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MAGDALENA MIKOŁAJEK-GOCEJNA

mmikol1@sgh.waw.pl
Warsaw School of Economics
al. Niepodległości 162, 02-554 Warszawa, Poland
ORCID ID: https://orcid.org/0000-0002-8979-2491

Performance of Polish and Foreign ESG Funds Operating in Poland – a Comparative Analysis

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Abstract

Theoretical background: Investment funds, due to their scale of operations, importance in financial markets, and influence on capital allocation processes, play a key role in financing the transition towards a sustainable and low-carbon economy. Their broad investment scope – covering multiple asset classes, market segments, and geographical areas – makes them particularly relevant for analyzing the effectiveness of ESG (environmental, social, and governance) integration in investment strategies. A central issue in both academic research and investment practice is whether the inclusion of ESG criteria affects fund performance in terms of returns and risk.
Purpose of the article: The main objective of this study is to compare the performance of Polish ESG funds with that of foreign ESG funds available in the Polish market. The analysis is conducted both for the entire sample and across selected asset classes. Additionally, the study aims to assess the statistical significance of differences in returns and risk between these groups. The study tests the hypothesis that there are statistically significant differences in both the mean returns and the variance of performance between Polish and foreign ESG funds.
Research methods: The empirical analysis is based on a sample of 48 Polish ESG funds and 277 foreign ESG funds offered in Poland over the period 2019–2023. The data used in this study were obtained

from reports and databases of the Polish Chamber of Fund and Asset Management (IZFiA). Additional information was sourced from commercial industry databases, including Analizy.pl and Bloomberg. Fund performance is evaluated using return measures, standard deviation, downside risk, Sharpe ratio, and the Additional Return-Risk (ARR) ratio. To test for statistically significant differences in means and variances between groups, Welch's *t*-test and the Brown–Forsythe test were applied at a significance level of $\alpha = 0.05$. **Main findings:** Both Polish and foreign ESG funds recorded their highest returns over longer investment horizons (36- and 60-month periods), supporting the concept of sustainable investing as a long-term strategy. In terms of risk, Polish ESG funds were found to be less volatile on average than their foreign counterparts, as evidenced by their lower standard deviation of return. Among the various asset classes analyzed, the highest returns were achieved by foreign ESG funds investing in globally developed market equities and U.S. equities. We also found that in most cases, the differences in fund performance (means and variances) between groups were statistically significant. This may be attributed to differences in fund-specific criteria and the inherent difficulty of isolating relatively homogeneous ESG strategies across different fund groups. The originality of this research lies in its comparative approach within a single emerging market context, allowing for a more controlled analysis of ESG fund performance under similar regulatory and market conditions.

Introduction

Financial markets play a key role in transforming the European Union's economy into a sustainable, low-carbon system based on the principles of equitable development. Through their capital allocation function, financial institutions act as both intermediaries and initiators of change in the real economy, while simultaneously shaping risk pricing mechanisms and the cost of capital. These processes are particularly important in the context of the ongoing sustainable transition at both global and local levels. The role of financial institutions in providing access to capital – through the banking sector as well as investment markets – is therefore crucial and can be understood along several dimensions, including the analysis and mitigation of ESG risks, the development of mechanisms supporting sustainable investments, and the transformation of business models towards achieving Sustainable Development Goals (SDGs).

Consequently, over the past few years, regulators have placed environmental-social governance (ESG) issues on their agenda, and the priority of environmental issues is increasing every year. In 2018, the European Commission published the Action Plan for Financing Sustainable Growth, which implemented a number of steps in practice and first involved the EU proposing a classification system to provide clarity on what is an environmentally sustainable activity/investment (EU Taxonomy).

From the perspective of investment funds, other regulations were also extremely important, including the SFRD, Principles Adverse Impact (PAI), Commission Delegated Directive (EU) 2017/593 of April 7, 2016, Commission Delegated Directive (EU) 2021/1270 of April 21, 2021, and Commission Delegated Regulation (EU) 2021/1255 of April 21, 2021. These regulations, on the one hand, introduce changes to the risk management mechanisms of investment fund portfolios, treating ESG as a cross-cutting risk; on the other hand, they oblige institutional investors to take ESG risks into account both in their decision-making process and in the construction of

their investment portfolios. In addition, they imposed an obligation to consult clients about their sustainability and ESG goals. Grygiel-Tomaszewska and Lipski (2023) indicate that ESG has been multi-dimensionally introduced into investment portfolio construction processes as:

- an equal investment objective in addition to the objective related to the expected rate of return;
- an equal component of due diligence and selection of financial instruments, in addition to classical economic and financial analysis;
- a tool for assessing the risk of the issuer, financial instruments and investment portfolio;
- a tool for assessing portfolio resilience to ESG risk.

The diverse functionality of funds as investment objects makes them doubly important participants in the financial market. Given the scale of funds operations and their importance in financial markets, it is also important to emphasize their influence on the processes occurring in the real economy. Decisions regarding capital allocation in funds are made in close coordination with the valuation of company risk and growth potential. Thus, funds have an impact on capital allocation processes, and since this is the case, on par with other financial market players, they are predisposed to influence the financing of the green transition through their allocation.

At the same time, the ESG investment market has been experiencing dynamic growth. According to PwC (2023), ESG-oriented assets under management in Europe are expected to grow at an average annual rate of 10.9%, reaching approx. EUR 9.4 trillion by 2027. Despite this rapid expansion, the Polish sustainable investment market remains at a relatively early stage of development. As of the end of 2023, 61 domestic ESG funds compliant with Article 8 or Article 9 of the SFDR were operating in Poland, with total assets amounting to approx. PLN 8.9 billion, alongside more than 600 foreign ESG funds and sub-funds available to Polish investors (IZFiA, 2024).

Although the growing importance of ESG investing has been widely acknowledged in the literature, empirical findings on the financial performance of ESG funds remain inconclusive. While a large body of research suggests that ESG funds may outperform or exhibit greater resilience compared to conventional funds, other studies find no statistically significant differences or even evidence of underperformance. Moreover, the existing literature primarily focuses on comparisons between ESG and non-ESG funds, while relatively little attention has been paid to differences within the ESG fund universe itself.

