therefore, allows us to examine the research topic from a series of complementary angles. In line with these themes, we believe it is appropriate to use this approach also to observe the questions regarding investment decisions of mutual investment funds and the sustainability on which this study is developed.

To do this we used “R -Studio”, an accredited statistical derivation program that allows you to develop different types of analyses. In this paper we propose a descriptive statistical analysis based on histograms and scatter plots. This program, in connection with its many computational and statistical applications, allowed us to use powerful analysis tools to answer our RQs (Allaire, 2012; Gandrud, 2018). Basically, we used “R-Studio” to measure the frequency distribution and interval groups of the sample against some key parameters (explained in Sub-section 2.2). The data useful to develop the analysis was extracted by Bloomberg’s database. According to the information we needed, the data was processed and “cleaned” through Excel, making them available to analysis. In fact, not all the variables provided by the dataset would have been useful in bringing statistical evidence. Next, the new file was exported to “R-Studio”.

2.1. *Database*

In order to bring an empirical analysis that could support our research questions, we worked a database provided by the USSIF called “Sustainable Investment Mutual Funds and ETFs Chart” (extracted on 03-31-2023). This association, based in Washington DC (U.S.A.), is a member of the Global Sustainable Invest Alliance and specifically judges and promotes sustainable instruments in various investment categories. Its members count assets of about five trillion dollars and rely on estimates, as well as judgments, issued by the U.S. SIF to compare costs, financial performance, screening and records of funds that are open for new investors. This association, as in our case, sometimes relies on estimates and reports issued by third parties.

Specifically, the database we worked relies on estimates issued by Bloomberg LP. The data reported, in fact, are directly issued by Bloomberg’s Environmental, Social and Governance Data Service, which continuously monitors about 10.500 companies worldwide from a multi-year perspective. These companies, then grouped according to specific classes, are analyzed with complex and timely analytics to improve transparency, liquidity and asset valuation in ESG.

2.2. *Composition of the sample*

The database we present is composed by a sample of 170 mutual funds, divided into four specific categories: Equity (72), Bond (46), Int’l Global (36) and Balanced (16). Specifically, Equity funds are considered stock funds, Bond refers to bond type funds, Int’l Global refers to funds active in the international market (mainly Equity) and Balanced corresponds to a mixed classification between Equity and Bond.

The information extracted on 03-31-2023 are public and cover multiple categories. Specifically, to conduct our analysis, we focused on a few key parameters:

- a. Inception Month;
- b. AUM (expressed in US\$ Millions);
- c. 1 yr average (AVG) in %;
- d. 3 yr AVG in %;
- e. 5 yr AVG in %;
- f. 10 yr AVG in %.

Category a. simply reports the date of creation of the fund. AUM (Category b.), as we said, is a financial locution denoting the market value of all funds managed by a financial institution on behalf of its clients or investors. Categories c. - d. - e. - f., on the other hand, concern the average returns made by funds in the 1, 3, 5 and 10 years categories.

The other parameters provided by the database, as stated, were excluded from our study because they were judged as not inherent to our research questions. These data, however, were still useful for us in order to outline the overall picture of such information.

