

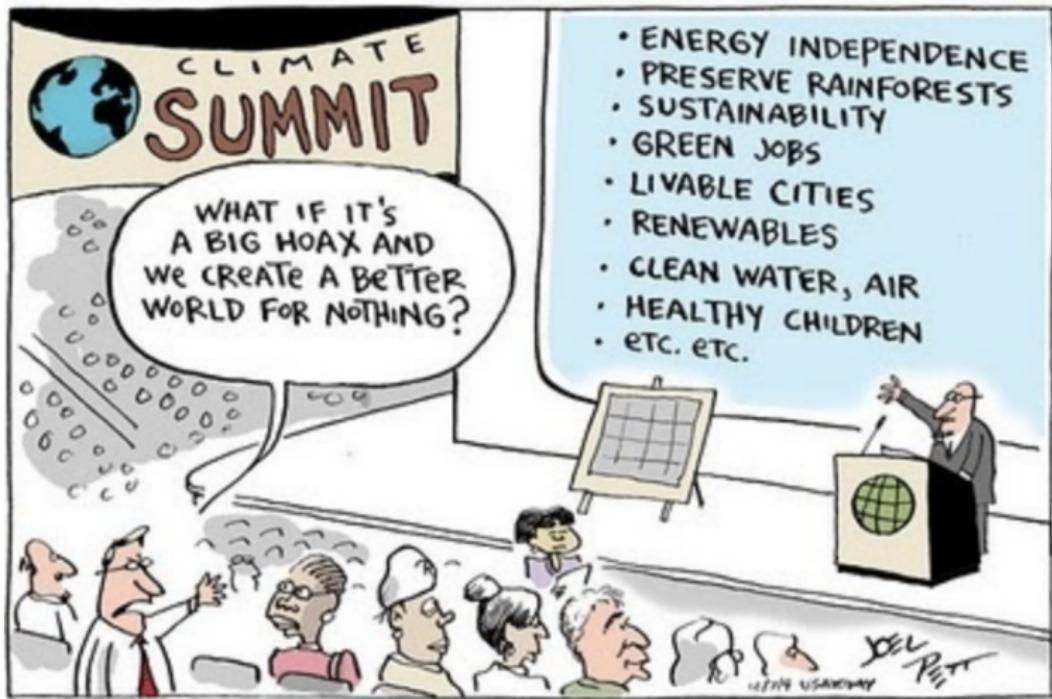
The Inherent Complexity of ESG Investing

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ESG investing is insanely complicated



Source: <https://www.climateactionreserve.org/blog/2012/08/31/environmental-cartoons-by-joel-pett/> This image is copyright protected. All rights reserved.

There are lots of issues to consider



Source: Lisa Goldberg's iPad

Measurement can be subjective



You really think "pitchfork count" is the best metric for measuring crowdsourcing?

Source: <https://www.robcottingham.ca/cartoon/archive/14-measuring-the-impact-of-the-crowd/> (creative commons)

And then, there is portfolio construction



Source: https://www.freepik.com/free-vector/engineers-team-discussing-issues-construction-site_7416549.htm

Guiding questions for this presentation

What might happen when we apply different portfolio construction methodologies to the same ESG data*?

What might the tradeoffs between financial outcomes and ESG exposures look like?

What might we expect from a portfolio tilt based on aggregating lots of issues into a single score?

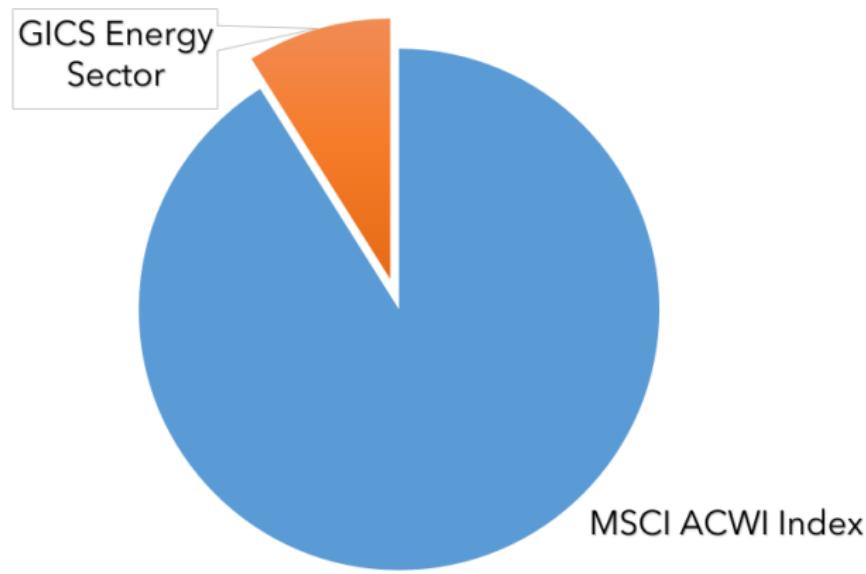
* assuming we have adequately met the formidable challenges of issue selection and measurement

We'll start with exclusion portfolios, and there is more than one way to build one

	Method	Comment
Simple	cap weight	active bet
Optimized	minimize tracking error	requires a risk model and an optimizer

