**ESG Funds analysis**

# Overview

the code serves to analyze the performance of ESG funds against a benchmark index, providing insights into their relative performance over time while also ensuring that data is cleaned and formatted for analysis.

# Project Objective:

* Analyze the performance of ESG (Environmental, Social, and Governance) funds to determine when they outperform or underperform compared to the S&P 500 index and to
* extract additional insights from the data.

# Steps taken in the analysis

## Library Imports

The code imports the `pandas` library for data manipulation and analysis.

## Custom Functions

* **`print\_bordered\_table(df)`:** A function to print pandas DataFrames with borders for enhanced readability.
* **`display\_fund\_composition\_as\_percentages(df)`:** A function to format and display fund composition as percentages.
* **`display\_correlation\_matrix(correlation\_matrix, title)`:** A function to print a correlation matrix with formatting for better visualization.
* **`clean\_column\_names(column\_names)`:** A function to clean and standardize column names in the datasets.

## Data Loading and Cleaning

* Loads data from CSV files for factsheet and performance datasets.
* Cleans the column names in both datasets to make them more consistent.
* Adjusts percentage values in the factsheet by dividing by 100.
* Handles duplicates and missing data in the performance dataset, ensuring proper data types.

## Yearly & Monthly Performance Analysis

* Calculates the monthly rate of change for two ESG funds and the S&P 500 index to evaluate performance over time.
* Resamples the performance data to a yearly frequency and calculates the year-over-year (YoY) rate of change for the ESG funds and the S&P 500.
* Identifies periods of outperformance for each ESG fund compared to the S&P 500.

## Data Visualization

Plots the monthly rate of change for both ESG funds and the S&P 500, visually comparing their performance.

# In depth explanation of the Fund performance and correlation

when do ESG funds outperform or underperform, and what factors contribute to this performance?

## Yearly and Monthly Changes

Calculating yearly changes reveals the long-term performance of ESG funds relative to traditional funds or benchmarks. By analyzing year-over-year percentage changes, you can identify performance trends over time.

### ****Why Yearly Changes Matter?****

* **Trend Analysis:** Determines if ESG funds are gaining or losing value over the years.
* **Performance Comparison:** Allows for comparison against non-ESG funds or benchmarks to assess relative performance.

### ****Why Monthly Changes Matter?****

**Short-Term Insights:** Highlights volatility and seasonal patterns.

## Correlation with Sectors

The correlation analysis with different sectors helps to identify how the performance of ESG funds relates to specific market sectors.

### Why Sector Correlation Matters:

**Sector Performance Influence**: Understanding which sectors are positively or negatively correlated with ESG fund performance can indicate market behavior and help explain the outperformance or underperformance of ESG investments.

## Pie Charts

The use of pie charts provides a visual representation of the distribution of investments across different sectors within the ESG funds.

### Why Pie Charts Matter:

* **Allocation Insight**: Pie charts can visually communicate the percentage allocation of ESG funds to various sectors, helping to illustrate the diversification or concentration of these investments.

## Top Sectors Discovery

Identifying the top-performing sectors within ESG investments can help in answering the performance-related questions.

### Why Top Sectors Discovery Matters:

* **Performance Drivers**: Recognizing which sectors are leading the performance allows for better forecasting and strategy adjustment. If ESG funds are doing well, understanding which sectors contribute can help replicate that success.

## Correlation analysis

One of the ways to detect if any meaningful correlation exists between the different funds and most important indexes is to do a correlation analysis.

In our case the correlation matrix showed that the **Narcissus\_Core\_Equity\_Sustainability\_Fund** does not have any strong correlation between the other funds or even its most important investing sectors, on the other hand the **Pietro\_Advisory\_Sustainable\_Large\_Cap\_ETF** has a strong correlation with the 3 sectors.

## Answering the Key Question

Combining these analyses enables you to answer when ESG funds outperform or underperform:

**Outperformance Situations**:

* When ESG funds show positive yearly changes alongside strong sector performance, indicating favorable market conditions for ESG investments.
* When top sectors within the ESG space are thriving due to broader economic trends, innovation, or regulatory support.

**Underperformance Situations:**

* When monthly changes indicate a downturn in ESG funds that coincide with broader market declines or negative sector trends.
* When ESG funds are heavily invested in sectors that are performing poorly, leading to drag on overall fund performance.

## Possible Reasons for Performance Variability (research insights)

* **Market Trends:** Growing interest in sustainable and green initiatives can drive ESG fund performance, as more capital flows into environmentally and socially responsible sectors.
* **Sector-Specific News:** ESG funds can be influenced by news related to renewable energy advancements, climate change policies, or corporate scandals. For example, positive developments in clean energy could boost ESG funds, while controversies around companies failing ESG standards might lead to underperformance.
* **Investor Sentiment:** ESG funds are often more sensitive to shifts in investor sentiment around sustainability. Increased demand for ethical investing boosts fund performance, while skepticism or disinterest in ESG principles may result in downturns.
* **Regulatory Impact:** Changes in regulations, such as stricter ESG reporting requirements or incentives for green investments, can affect fund performance. Stronger regulations generally lead to positive performance, while uncertainty or deregulation may cause volatility.

# Conclusion

By examining yearly and monthly changes, analyzing sector correlations, utilizing pie charts for visual insights, and identifying top-performing sectors, the code delivers a comprehensive framework for assessing the performance of ESG funds. This holistic view enables a better understanding of when and why ESG funds outperform or underperform, ultimately guiding investment decisions in this growing segment of the market.