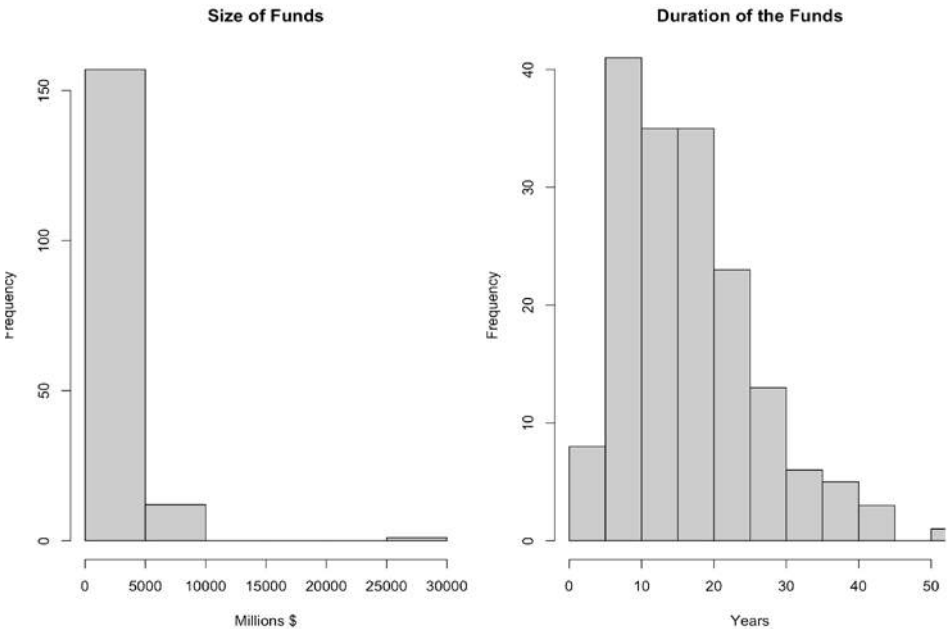
3. Results and Discussion

The present section is devoted to show the analysis results and it is pro-dromic in answering our RQs. As a first step, we decided to classify the sample of 170 units by size in term of AUM and by duration in term of life-cycle of the mutual funds. As shown in *Figure 1*, classification by AUM is summarized in the left histogram while classification by duration is summarized in the right histogram.

In the case on the right, we measured how the frequency (y-axis) of the

sample is grouped with reference to the size (x-axis) expressed in US Millions thanks to the AUM data in the database. In the case on the left, we proceeded in the same way but measured the duration of funds expressed in years (x-axis).

Figure 1 - Size and Longevity of the Funds



Source: Authors

Focusing on the left histogram (*Fig. 1*), it is possible to recognize the mutual funds distribution almost in three main classes. The first class (0 – 5.000), in fact, has as many as 92.94% of the sample with 158 funds. The second class (5.000 – 10.000) gathers 6.47% of the sample with 11 funds. The last class (25.000 – 30.000), which is extremely large especially with reference to the other funds in the database, gathers only 0.58% from the sample with the presence of only one fund.

Following this overview, we analyzed how the 170 investment funds studied perform within each individual category. The Equity category includes the

largest fund in the database (AUM: 25.316 Millions USD) and has a significant percentage of other funds in the second category (5.000 – 10.000) with 8 out of a total of 11 funds. Considering this, it can be stated that the Equity category contains the largest funds classified by AUM. The Bond category, with its 3 funds in the second class (5.000 – 10.000), completes the group of funds classified as medium-sized. The last two categories, Int'l Global and Balanced, remain less prominent, featuring smaller funds and not exceeding 2.400 Millions USD in either case.

In addition, focusing on the right histogram (*Fig. 1*), we can recognize several groups of funds classified by longevity:

- 0 – 4: 4.7% with 8 funds;
- 5 – 9: 24.12% with 41 funds;
- 10 – 14: 20.59% with 35 funds;
- 15 – 19: 20.59% with 35 funds;
- 20 – 24: 13.53% with 23 funds;
- 25 – 29: 7.65% with 13 funds;
- 30 – 34: 3.52% with 6 funds;
- 35 – 39: 2.94% with 5 funds;
- 40 – 44: 1.76% with 3 funds;
- 45 – 49: 0% with no funds;
- 50 – 55: 0.58% with 1 fund.

Deeping this evidence, it is possible to build up a preliminary consideration related to the number of funds analyzed by classification. Unlike the situation observed with fund size, the distribution of longevity across the Equity, Bond, Int'l Global and Balanced categories is quite even. In this case, it is the Balanced category that includes the oldest fund, established in 1971. The other categories are similarly well-distributed, and a detailed explanation of their distribution does not present significant statistical insights.

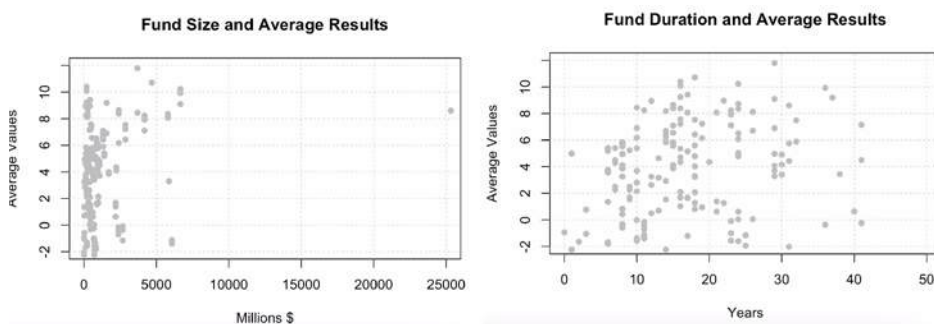
To complete the discussion on longevity, as evident from the histograms

on the right side of *Fig. 1*, it is important to note that not all funds in the database reach 10 years of operation. From this point forward, and throughout the course of this empirical analysis, it is important to emphasize that only the 121 funds with available data for categories c, d, e and f will be considered, as they are more than 10 years old.