In particular, there is a noticeable lack of studies comparing the performance of domestic and foreign ESG funds operating within the same market environment. This gap is especially relevant in the case of Poland, where foreign ESG funds – often domiciled in Luxembourg or Ireland and managed by global asset managers – coexist with domestic funds that are typically smaller in scale and may be more strongly influenced by regulatory compliance requirements. These structural differences may translate into variations in investment strategies, risk exposure, and ultimately fund performance.

Therefore, the main objective of this study is to compare the performance of Polish ESG funds with that of foreign ESG funds available in the Polish market, both for the entire sample and across selected asset classes. In addition, the study aims to assess whether the observed differences in returns and risk between these groups are statistically significant. The research is guided by the following hypothesis: there are statistically significant differences in both the mean returns and the variance of performance between Polish and foreign ESG funds**.**

The originality of this study lies in its comparative approach within a single emerging market context, which allows for a more consistent evaluation of ESG fund performance under similar regulatory conditions. By focusing on the Polish market, the study contributes to filling a gap in both domestic and international literature, while also providing insights that may be relevant for other emerging markets characterized by a strong presence of foreign investment funds.

The remainder of the paper is structured as follows. The next section presents a review of the literature on ESG fund performance. This is followed by a description of the data and research methodology. The subsequent section presents the empirical results and their discussion. The final section concludes the paper by summarizing the main findings, outlining the study's limitations, and suggesting directions for future research.

Literature review

ESG funds, formerly socially responsible investment (SRI) funds, differ from conventional mutual funds. Literature on traditional investment funds indicates that one of the most important factors determining fund flows is past financial performance (Chevalier & Ellison, 1997; Del Guercio & Tkac, 2002; Sirri & Tufano, 1998). Meanwhile, Benson and Humphrey (2008) and Renneboog et al. (2011) argue that ESG investors are less receptive to information on the past performance of funds, with the non-financial aspects of investments being their main source of utility. Research conducted by Riedl and Smeets (2017) revealed that intrinsic social preferences play a more important role than financial motives in determining ESG investors' investment decisions, and that investors are willing to pay significantly higher management fees for ESG funds than for conventional funds. Similar results were obtained by Heinkel et at. (2001), and Gollier and Pouget (2014). According to these findings, Sim and Kim (2022) pointed out that investor preference for the non-financial aspects of ESG funds leads to different implications for future fund performance. Investors and researchers are interested in answering the question of whether including ESG factors in the analysis and application of ESG screens leads to similar, better, or worse results. Studies conducted on various markets have yielded inconclusive results (Renneboog et al., 2011; Sim & Kim, 2022).

The vast majority indicates that ESG funds perform better than traditional funds. Mallin et al. (1995) found that sustainable funds outperform traditional funds in terms of Jensen's (1969) alphas generated by these funds. According to Tripathi and Bhandari (2014), socially conscious (ESG) portfolios can outperform other portfolios in both boom and downturn scenarios. Kumar et al. (2016) proved that companies incorporating ESG factors exhibit lower volatility and generate higher returns. The study conducted by Naffa and Fain (2020), covering the period from 2015 to 2019, found that ESG funds generate superior risk-adjusted returns, even after discounting transaction costs. Guimarães and Malaquias (2023) analyzed 3,840 equity mutual funds from January 2006 to December 2020 and classified each fund as an ESG-related fund or a conventional fund; the main results of this study indicate that ESG funds presented higher risk-adjusted returns, especially during periods of financial constraint (e.g., the pandemic period). Similar results were obtained by Zakharcheva (2023), who proved that ESG funds had higher returns and performance than their peers and showed more stable results because of their more diversified portfolio strategy and consideration of ESG factors. Gupta (2022) analyzed the growth of ESG mutual funds in India and evaluated their performance using stand-alone return and risk measures as well as Sharpe Index, Treynor (1965) Ratio, Sortino (1991) Measure, and Jensen's Alpha and found that ESG funds not only lead to the accomplishment of sustainability goals of investors but also provided higher returns than the traditional fund. Curtis et al. (2021) also show that ESG funds offer investors competitive investment products with higher returns. It should be noted that ESG screens applied by ESG funds can eliminate poorly managed companies and leave companies with more sustainable profitability (Derwall et al., 2005; Gil-Bazo et al., 2010). Recent literature further refines this picture: European ESG equity mutual funds with low ESG ratings demonstrated superior performance and stronger persistence when compared to high-rated counterparts over long periods, although both groups sometimes underperformed passive benchmarks in extreme market conditions (e.g., pandemic) (Chen et al., 2025). Moreover, studies on ESG investment styles show that optimizing ESG investment orientation is positively associated with fund performance and consistent excess returns in emerging markets (Modaffari & Beck, 2025).

Part of the research does not strictly address the problem of ESG fund performance but rather their resilience to crises. Bauer et al. (2005) showed that sustainable funds were less sensitive to market fluctuations. Kreander et al. (2005) found that sustainable funds are less risky when measured by both beta and standard deviation. Abdullah and Rao (2022) indicated that ESG funds exhibit resilience, while traditional funds displayed weakness facing crises. El Bannan (2023) provided strong evidence for resilience of sustainable funds during the crash, with returns showing persistence during the market turndown; moreover, this study found that ESG investments may outperform their counterparts. The greater resilience of ESG funds has also been confirmed by studies conducted by Capota et al. (2022); the authors claimed that ESG fund investors react differently to past negative performance, making them

less sensitive to short-term changes in returns. This allows ESG funds to provide a stable source of financing for green transitions and may reduce the risk of financial instability, particularly during turmoil episodes. Similar results were obtained by Sim and Kim (2022), who argued that ESG funds significantly weaken flow-performance sensitivity. Additional research focusing specifically on turmoil periods in European markets indicates that ESG portfolios often exhibit higher resilience compared to traditional ones during market shocks, despite regional differences in volatility dynamics (Lowry et al., 2026; Mahadevan & Amudha, 2025). Papathanasiou and Koutsokostas (2024) highlighted that in European markets, ESG funds with higher ESG ratings tend to achieve more stable risk-adjusted returns, while lower-rated funds can exhibit greater variability, emphasizing that differences in ESG ratings have a significant impact on fund performance.

