

# ESG Fund Performance in the US and the Role of Behavioural Maturity

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## Introduction

Sustainable investing has become an increasingly important part of financial markets, with portfolio managers allocating capital to ESG-focused companies. However, conventional ESG metrics may place greater emphasis on compliance and risk management than on strategic and behavioural change within firms.

Imperial’s research\* has found that companies with more actions targeted towards operational sustainability tend to generate additional alpha in the stock market. This research moves the unit of analysis from companies to funds, analysing a set of real ESG targeted portfolios’ returns, with focus on US holdings only.

The GOLDEN Sustainability Dataset is used to classify each firm’s sustainability initiatives into three categories of increasing strategic depth: Advocacy, Preparation and Transformation. Transformation represents innovation-driven strategic change embedded in products, processes, governance and value chains, reflecting behavioural maturity.

## Objectives

- Investigate whether better GOLDEN coverage of portfolio holdings correlates with returns.
- Investigate the relationship between returns and how well a portfolio’s holdings score on Transformation initiatives.

## Methodology

The analysis combines:

- CRSP monthly mutual fund monthly holdings (07/2011 - 11/2024)
- GOLDEN Sustainability Dataset
- Compustat/CRSP security-level monthly prices and returns

Datasets are matched by firm identifier and date. The research sample is restricted to portfolio-months  $\geq 80\%$  US-weighted with  $\geq 5$  holdings.

The firm-level Transformation Score is used as a proxy for behavioural maturity:

$$Transformation\ Score = \frac{Number\ of\ Transformation\ Initiatives}{Total\ Number\ of\ Initiatives}$$

This is then aggregated across portfolio holdings to construct a portfolio-level measure, TES:

$$Transformation\ Exposure\ Score = \sum Transformation\ Score_{c,p,t} \times Weighting_{c,p,t}$$

GOLDEN coverage ratio is the proportion of portfolio holdings with available GOLDEN data.

Two weighting schemes are used:

- Covered-only: GOLDEN-matched holdings only, weights rescaled to sum to 1.
- Coverage-discounted: all holdings; weights rescaled to sum to 1; TES  $\times$  coverage ratio, so uncovered holdings contribute zero.

Value-weighted monthly portfolio returns are constructed based on holdings’ market value, and then OLS regressions of return on GOLDEN coverage / TES is applied.

## Results

**Question 1: is better GOLDEN coverage ratio associated with higher returns?**

In the simple (contemporaneous) specifications, GOLDEN coverage and portfolio returns are measured over the same monthly period. In the lagged specifications, GOLDEN coverage is measured in the previous year and related to portfolio returns in the following year.

| Model                        | N     | Coef   | p-value |
|------------------------------|-------|--------|---------|
| Simple                       | 5,239 | −0.024 | <0.001  |
| Portfolio FE                 | 5,239 | −0.027 | <0.001  |
| Year FE                      | 5,239 | −0.017 | <0.001  |
| Portfolio + Year FE          | 5,239 | −0.009 | 0.325   |
| Lagged                       | 457   | −0.152 | <0.001  |
| Lagged + Portfolio FE        | 457   | −0.138 | 0.008   |
| Lagged + Year FE             | 457   | −0.145 | 0.011   |
| Lagged + Portfolio + Year FE | 457   | −0.112 | 0.578   |

GOLDEN coverage is negatively associated with portfolio returns in 6 out of 8 specifications.

However, this does not imply that greater sustainability reporting causes lower returns. Higher reporting may reflect greater disclosure without necessarily indicating meaningful changes in firms’ underlying behaviour. In some cases, sustainability reporting may primarily serve reputational or compliance purposes rather than reflect substantive economic value. This motivates the second research question.

**Question 2: is higher behavioural maturity within a portfolio holdings associated with higher returns?**

**Covered-only:**

| Model                 | N     | Coef   | p-value |
|-----------------------|-------|--------|---------|
| Simple                | 5,102 | +0.152 | 0.135   |
| Portfolio FE          | 5,102 | +0.161 | 0.154   |
| Year FE               | 5,102 | −0.046 | 0.671   |
| Portfolio + Year FE   | 5,102 | −0.102 | 0.435   |
| Lagged                | 443   | +6.489 | <0.001  |
| Lagged + Portfolio FE | 443   | +7.242 | 0.011   |

The contemporaneous specifications show no statistically significant relationship between portfolio TES and returns. However, when TES is lagged by one year, capturing the relationship between the transformation characteristics of holdings in one year and portfolio returns in the following year, the coefficient becomes substantially larger and statistically significant.