Focusing on the structure of the following charts, the analysis provides a change of the frequency with the average results of the funds (*Fig. 2*) on the y-axis. Items are illustrated in their “Average Values” (expressed in %). To derive this value, we performed the arithmetic mean of the values composing the average results of points c. - d. - e. - f. (which we reported in Sub-section 2.2). On this base, the average results of each fund, with reference to the four performance classes on years 1, 3, 5 and 10, were then obtained. The x-axis, instead, for each histogram has been remains unchanged, on the right one the AUM while in the left one the funds life-cycle.

Fig. 2, through the scatter plot representation, shows the trend of two variables and how they are distributed in space. In one hand, the scatter plot on the left represents the distribution of average results in correspondence with the fund size (which is always identified by the AUM parameter expressed in US\$ Millions). In the other hand, the right one represents the graphical distribution of average fund outcomes with reference to their age.

Figure 2 - Average Results compared to Fund Size and Longevity



Source: Authors

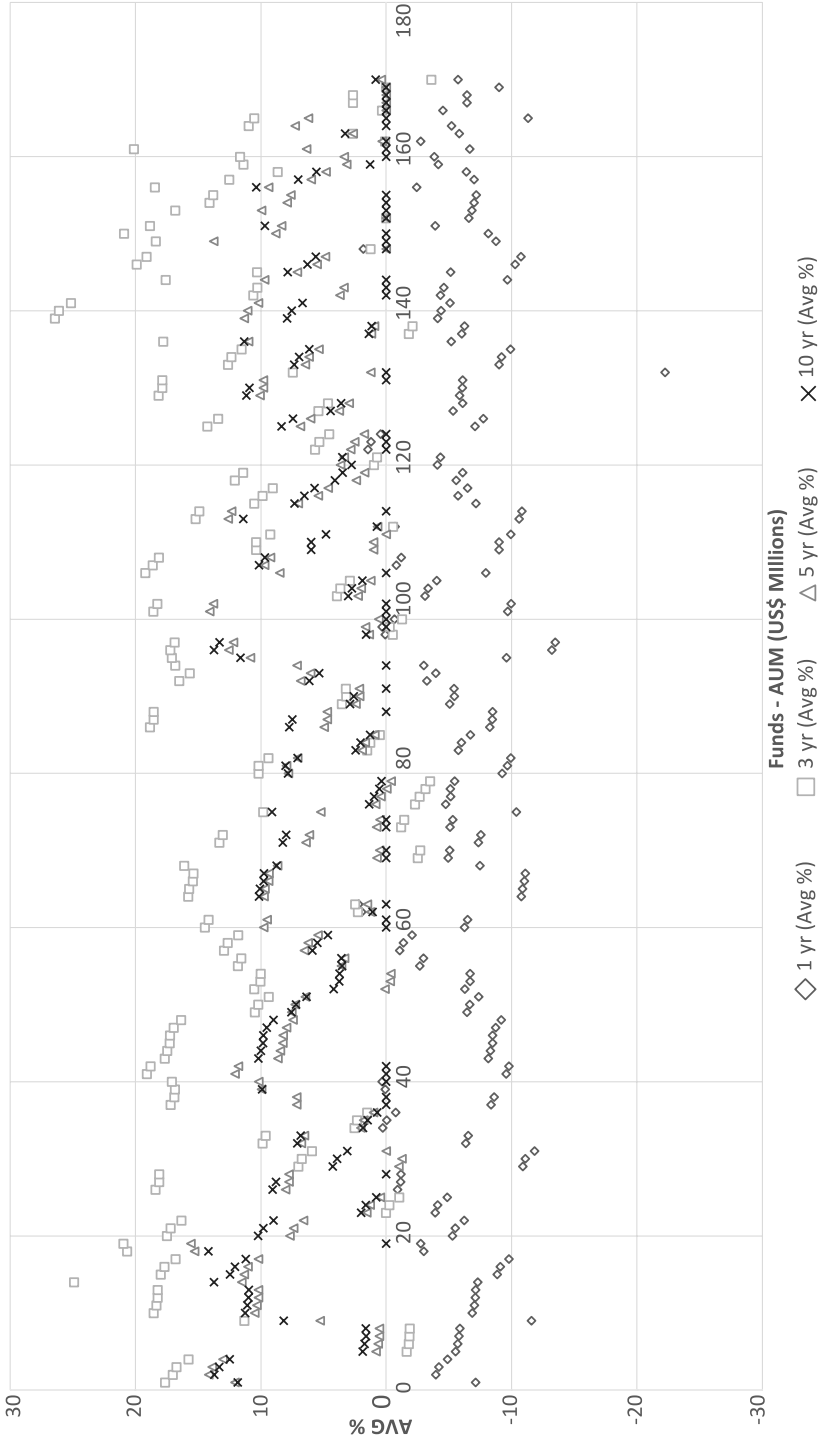
Interestingly, considering the histogram on the left, there is no direct relationship between the best average values and fund size. In fact, the result of the largest fund, with reference to the AUM class \$25.000 - \$30.000 Millions, collects only the fifteenth best result in terms of average value. The same point can be drawn for the right histogram. The oldest fund collects the eighty-sixth best average result. The top five best average results, moreover, belong to funds that are considered “young”, i.e., < 25 years old.