Several studies have also shown that ESG funds and traditional funds perform similarly, and that their performance is not statistically significantly different. Hamilton et al. (1993) found that ESG funds do not earn statistically significant excess returns and that the performance of such mutual funds is not statistically different from the performance of conventional mutual funds. Similar conclusions were reached by Statman (2000), whose analysis showed that socially responsible mutual funds performed better than conventional mutual funds in the 1990–1998 period but that the differences between their risk-adjusted returns were not statistically significant. In addition, Renneboog et al. (2011) found no evidence that ESG funds outperform or underperform conventional funds. More recent research also supports this conclusion: Plagge et al. (2020) found that the majority of ESG funds did not produce statistically significant positive or negative returns compared to traditional funds. The same results were obtained by Zorina and Corlett-Roy (2022) and Kuzmina et al. (2023). The empirical findings of Milonas et al. (2022) also did not reveal any statistically significant difference between ESG and non-ESG funds, although the former has slightly higher returns than the latter.

Some studies indicate that ESG funds perform worse than conventional funds, although they are in a vast minority. Renneboog et al. (2008) showed that ESG funds in the US, the UK, and many continental European and Asia-Pacific countries underperform their domestic benchmarks by −2.2% to −6.5%, and argued that the reason for the underperformance of ESG funds could be their screening process, which reduces the investment universe. El Ghoul and Karoui (2017) also found poor performance in ESG funds, suggesting that socially responsible funds are less desirable to performance-chasing investors. Some authors suggest that the underperformance of ESG funds results from investors being able to sacrifice their financial performance to invest in accordance with their social and environmental preferences (Riedl & Smeets, 2017).

All the studies cited above analyze the financial performance of ESG funds compared to that of conventional funds. While the vast majority prove that ESG funds outperform conventional funds, there is a lack of studies that show which ESG strategies used by individual funds are more profitable for investors. The foreign

and Polish literature lacks analyses comparing ESG funds in terms of performance. Hence, the purpose of this study is to fill this research gap and try to answer the question of which ESG funds are the most profitable and which yield the best performance.

Research methods

This study compares the performance of Polish ESG funds with that of foreign ESG funds available in Poland. For the purpose of this study, Polish ESG funds are defined as funds domiciled in Poland and managed by Polish investment fund companies (TFIs), while foreign ESG funds refer to funds domiciled outside Poland (primarily in Luxembourg and Ireland) but available to Polish investors.

As mentioned, the Polish sustainable investment market is at a relatively early stage of development. As of mid-2023 Poland had 61 domestic ESG funds more than 600 foreign ESG funds and sub-funds. The research covered 48 Polish ESG funds and 277 foreign ESG funds available in Poland for each of which we were able to collect the necessary data. A comparison was made across the entire group of ESG funds: the performance of Polish funds versus that of foreign funds available in Poland. The data used in this study were obtained from reports and databases of the Polish Chamber of Fund and Asset Management (IZFiA). Additional information was sourced from commercial industry databases, including Analizy.pl and Bloomberg, covering both domestic and foreign funds available on the Polish market. All financial data was converted to Polish zlotys. These data enabled the precise identification of funds compliant with Articles 8 and 9 of the SFDR, their structures, and the value of assets under management. The sample covers the period from 18 July 2019 to 18 July 2023 allowing for the analysis of both short- and long-term fund performance.

The initial comparative analysis was supplemented by an analysis of the performance of Polish and foreign ESG funds according to the asset classes in which these funds invested. The original idea was to benchmark the ESG strategies used, but the investment policies of the analyzed funds were so diverse, taking into account the different ESG factors that it became impossible to separate groups of funds that used relatively homogeneous ESG strategies, or it would be far discretionary, leading to questionable results. Given these limitations, we divided the funds by the asset classes in which they invest, as such a classification does not raise any major issues.

The analysis of Polish and ESG funds available in Poland allowed them to be grouped into the following classes: global developed market equity funds, European developed market equity funds, foreign debt securities funds, U.S. equity funds, global debt securities funds, mixed foreign active allocation funds, mixed foreign stable growth funds, global emerging market equity funds, foreign sector equity funds, and Asian equity funds (excluding Japan).

For a detailed comparison analysis, we selected: developed global market equity funds, developed European market equity funds, foreign sector equity funds, US

equity funds, mixed stable growth funds, and global debt securities funds. This is due to the fact because both Polish ESG funds and foreign ESG funds available in Poland were the asset classes in which the most funds invested. In situations where one or two funds were classified into a given group, such an asset class was excluded from the detailed comparisons. The comparisons were as follows:

- the value of the fund's assets;
- fund returns: daily, monthly, 3-month, annual, 3-year, 5-year, and YTD;
- risk of the fund;
- downside risk;
- Sharp's ratio of funds;
- the additional return-risk ratio of the fund.

Fund returns were calculated according to the following formula:

$$Ri = \frac{(S_i - S_{i-1})}{S_{i-1}} \tag{1}$$

where:
S_i = Net Asset Value (of a fund at the end of period i)
S_{i-1} = Net Asset Value (at the end of period i–1)

The risk of the fund (the volatility of an investment) was measured by the standard deviation of its returns:

$$\partial_i = \sqrt{\frac{1}{(n-1)} \sum_{i=1}^{n} (r_i - \bar{r})^2} \tag{2}$$

where:
∂_i – total risk (standard deviation) of period i
r_i – returns in each period
n – total number of observation

Downside risk for fund refers to the potential loss or negative deviation from an expected return or to the uncertainty about the magnitude of that difference (Aleksander et al., 2005) and was measured by semi-deviations (Sortino & Price, 1994):

$$\partial_{semi} = \sqrt{\frac{1}{N} \sum_{r_i \leq MAR} (r_i - MAR)^2} \tag{3}$$

where:
$\partial\ semi$ – downside risk (semi-deviation)
r_i – returns in each period
N – total number of negative observations
MAR – minimum acceptable return

Following Sharpe (1966), the Sharpe ratio is calculated as:

$$SR_i = \frac{(r_i - \bar{r_f})}{\partial_{r_i - r_f}} \tag{4}$$

where:

r_{f_f} – risk-free rate of return

$\partial_{r_i - r_f}$ – the standard deviation of excess returns over the risk-free rate of returns (Fama & French, 1996; Sharpe, 1964).