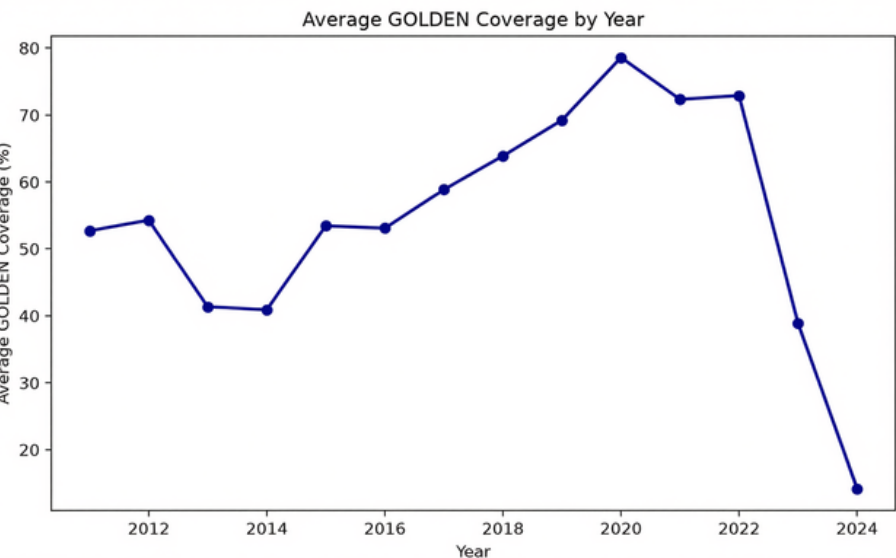
This provides some evidence consistent with the hypothesis that greater exposure to transformation-oriented firms may be associated with higher subsequent returns. For sustainable investors, this suggests that allocating capital to firms taking steps to embed sustainability more deeply into innovation and business models may be associated with stronger subsequent returns.

**Coverage-discounted:**

This measure shows a significant negative relationship with returns in some of the contemporaneous specifications.

| Model                 | N     | Coef   | p-value |
|-----------------------|-------|--------|---------|
| Simple                | 5,102 | −0.420 | <0.001  |
| Portfolio FE          | 5,102 | −0.502 | <0.001  |
| Year FE               | 5,102 | −0.204 | 0.014   |
| Portfolio + Year FE   | 5,102 | −0.115 | 0.417   |
| Lagged                | 443   | +0.243 | 0.773   |
| Lagged + Portfolio FE | 443   | +0.985 | 0.316   |

Although the results appear conflicting, they should be interpreted cautiously because this measure is particularly sensitive to incomplete GOLDEN coverage, as TES is discounted by the GOLDEN coverage ratio, meaning a lower score may reflect missing data rather than genuinely lower behavioural maturity.



**Additional test: different sample periods**

| Breakpoint | Pre Simple (p) | Post Simple (p) |
|------------|----------------|-----------------|
| 2020       | +0.314 (0.002) | −0.556 (<0.001) |
| 2021       | +0.291 (0.021) | −0.865 (<0.001) |
| 2022       | +0.173 (0.122) | −1.275 (<0.001) |

The results vary substantially across different sample periods, with the sign switching from positive to negative over time. This coincides with changes in GOLDEN coverage, which increased up to 2022 before declining sharply, partly because 2024 data from sustainability reports issued in 2025 is still being processed. The positive relationship during higher-coverage periods is consistent with our hypothesis.

## Conclusion

- GOLDEN coverage is negatively associated with portfolio returns, but this does not imply that greater sustainability reporting reduces performance.
- The findings provide some evidence consistent with a link between behavioural maturity and subsequent performance, but the relationship is sensitive to coverage and model specification.

## Further Analysis

- Expand the sample to international holdings to test generalisability.
- Analyse further how the relationship changes across different market periods.
- Control for portfolio characteristics, such as size, value/growth exposure, momentum, volatility and sector composition.
- Restrict the sample to well-covered portfolios to reduce the impact of incomplete GOLDEN data on the results.

\*Burrato, M., Nouri, M., Pellegrino, F., Scalvini, L. and Wu, S., Zollo M. (2025) A Behavioural Revolution: Sustainability Actions that Create Alpha. Imperial Business School. doi:10.25560/129980.