Following the summary overview in *Fig. 2*, we have gathered specific observations regarding the four categories: Equity, Bond, Int'l Global and Balanced. The best results are achieved by the Equity and Int'l Global categories. The Equity category exhibits a peak maximum AVG % of 11.79 and includes 19 funds with results greater than an AVG % of 8. The Int'l Global category also reaches a high peak with 10.4 and exceeds the AVG % of 8 with 5 funds. These two categories, being equity-based, reach the highest peaks and average values, but they exhibit substantially different behaviors. While Equity, despite being the most numerous category in the sample, does not show any negative results and only has a minimum point of 1.2775 AVG %, Int'l Global shows a negative minimum peak of -0.7025 AVG %.

The Balanced category achieves average results (from 5 to 3 AVG %), with only one fund reaching a very low, yet positive average result of 0.6975 AVG %. Lastly, the Bond category is the least performing. Its peak maximum reaches a modest 1.6725 AVG %, and 16 out of 46 funds in this category have negative results ranging from -0.875 to -2.245 (the minimum result of the sample). As previously mentioned in the general considerations related to *Fig. 2*, there is no particular statistical relevance linking size and age to better average results. This, however, does not apply to the four analyzed categories, as it highlights a clear dominance of the Equity and Int'l Global categories, which are equity-based.

As a final pillars, even through a scatter plot, the paper shows the average results (of categories c. - d. - e. - f.). To do this, we represented in *Fig. 3* a Cartesian Graph that would collect on the y-axis the AVG values expressed as percentages, and on the x-axis the funds sorted by AUM.

Figure 3 - Average Results (1, 3, 5 and 10 years) of the sample



Source: Authors

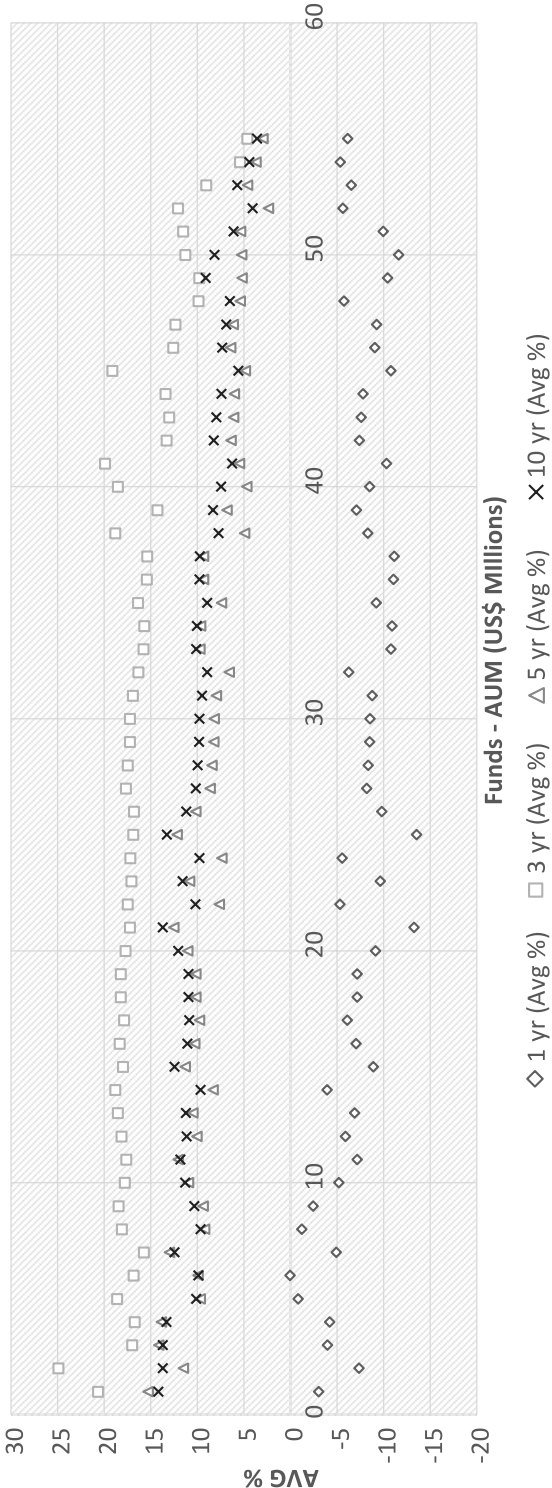
Thanks to the graphical representation, it is possible to see that the funds behave very similarly to each other. In fact, the average results in the first year are almost entirely negative (except for very few cases that are at or slightly above 0). In contrast, but again following a logic common to almost all funds, the best average results find their highest point in the third year. Thereafter, the average results in the 5th and 10th years, these seem to settle between an AVG value of 0 and 15% (*Fig. 3*).