The construction of the additional return-risk ratio of the fund (ARR Ratio) was based on the relationship between the expected additional return of the fund and the standard deviation of the additional returns, where the additional return is the difference between the return of the fund and the return of the benchmark, describing the behavior of a group of funds homogeneous in terms of their investment policy.

$$ARR_i = \frac{E(r_i - r_b)}{\partial_{E(r_i - r_b)}} \tag{5}$$

where:

r_b – the return of the benchmark, describing the behavior of a group of funds homogeneous in terms of their investment policy

$\partial_{E(r_i - r_b)}$ – the standard deviation of expected additional returns over the benchmark

In this study, the benchmark used in the ARR ratio was constructed from the sample itself, representing the average performance of funds investing in the same asset class. This approach ensures that comparisons reflect the characteristics of the observed ESG fund market rather than broader market indices. We hypothesize that in terms of both mean and variance, the performance of Polish and foreign ESG funds differs significantly. We assess the statistical significance of the differences between the means using the Welch's *t*-test (for two populations with different sizes and different variance values). Welch's *t*-test uses the following *t* statistic (Welch, 1947):

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{s_1^2}{N_1} + \frac{s_2^2}{N_2}}} \tag{6}$$

where:

$\overline{X}_i$ – mean in the *i*-th sample

s_i^2 – the standard deviation in the *i*-th sample

N_i – the *i*-th sample size

To verify the statistical significance of the differences between the variances, we use the Brown–Forsythe test (1947). The analysis involves determining the

absolute deviation of the measurement results from the median in each study group. The Brown–Forsythe test statistic is a model F statistic from a one-way ANOVA on $z_{ij} = \left|y_{ij} - \tilde{y}_j\right|$, where $\tilde{y}_j$ is the median of group j:

$$F = \frac{(N-g)}{(g-1)} \frac{\sum_{j=1}^{g} n_j (\bar{z}_{.j} - \bar{z}_{..})^2}{\sum_{j=1}^{g} \sum_{i=1}^{n_j} (z_{ij} - \bar{z}_{.j})^2} \tag{7}$$

where:
g – number of groups
n_j – number of observations in group j
N – total number of observations
$\bar{z}_{.j}$ – group means z_{ij}
$\bar{z}_{..}$ – overall average z_{ij}

Results and discussion

We analyzed 48 Polish ESG funds and 277 foreign ESG funds available to Polish investors to assess the structure and investment focus of the market. Among the domestic funds, seven were classified as Article 9 ("dark green") under the SFDR, while the remaining funds were categorized as Article 8, promoting environmental or social characteristics. The analysis revealed that Polish ESG funds are predominantly structured using a conservative approach, often through master-feeder arrangements or by replicating foreign investment strategies, reflecting both the early stage of development of the domestic market and its reliance on international financial institutions (CFA Society Poland, 2024). Regarding foreign ESG funds, the majority of the 277 funds studied were domiciled in Luxembourg or Ireland and managed by global asset management companies. These funds mainly invest in global equity markets, which remain the dominant asset class within ESG portfolios. The findings indicate that while the domestic market is limited in scale, it is strongly influenced by international ESG solutions.

The classification of the analyzed funds according to the SFDR shows a clear predominance of Article 8 funds, with a relatively small proportion of Article 9 funds both domestically and among foreign providers. This highlights the limited availability of investment strategies fully aligned with stringent sustainability objectives within the Polish market.

Overall, the results suggest that the Polish ESG fund market in mid-2023 remained dependent on foreign investment offerings, but the observed growth in the number of funds and total assets demonstrates an increasing importance of sustainable investing in Poland, driven by regulatory developments and the expansion of international ESG solutions. The results for Polish and foreign ESG funds are presented in Table 1 (see Appendix 1).

Polish ESG funds' assets are incomparably smaller than those of foreign sustainable funds. This is mainly due to the fact that foreign ESG funds operating on the Polish market are mostly sub-funds of the world's largest investment funds. Meanwhile, a Polish sustainable investment market has been developing. The average value of assets accumulated by foreign ESG funds is PLN 8686.80 million, with 25% of the largest funds having accumulated assets in excess of PLN 73758.90 million. The average value of assets accumulated by Polish sustainable funds was PLN 154.66 million, with 25% of the largest funds accumulating assets in excess of PLN 180.4 million. The average unit value for Polish sustainable funds was PLN 174.07 with the highest value for Santander Prestiż Odpowiedzialnego Inwestowania Globalny (PLN 1109.18) and the lowest for Pekao Ecological (PLN 10.57). For foreign ESG funds, the average value of the participation unit was PLN 277.49 with the highest value for iShares IV – iShares MSCI USA SRI UCITS ETF (Dis) (EUR) (PLN 7116.35), and the lowest value for Franklin Biotechnology Discovery Fund N (Acc) (PLN) (PLN 8.15).

Analysis of the returns of the sustainable funds leads to some interesting conclusions:

1. Both Polish and foreign ESG funds achieved the highest returns for the 36- and 60-month periods, respectively. Undoubtedly, the turn towards ESG funds is also a result of the COVID-19 pandemic. These results are consistent with the concept of sustainable investment.
2. On average, foreign ESG funds achieved higher returns in all the periods studied. For the 5-year period, the return was more than double that of the Polish sustainable funds. This may be related to the early stage of development of the Polish ESG investment market and also underscored by the fact that the main motivation for Polish TFIs to implement ESG strategies is their need to comply with legal regulations. Thus, we discuss a strictly external motivation that shapes the purely pragmatic approach to the subject. The ESG embedded in development strategies and the achievement of environmental goals lags far behind the motivational priorities of most Polish TFIs (CFA Society, Poland, 2024).
3. For Polish ESG funds, the 36-month return was essentially the same as that of the 60-month period. For foreign funds, the average return over the 3-year period (approx. 24%) was lower than the 5-year return (approx. 36%) by about 12 percentage points (pp), which corresponds to a relative difference of approx. 33%. This may be due to the specificity of 2022. Statistics from companies monitoring the global mutual fund market show that in 2022, investors withdrew USD 13.2 billion from ESG funds: stocks, bonds, and mixed assets. This phenomenon was first observed in 2018. First, by 2022, ESG funds will have lower returns than broad market funds. The former saw a decline of approx. 19%, whereas other funds decreased by 16% (Morgan Stanley, 2022). Russia's attack on Ukraine triggered a major energy crisis across Europe that undoubtedly projected the health of ESG-based investment funds. This seems to have been rather short-lived and is related to geopolit-

ical factors. Turbulence, such as the energy crisis, has not restored faith in fossil fuels and the response to turbulence is an even more intensive policy for investing in low-carbon technologies. Second, the definition of funds was modified in 2022, and many previously considered balanced funds were removed from this category, which translated into a decline in the value of their assets. Third, there were instances of green washing among funds in 2022 (RepRisk, 2022), which may also have resulted in a shift of interest away from this type of investment.