After analyzing the sample's behavior, we provide evidence of the performance of the four classes: Equity, Bond, Int'l Global and Balanced. The following graphs (*Figures 4, 5, 6 and 7*) will therefore reflect the same logic as the graph discussed in *Fig. 3*, but for each individual category.

The Equity class (*Fig. 4*) exhibits a linear and clearly distinguishable trend. All funds, except for one that has an AVG % of 0, show negative results in their first year of operation. The best results are achieved by all funds within the third year, with no exceptions. By the fifth year, results remain positive and relatively high, but still declining compared to the average over the first three years. It is particularly interesting to note that, over ten years, 48 funds surpass the five-year AVG % average.

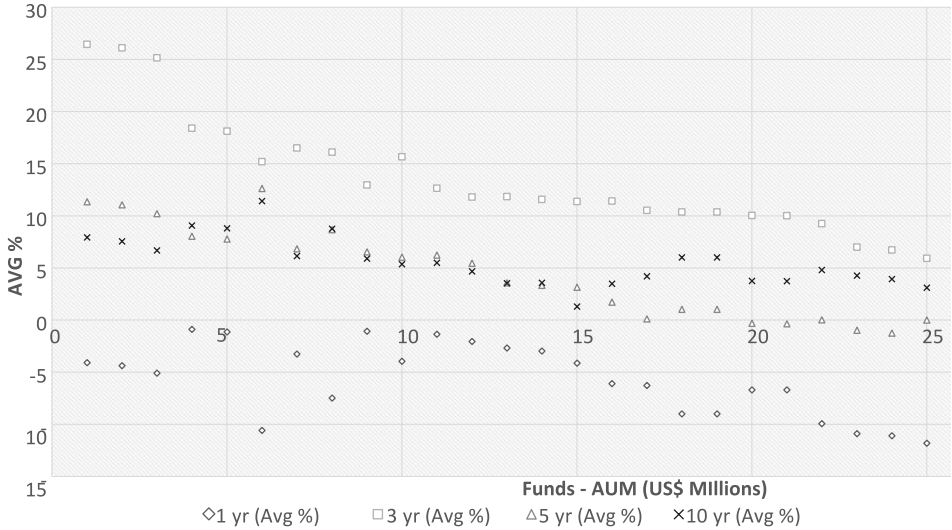
This cycle represents a well-defined pattern that can be explained as follows. The negative results in the first year may stem from a period of adjustment or unfavorable market conditions. Funds reach their peak efficiency within the third year, thanks to the maturation of investment strategies, which are often very aggressive to acquire resources. After the third year, the positive but declining returns by the fifth year suggest a stabilization or a shift towards a more conservative strategy. Over the long term, funds tend to generate solid returns, surpassing the five-year average due to value accumulation and adaptation to market conditions.