4. It is worth noting that considering both the 12- and 36-month periods of analysis, the highest rates of return among all analyzed funds (both Polish and foreign) were achieved by the Polish ESG fund QUERCUS Agresywny (43.63% and 88.33% respectively), which invested at least 50% of assets in financial instruments issued by companies whose activities are aimed at meeting the 10 principles of the UN Global Compact or are in line with these principles. It is also worth noting that this fund primarily invests in Polish companies.

The analysis of fund risk leads to the conclusion that Polish ESG funds are, on average, less risky than their foreign counterparts, as they are characterized by a lower standard deviation of achieved returns. This may be related to the early stage of market development and thus to more cautious investment strategies. The riskiest among Polish sustainable funds, while achieving some of the highest rates of return in all the sub-periods studied, was the Goldman Sachs Responsible Investing Index. Among foreign funds, the riskiest was iShares II – iShares Global Clean Energy UCITS ETF (Dis) (USD). Although the risk measured by the standard deviation in Polish ESG funds is lower than that in their foreign counterparts, it should be noted that Polish sustainable funds are characterized by a higher downside risk. This means that they are characterized by a greater risk of negative return rates.

The average Sharpe's ratio for Polish sustainable funds was 0.09, while for foreign funds it was 0.14. This means that investors investing in foreign ESG funds achieve a higher risk premium. The highest premium among Polish ESG funds was guaranteed by two funds, QUERCUS Agresywny and Goldman Sachs Global Dividend Companies, whereas among foreign funds, Black Rock GF Global Long-Horizon Equity A2 (EUR) guaranteed the highest premium. Considering the ARR Ratio, Polish ESG funds performed better, meaning that they provided a better ratio of the expected additional return to the standard deviation of additional returns, where the additional return was defined as the difference between the fund return and the return of a benchmark describing the behavior of a group of funds homogeneous in terms of their investment.

The initial comparative analysis was supplemented by an analysis of the performance of Polish and foreign ESG funds according to the asset classes in which these funds invested. The original idea was to benchmark the ESG strategies used, but the investment policies of the analyzed funds were so diverse, taking into account the different ESG factors that it became impossible to separate groups of funds that used

relatively homogeneous ESG strategies or would have been far from discretionary, leading to questionable results. Considering these limitations, it was decided to divide the funds by the asset classes in which they invest their funds, as such a classification is not very questionable.

The following groups of ESG funds were selected for detailed performance comparisons: developed global market equity funds, developed European market equity funds, US equity funds, mixed stable growth funds, and global debt securities funds. This is due to the fact that on the side of both Polish ESG funds and ESG funds available in Poland, these were the asset classes in which the most funds invested. In situations where one or two funds were classified into a given group, such an asset class was excluded from the detailed comparisons. Descriptive statistics are presented in Table 2 (see Appendix 1). Within the analyzed fund classes, the highest returns were provided by foreign ESG funds investing their assets in developed global market equity and in US equity. This was valid for both 36- and 60-month returns. From the perspective of the YTD period, the highest returns were provided by foreign ESG funds investing in developed market equity and developed European market equity.

In the former case, one reason for the increased investment risk may have been the changes taking place in the European market, primarily in terms of the increasingly new ESG regulations. Throughout the review period, various EU sustainability regulations have been developed and implemented. Some relate solely to ESG reporting (e.g., the CSRD and ESRS Directive and the Sustainable Finance Taxonomy Regulation), while others are primarily concerned with making it mandatory for various entities to take certain actions and are related to the sustainable conduct of business by companies in terms of environmental, human rights, labor rights, and others (e.g., the Due Diligence Directive and the Equal Pay for Equal Work Directive).

There is no doubt that EU directives and regulations related to ESG issues will increase in number, and those already enacted are often still being modified or supplemented, which may cause difficulties in their implementation, thus, increasing investment risk. In turn, increased investment risk in the U.S. market may result from changing attitudes toward climate and sustainability-related investments, including a shift away from the acronym ESG to more neutral terms like "sustainability." The organizer of Wall Street's prestigious awards for financial analysts, has dropped the ESG label from its rankings, stressing that the new terminology is less controversial amid political tensions in the US. Moreover, the number of "anti-ESG funds" has increased in recent years. Morningstar reports that anti-ESG funds experienced a marked increase in investor interest in 2022, with net inflows reaching approximately USD 376 million in the third quarter of that year (Stankiewicz & Roy, 2023).

The highest "premium" obtained from a given investment portfolio relative to the risk incurred was recorded for foreign ESG funds investing in U.S. equities and global developed market equities. In contrast, foreign sustainable funds investing in developed European market equities achieved the highest additional return–risk ratio of the fund. By far, the lowest long-term returns (both 36-month, 60-month

and YTD) were achieved by foreign ESG funds investing in global debt securities. Here, the losses were as high as 11%.

The least attractive funds, from the point of view of the Sharpe ratio achieved, were Polish and foreign EGS funds investing in global debt securities, and Polish sustainable funds investing their capital in mixed stable growth.

The comparison between domestic and foreign ESG funds was made within the same asset classes, ensuring that the investment universe is comparable. However, differences in fund scale, management approach, and regional exposure may still influence observed performance. Therefore, while the results reflect returns within similar asset categories, they should be interpreted with caution, as variations may be due to structural and operational factors rather than ESG strategy alone.

While the descriptive statistics presented above provide initial insights into the differences in performance between Polish and foreign ESG funds, they do not allow for conclusions regarding the statistical significance of these differences. Therefore, in the next step, we apply formal hypothesis testing using Welch's *t*-test and the Brown–Forsythe test to verify whether the observed differences in means and variances are statistically significant. The results are presented in Table 3 (see Appendix 1).

Analysis of homogeneity of variance and the test of equality of means lead to the conclusion that there are significant differences in the performance of Polish foreign ESG funds. This applies to both the rates of return they achieve and their investment risks. Only in terms of Sharpe ratio, funds achieved similar results, both in terms of the entire analyzed group, and by the asset classes in which they invested.