Figure 4 - Average Results (1, 3, 5 and 10 years) – Equity class



Source: Authors

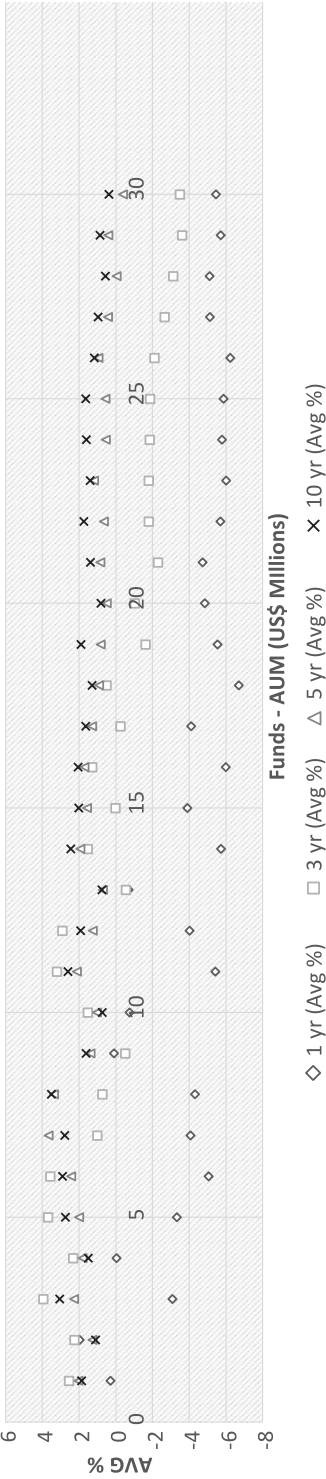
Figure 5 - Average Results (1, 3, 5 and 10 years) – Int’l Global class



Source: Authors

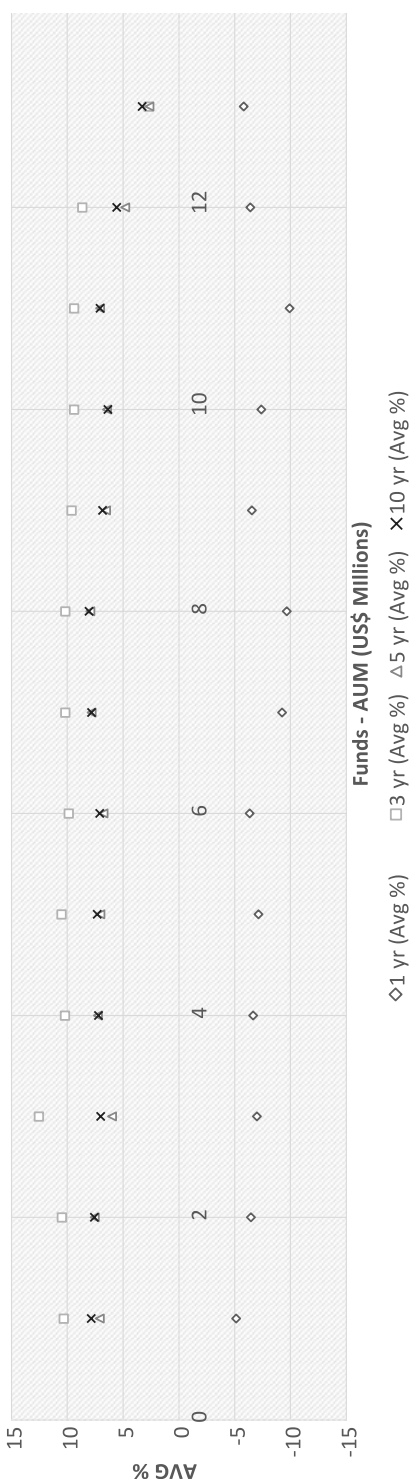
The Int’l Global class (*Fig. 5*), although showing lower AVG % returns compared to the Equity class, follows a similar trend. It is noteworthy, however, that the largest funds by AUM in this category struggle to achieve positive or moderately satisfactory results on average over five years. Specifically, the 6 largest funds in this category report four negative results and two close to zero. This difficulty may be attributed to the increased complexity in managing large amounts of capital, which can hinder agility and the ability to respond quickly to market changes, especially in an international context. Additionally, larger funds might be more exposed to systemic risks or less inclined to invest in high-return opportunities that involve smaller volumes.

Figure 6 - Average Results (1, 3, 5 and 10 years) – Bond class



Source: Authors

Figure 7 - Average Results (1, 3, 5 and 10 years) – Balanced class



Source: Authors

The Bond class (*Fig. 6*), in contrast to the first two classes analyzed, shows positive or near-zero AVG % results in the first year for 4 small funds. However, the AVG % values over three years exhibit a fluctuating pattern and, unlike the equity classes, are consistently negative for the 12 largest funds in this category. This could be due to the impact of variable interest rates or unfavorable economic conditions, which negatively affect medium-term bond returns, compounded by the difficulty large funds face in quickly rebalancing their portfolios in response to these changes. The AVG % trends over 5 and 10 years follow a linear pattern, albeit with significantly lower values.