Considering the asset classes, the most noticeable significant differences in the mean and variance of performance were noted for two groups: global developed equity funds and global debt security funds. This may be the result of different regulations and classifications, or ESG terminology, in the various markets in which the funds' assets are invested. In particular, for funds investing in markets with relatively uniform regulations and ESG standards, performance did not differ significantly.

Overall, it seems that the differences in terms of rates of return and risk between Polish and foreign ESG funds may be caused by the specific criteria of the funds and the impossibility of isolating relatively homogeneous ESG strategies.

Conclusions

The main objective of this study was to compare the performance of Polish ESG funds with that of foreign ESG funds available in the Polish market, both for the entire sample and across selected asset classes. Additionally, the study assessed the statistical significance of differences in returns and risk between these groups, testing the hypothesis that significant differences exist in both mean returns and variance of performance between Polish and foreign ESG funds. The analysis led to the following key conclusions:

1. Both Polish and foreign ESG funds achieved the highest returns over 36- and 60-month periods, supporting the view of sustainable investing as a long-term investment strategy.
2. On average, foreign ESG funds delivered higher returns in all periods analyzed.
3. Polish ESG funds were, on average, less risky than foreign ESG funds, as indicated by lower standard deviations of returns. This may reflect the early stage of development of the domestic market and the more cautious investment strategies employed.
4. Investors in foreign ESG funds obtained a higher risk premium relative to the risk undertaken.
5. Within specific asset classes, the highest returns were achieved by foreign ESG funds investing in developed global market equities and U.S. equities, valid for both 36- and 60-month periods.
6. For the YTD period, the top returns were provided by foreign ESG funds investing in developed market equities and developed European market equities.
7. The highest risk-adjusted premiums were observed for foreign ESG funds investing in U.S. equities and global developed market equities.
8. The lowest long-term returns, across 36-month, 60-month, and YTD periods, were recorded for foreign ESG funds investing in global debt securities, with losses reaching up to 11%.
9. Statistical tests for homogeneity of variance (Brown–Forsythe) and equality of means (Welch's *t*-test) confirmed significant differences in performance between Polish and foreign ESG funds.
10. Observed differences in returns and risk may stem from both fund-specific criteria and the difficulty of isolating relatively homogeneous ESG strategies.

The study also has practical implications. Fund managers can benchmark their ESG products against those available in Poland, while investors can make more informed decisions in line with sustainable investment principles.

A key limitation of this study is that ESG funds were analyzed based on the asset groups in which they invest. Due to substantial variation in investment policies and ESG criteria, it was not possible to form groups of funds using fully homogeneous ESG strategies without introducing discretionary bias, which could compromise the validity of the results.

Overall, while differences in returns and risk between Polish and foreign ESG funds are evident, these findings should be interpreted with consideration of both structural factors and the heterogeneity of ESG approaches across funds.

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Appendix 1

Table 1. Descriptive statistics of Polish and foreign ESG funds

	Value of participation unit (PLN) 18.07.2023	Rate of return (%)							Value of assets (million PLN)	ARR Ratio	Fund risk (standard deviation)	Sharpe ratio	Downside risk
		1D	1M	3M	12M	36M	60M	YTD					
Polish ESG funds													
Average	174.07	0.06	-0.03	1.94	7.95	15.88	15.64	7.00	154.66	0.33	3.73	0.09	2.38
Median	112.84	0.08	0.01	0.98	7.00	12.42	7.87	5.78	40.35	0.20	4.04	0.08	-
Max	1,109.18	0.95	6.48	16.31	43.63	88.33	89.81	30.16	1430.00	1.98	7.43	0.27	-
Min	10.57	-0.89	-3.74	-6.66	-13.92	-11.32	-15.44	-7.66	0.41	0.00	0.58	0.00	-
Quartile 1	98.33	-0.10	-1.27	-0.15	0.34	0.75	0.55	2.74	16.76	0.00	2.30	0.00	-
Quartile 3	166.32	0.24	0.92	3.62	14.96	24.34	34.58	10.26	180.41	0.36	4.32	0.12	-
Foreign ESG funds													
Average	277.49	0.28	1.09	4.36	13.39	24.63	36.49	13.19	8686.80	0.26	5.11	0.14	1.84
Median	122.58	0.38	1.04	3.42	12.93	25.97	35.30	12.42	3777.10	0.03	5.22	0.09	-
Max	7,116.35	2.77	6.77	23.62	37.33	65.05	133.56	45.11	73610.00	7.00	9.28	0.13	-
Min	8.15	-1.27	-6.20	-6.17	-12.91	-24.16	-21.57	-7.01	0.10	0.00	0.04	0.00	-
Quartile 1	52.02	-0.08	-0.42	0.73	7.29	14.61	18.42	7.23	1137.90	0.00	4.58	0.03	-
Quartile 3	354.35	0.70	2.57	6.79	18.54	37.81	50.30	17.45	7358.90	0.34	6.07	0.14	-

Source: Author's own study.