In conclusion, *Fig. 7* shows that the Balanced class exhibits a trend very similar to the first two categories analyzed. This is interesting because it suggests that the Balanced class has returns that are more akin to those of Equity funds rather than Bond funds.

Considering the results expressed in each figure, the specific answer to the RQs can be formulated:

Answering RQ1 (How are sustainable funds ranked by AUM?), from the empirical analysis conducted the study shows that, in the sample analyzed, most of the sustainable mutual funds are small to medium sized. In fact, according to the ranking by AUM proposed, of the total of 170 funds, as many as 158 (92.94%) belong to the 0 - 5.000 \$M class. In addition to this, although there are larger funds (in the 5.000 – 10.000 and 25.000 – 30.000 \$M classes), the best results are achieved by smaller funds, showing that there is no positive relationship between higher AUM and better performance. This finding leads us to assert that size alone, as measured by AUM, does not necessarily correlate with the success or performance of sustainable funds. The data suggests that the smaller to medium-sized funds, often overshadowed by their larger counterparts, are achieving commendable results, challenging the conventional notion that larger AUM directly translates to better performance. This underscores the importance of considering various factors beyond sheer fund size when evaluating the success of sustainable funds, such

as investment strategies, portfolio composition and adherence to ESG principles. In conclusion, a more detailed study of the sample across the four categories (Equity, Int'l Global, Bond and Balanced) reveals that the Equity class not only includes the largest fund by size, but also has the highest number of medium-sized funds (8 out of 11) in the AUM 5.000 – 10.000 Millions USD category. This suggests that equity funds have a higher ease in raising resources, even within the realm of sustainability.

Also, answering to RQ2 (What is the activity period of mutual funds considered sustainable?), the results highlight that the period of activity of the analyzed funds can be grouped in a class ranging from 0 - 25 years. In fact, this period gathers as many as 134 funds (78.8% of the sample). Compared with “traditional” investment funds, therefore, it is possible to assert that sustainable ones have a shorter average period of activity. Based on this observation, we assert that the sustainable funds analyzed in this study tend to have a relatively shorter history of operation when compared to their traditional counterparts. This temporal distinction raises interesting questions about the evolution and maturation of the sustainable investment landscape. The prevalence of funds with shorter activity periods suggests a growing interest and perhaps a recent surge in the establishment of sustainable funds, indicating a dynamic and evolving market in response to the increasing demand for socially responsible and environmentally conscious investment options. These results prompt further exploration into the factors contributing to the emergence and success of sustainable funds within a shorter timeframe. It also emphasizes the need for investors and stakeholders to consider the specific characteristics, strategies and performance metrics of sustainable funds, beyond their relatively shorter activity periods, when making informed investment decisions in the realm of sustainable finance. In this case, as addressed in the analysis of results, there is no statistical evidence linking longevity to the four categories analyzed, with the oldest fund belonging to the Balanced category.

Focusing on performance topics, according to RQ3 (What is the cycle of average returns (1, 3, 5 and 10 years) realized by sustainable funds?), the study

showed that the highest returns from the sample are achieved in the third year of activity (*Fig. 3*). In fact, in the third year, there are the highest individual fund AVGs recorded, and likewise, the highest average compared to the other years under analysis (1, 5 and 10). The peak in AVG, thereafter, settles from the 5th to the 10th year of operation based on the performance of individual funds. Therefore, we can assert that sustainable funds tend to exhibit their highest average returns in the early years of operation, with a notable peak in the third year. This finding challenges the conventional wisdom that investment performance necessarily improves with the maturity of a fund. The observed trend may suggest that sustainable funds, during their initial years, capitalize on specific opportunities or market conditions that contribute to higher average returns. However, the subsequent stabilization of returns from the 5th to the 10th year indicates that, while the third year may present a peak, sustainable funds generally sustain competitive performance over a more extended period. This nuanced understanding of the performance trajectory provides valuable insights for investors seeking to optimize their investment strategies within the realm of sustainable funds. An analysis of the different fund classes suggests an investment strategy that begins with allocating capital to small-sized Bond funds, to ensure stable returns and manage short-term risk. By the second year, following the trend observed in *Fig. 4*, it would be optimal to shift capital towards Equity funds, capitalizing on their peak efficiency achieved within the third year. The portfolio diversification should include Int'l Global funds, favoring medium or small-sized ones to avoid the operational difficulties typical of larger ones. After the third year, it would be prudent to gradually reduce exposure to Equity and Int'l Global funds, reallocating towards Balanced ones, which are known for offering returns similar to equity funds, but with lower volatility. Finally, maintaining a long-term perspective, one could benefit from the tendency of Equity funds to surpass the five-year average over a ten-year horizon, thereby optimizing returns while minimizing short-term fluctuations.