Table 2. Descriptive statistics of selected group of funds

		Rate of return (%)									
	Value of participation unit (PLN) 18.07.2023	1D	1M	3M	12M	36M	60M	YTD	Value of assets (million PLN)	ARR Ratio	Fund risk (standard deviation	Sharpe ratio
Developed global market equity funds												
Polish ESG funds												
Average	248.93	0.03	-0.13	2.74	11.20	20.64	21.36	9.15	141.42	0.20	4.28	0.12
Median	124.61	0.04	-0.59	2.24	10.78	18.28	19.01	7.86	40.35	0.20	4.28	0.12
Max	1,109.18	0.76	3.24	11.80	25.18	46.78	46.96	30.16	758.45	0.69	5.22	0.27
Min	10.57	-0.66	-3.09	-6.66	-6.74	3.97	-5.93	-7.66	0.41	0.00	3.71	0.06
Quartile 1	95.28	-0.27	-1.56	0.51	7.31	13.29	7.87	3.77	27.80	0.00	4.05	0.09
Quartile 3	180.94	0.28	1.04	5.54	15.00	20.80	36.89	14.05	190.97	0.20	4.28	0.12
Foreign ESG funds												
Average	344.53	0.46	1.23	4.99	12.97	29.62	42.48	12.83	5574.43	0.25	4.84	0.12
Median	271.20	-0.30	0.72	0.98	13.68	28.99	39.09	8.18	9278.80	0.00	7.20	0.03
Max	1,323.61	1.35	4.51	10.56	29.53	65.05	123.28	21.78	50351.40	5.18	9.28	0.30
Min	8.53	-0.94	-1.53	-3.50	-2.17	7.15	4.12	-4.05	0.10	0.00	0.09	0.00
Quartile 1	56.66	0.20	-0.10	3.45	7.91	23.56	31.08	9.66	1048.60	0.00	4.60	0.06
Quartile 3	521.48	0.81	2.28	6.66	17.85	34.48	54.02	16.19	6196.75	0.25	5.21	0.17
Developed European market equity funds												
Polish ESG funds												
Average	152.94	-0.14	-1.29	-1.11	10.29	18.96	23.00	8.15	76.18	0.24	5.22	0.10
Median	144.96	-0.23	-1.23	-0.72	14.03	20.20	32.49	8.48	42.13	0.10	5.24	0.10
Max	223.54	0.46	-0.69	2.56	22.62	37.04	38.99	18.44	146.43	0.76	6.70	0.20
Min	98.30	-0.56	-2.01	-5.54	-9.50	-1.59	-2.47	-2.82	39.99	0.00	3.71	0.00
Quartile 1	122.20	-0.53	-1.82	-2.53	5.84	10.79	15.01	5.15	41.06	0.00	4.17	0.06
Quartile 3	175.69	0.17	-0.70	0.70	18.48	28.36	35.74	11.48	94.28	0.33	6.29	0.13
Foreign ESG funds												
Average	190.59	0.06	0.42	1.36	16.97	28.13	30.12	13.63	5549.60	0.29	5.55	0.11
Median	128.28	-0.49	1.11	1.95	19.88	18.74	33.90	15.24	12448.10	0.26	5.46	0.08
Max	1,044.95	2.41	3.89	6.38	37.33	58.02	81.73	23.63	28423.50	7.00	7.04	0.21
Min	13.30	-1.24	-1.97	-2.49	1.62	4.92	-18.71	6.84	24.00	0.00	0.04	0.00
Quartile 1	69.15	-0.71	-0.67	-0.09	10.15	19.31	17.53	10.71	804.60	0.00	5.12	0.06

		Rate of return (%)										
	Value of participation unit (PLN) 18.07.2023	1D	1M	3M	12M	36M	60M	YTD	Value of assets (million PLN)	ARR Ratio	Fund risk (standard deviation	Sharpe ratio
Quartile 3	206.31	0.53	1.44	2.44	23.07	35.03	43.02	16.90	6033.80	0.29	6.13	0.15
US equity funds												
Polish ESG funds												
Average	157.69	0.28	0.34	4.30	3.30	15.54	11.40	9.71	70.34	0.15	5.42	0.09
Median	117.68	0.09	0.54	4.70	-0.40	1.17	2.13	9.91	19.88	0.08	5.65	0.06
Max	291.75	0.95	1.37	8.02	16.61	44.83	39.09	18.56	180.41	0.46	6.14	0.23
Min	103.67	0.00	-1.10	-0.22	-2.64	0.61	-7.03	0.45	10.74	0.00	4.23	0.01
Quartile 1	109.14	0.05	-0.34	2.74	-1.51	0.89	-2.45	7.01	15.31	0.00	5.12	0.03
Quartile 3	166.23	0.31	1.21	6.26	4.41	23.00	20.61	12.61	100.15	0.23	5.95	0.13
Foreign ESG funds												
Average	858.95	0.59	3.25	7.44	9.31	35.02	41.50	12.26	9616.66	0.26	5.08	0.13
Median	128.68	0.42	3.65	9.74	13.59	35.46	44.16	18.01	4796.00	0.00	5.42	0.12
Max	7,116.35	1.33	5.83	17.17	26.68	51.18	91.28	40.12	51963.50	0.90	7.00	0.26
Min	9.22	-0.38	0.34	1.58	0.46	3.55	12.83	2.69	551.80	0.00	4.19	0.00
Quartile 1	53.72	0.36	2.75	7.19	8.81	15.40	33.59	12.18	1610.40	0.00	4.98	0.03
Quartile 3	227.72	0.77	4.42	15.56	18.17	41.84	53.79	28.22	26223.30	0.50	6.20	0.15
Mixed stable growth funds												
Polish ESG funds												
Average	130.98	0.31	0.24	0.99	4.56	1.18	3.95	4.55	96.91	0.00	1.93	0.00
Median	110.74	0.26	0.25	0.95	4.53	1.50	4.13	4.75	129.49	0.00	1.99	0.00
Max	203.80	0.48	0.37	2.19	5.90	3.74	7.28	5.78	148.67	0.00	2.46	0.00
Min	98.64	0.24	0.10	-0.12	3.26	-2.03	0.26	2.91	12.58	0.00	1.28	0.00
Quartile 1	104.73	0.25	0.15	0.67	3.42	-0.95	1.45	4.16	71.04	0.00	1.70	0.00
Quartile 3	136.99	0.32	0.33	1.27	5.67	3.63	6.63	5.14	139.08	0.00	2.22	0.00
Foreign ESG fund												
Average	414.81	0.53	0.63	1.65	0.69	5.79	19.98	4.21	7236.05	0.30	2.55	0.03
Median	342.59	0.39	0.73	1.82	0.53	7.69	23.75	4.28	655.80	0.00	2.16	0.02
Max	1,057.79	1.00	1.05	2.27	4.34	19.92	32.79	5.83	27075.40	0.86	4.42	0.11
Min	80.85	0.24	-0.03	0.87	-1.26	-6.08	-0.35	2.66	557.20	0.00	1.63	0.00