Finally, to answer RQ4 (What is the relationship between returns and clas-

sification of funds by AUM and age?) we studied the relationship between average values, AUM and age (*Fig. 2*). In our opinion, in fact, AUM and age of the funds are two key parameters useful for offering some interesting reflections. It is interesting to observe, with reference to AUM, that the highest returns are typically achieved by small and medium-sized funds. With reference to age, however, we provide evidence of how the best results are achieved by funds that have been active for < 25 years. By linking these two considerations together, contrary to what one might think in common logic, we answer our RQ4 by saying that there is no relationship between high capitalization and high longevity in achieving better results. After analyzing the four categories — Equity, Bond, Int'l Global and Balanced — the best results were achieved by the Equity and Int'l Global categories, both of which are equity-based. The Equity category has a peak maximum of 11.79% AVG with a minimum of 1.2775%, while Int'l Global has a maximum of 10.4% AVG but a negative minimum of -0.7025%. The Balanced category shows average results, whereas the Bond category is the least performing, with a maximum of 1.6725% AVG and numerous negative results. In conclusion, there is no significant correlation between size, age and average results; rather, there is a higher (and significant) performance in the two equity categories.

4. Conclusion

The world of mutual funds is competitive and constantly growing (Carhart, 1997; Berk and Green, 2004; Rasheed and Qadeer, 2012; Jin et al., 2023). However, as this work has shown, there are strong incentives for mutual funds to distinguish themselves from one another. One of the most important of these elements is, undoubtedly, the focus on sustainability.

In this context, this study confirms a substantial difference in terms of characteristics and performance even among funds classified as sustainable.

Summarizing our results, the empirical analysis shows that most sustainable mutual funds are small to medium-sized, with 92.94% of the sample falling within the 0 – 5.000 \$M AUM class. Smaller funds often outperform larger ones, challenging the assumption that larger AUM correlates with better performance. Additionally, most sustainable funds have been active for < 25 years, indicating a shorter average period of activity compared to older ones. The highest average returns are achieved in the third year of operation, after which returns stabilize. Putting these reflections together, in our sample, there is no direct relationship between AUM, longevity and higher performance in sustainable funds.

Based on these results the present study reveals several theoretical and managerial implications. From the theoretical point of view, the study delves into the issue of sustainability related to public interest companies, such as mutual funds, aiming to contribute to fill a gap in reference to the topics covered. In addition to that, this paper clarifies the link that exists between sustainability and some of the performance parameters that we have discussed in the empirical analysis, providing useful statistical evidence to draw considerations that could direct new studies and reflections. Ultimately, sustainability, if evaluated and monitored with accurate tools, can take on a role as a guarantor of transparency, limiting agency theory issues.

The implications of this study are also practical. Indeed, the statistical analysis we propose can be a valuable aid in defining the sustainable course of action of fund owners for their management. The numerical evidence we provide, in fact, shows an element of choice on key parameters such as longevity and fund size. At the same time, it can be an informed choice aid for investors to select investments with future performance related to sustainability. This study, in fact, could be taken as a tool capable of encouraging sustainable investment choices and making such decisions more aware.

We are fully conscious that the study conducted, especially in the empirical analysis, has limitations that can be overcome. First, while the sample of 170 mutual funds assumes a proper statistical basis, this certainly could be

expanded in the international context. Linked to this, in fact, our statistical research rests on a sample whose data were issued from only one source. Moreover, in assessing sustainability we have left out pivotal aspects that are often difficult to assess from a quantitative perspective.

All the limitations listed can certainly be overcome and be an interesting cue for future research on this topic. Specifically, information from multiple databases issued by different companies could be cross-referenced to enlarge the sample and make it more varied. In addition to this, the management policies of the ethical component of the fund, which are often not reported in quantitative databases, could be explored in depth to see how such policies, in addition to sustainability, impact the indicators studied. As a final point, it would be interesting to compare the results collected from this database (or from multiple databases) with sustainability benchmarks used by individual funds.

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