		Rate of return (%)										
	Value of participation unit (PLN) 18.07.2023	1D	1M	3M	12M	36M	60M	YTD	Value of assets (million PLN)	ARR Ratio	Fund risk (standard deviation	Sharpe ratio
Quartile 1	225.02	0.25	0.56	1.41	-1.24	-5.25	15.48	3.31	631.15	0.00	1.70	0.00
Quartile 3	445.06	0.84	0.77	1.86	1.08	12.68	28.25	4.99	7260.70	0.66	3.07	0.04
Global debt securities funds												
Polish ESG funds												
Average	122.22	0.13	0.51	0.92	4.83	-4.34	-0.96	3.42	59.74	0.23	1.62	0.00
Median	102.82	0.14	0.37	0.87	3.10	-5.66	0.71	3.31	18.18	0.23	1.62	0.00
Max	190.38	0.30	1.14	1.80	10.97	5.27	7.40	4.47	278.81	0.40	2.30	0.00
Min	90.28	-0.09	0.28	0.39	2.15	-11.32	-12.65	2.57	1.96	0.06	1.20	0.00
Quartile 1	99.14	0.09	0.34	0.62	2.83	-7.86	-3.16	3.13	11.78	0.23	1.43	0.00
Quartile 3	137.56	0.20	0.51	1.02	5.10	-2.14	2.92	3.60	28.27	0.23	1.62	0.00
Foreign ESG funds												
Average	171.36	-0.27	-2.09	-1.82	3.72	-10.93	-3.43	0.35	1859.08	0.20	2.09	0.00
Median	47.67	-0.13	-1.84	-2.10	3.34	-11.76	-0.81	0.50	907.70	0.00	1.85	0.00
Max	495.21	0.30	0.25	1.60	13.77	2.54	7.43	6.42	5747.60	1.08	4.37	0.00
Min	8.31	-1.27	-6.20	-6.17	-1.04	-24.07	-21.57	-7.01	58.80	0.00	0.88	0.00
Quartile 1	40.32	-0.47	-2.84	-3.71	0.45	-15.72	-8.21	-1.40	493.38	0.00	1.61	0.00
Quartile 3	354.35	0.01	-1.15	0.00	5.73	-5.88	1.23	1.99	2931.63	0.20	2.35	0.00

Source: Author's own study.

Table 3. The results of the Brown–Forsythe test and Welch test, a two-sided probability, that the variance differences and the mean differences in the performance of Polish and foreign ESG funds are not significant

		Rate of return (%)										
	Value of participation unit (PLN) 18.07.2023	1D	1M	3M	12M	36M	60M	YTD	Value of assets (million PLN)	ARR ratio	Fund risk (standard deviation	Sharpe ratio
Polish and foreign ESG funds overall												
Brown–Forsythe test	5.44E-12	0.2912	0.2042	0.2194	1.96E-05	0.0225	0.4379	0.2127	0.1739	3.91E-11	0.0028	0.1954
Welch test	0.9383	0.0696	0.0026	0.01525	0.01237	0.1119	0.0114	0.0001	0.0031	0.2243	0.0006	0.5531
Polish and foreign ESG funds – developed global market equity funds												
Brown–Forsythe test	0.8296	0.3327	0.2434	0.0075	0.4272	0.3096	0.9311	0.0029	1.02E-17	0.0001	0.0008	0.6027
Welch test	0.32633	0.0039	0.0207	0.0813	0.2726	0.078	0.0283	0.149	1.56E-05	0.5746	0.0006	0.9887
Polish and foreign ESG funds – developed European market equity funds												
Brown–Forsythe test	0.0387	0.5007	0.3681	0.0599	0.1179	0.341	0.6097	0.0145	0.0014	0.1963	0.1854	0.1901
Welch test	0.3277	0.4989	0.0098	0.2432	0.4133	0.3472	0.6387	0.2976	5.24E-07	0.7939	0.6805	0.748
Polish and foreign ESG funds – US equity funds												
Brown–Forsythe test	0.0012	0.6133	0.8831	0.7572	0.2878	0.1514	0.2808	0.6067	8.77E-05	0.5769	0.6594	0.429
Welch test	0.0815	0.373	0.0063	0.0323	0.09694	0.4103	0.1308	0.0721	2.27E-05	0.5121	0.9576	0.8075
Polish and foreign ESG funds – mixed stable growth funds												
Brown–Forsythe test	0.0089	0.0934	0.1095	1.9921	0.4322	0.0508	0.0412	0.9645	6.23E-05	_	0.2209	_
Welch test	0.0991	0.1945	0.0509	0.2654	0.0179	0.4245	0.11	0.6811	0.3594	0.1827	0.2723	0.1317
Polish and foreign ESG funds – global debt securities funds												
Brown–Forsythe test	0.0033	0.0137	0.0033	0.0035	0.6246	0.9915	0.9038	0.001	4.42E-06	0.0239	0.0524	_
Welch test	0.2164	0.0007	6.49E-09	4.36E-06	0.6397	0.1567	0.6265	0.0003	0.0004	0.7025	0.0687	_

level of significance $\alpha = 0.05$

Source: Author's own study.

Appendix 2

Table 4. The top 10 Polish ESG funds by assets

Fund	Value of participation unit (PLN) 18.07.2023
Santander Prestiż Akcji Europejskich	1,499.37
Santander Prestiż Odpowiedzialnego Inwestowania Globalny	1,109.18
Santander Prestiż Future Wealth	851.35
Goldman Sachs Indeks Odpowiedzialnego Inwestowania	424.77
Goldman Sachs Globalny Spółek Dywidendowych	330.47
QUERCUS Agresywny	300.6
Goldman Sachs Spółek Dywidendowych USA	291.75
Goldman Sachs Europejski Spółek Dywidendowych	223.54
Goldman Sachs Polski Odpowiedzialnego Inwestowania	204.81
Millennium Plan Wyważony	203.8

Source: Author's own study.

Table 5. The top 10 Foreign ESG funds by assets

Fund	Value of participation unit (PLN) 18.07.2023
iShares IV – iShares MSCI USA SRI UCITS ETF (Dis) (EUR) (hedged)	7,116.35
iShares VII – iShares MSCI USA Small Cap ESG Enhanced UCITS ETF (Acc) (USD)	1,872.85
Schroder ISF US Small & Mid-Cap Equity A (Acc) (USD)	1,682.98
Schroder ISF US Small & Mid-Cap Equity A (Acc) (EUR)	1,676.54
Schroder ISF US Small & Mid-Cap Equity A1 (Acc) (USD)	1,548.99
Schroder ISF Global Sustainable Growth A (Acc) (USD)	1,323.61
Schroder ISF Asian Total Return A (Acc) (USD)	1,283.89
Schroder ISF QEP Global Quality A (Acc) (EUR)	1,225.4
Schroder ISF Asian Total Return A1 (Acc) (USD)	1,199.93
Black Rock SF Managed Index Portfolios - Growth D2 Hedged (PLN)	1,129.76

Source: Author's own study.