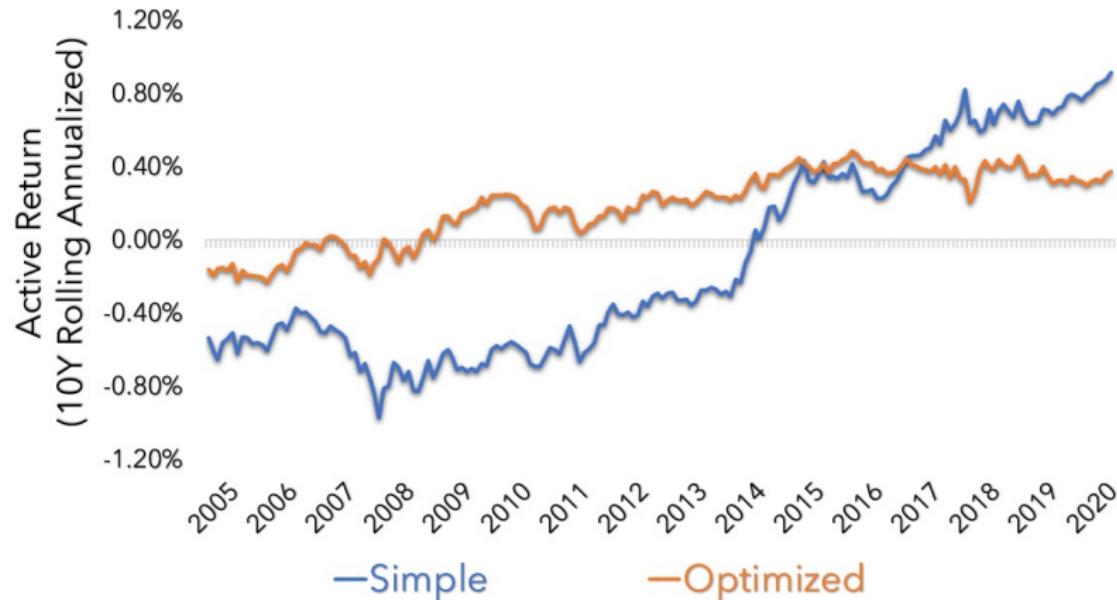
Exclusion portfolios differ in the way allowable securities are weighted. Some methodologies rely on external tools while others do not.

An Energy Exclusion is a broad-brush way to avoid fossil fuel companies



We'll look at GICS Energy Exclusions using data from July 1, 1995 to December 31, 2020.

Performance of an exclusion strategy depends on how we constructed the portfolio



Energy Exclusion portfolios rebalanced monthly, July 1, 1995–December 31, 2020. Benchmark: MSCI ACWI Index. Source: Aperio Group and Barra Portfolio Manager. Past performance is no guarantee of future results. There is no guarantee that any forecasts made will come to pass. Please see slide 29 for notes on the calculation methodology.

Performance of a simple exclusion can mirror the weight of the exclusion in the benchmark



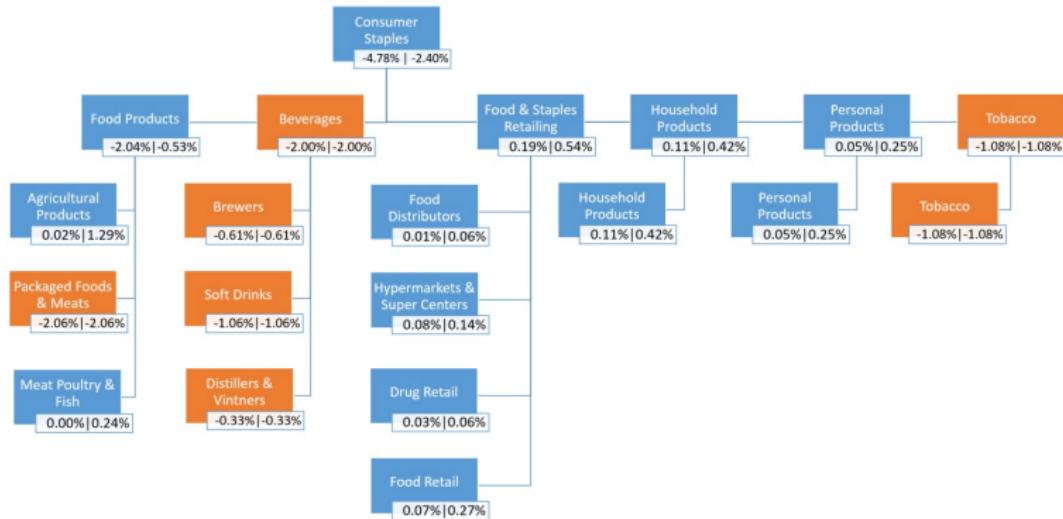
Ten-year rolling returns of Simple Energy Exclusion strategy and weight of the Energy Sector, July 1, 1995–December 31, 2020. Benchmark: MSCI ACWI Index. Source: Aperio Group and Barra Portfolio Manager. Past performance is no guarantee of future results. There is no guarantee that any forecasts made will come to pass.

A simple exclusion may be riskier than an optimized exclusion



Realized risk of Energy Exclusions strategies, July 1, 1995–December 31, 2020.
Benchmark: MSCI ACWI Index. Source: Aperio Group and Barra Portfolio Manager. Past performance is no guarantee of future results. There is no guarantee that any forecasts made will come to pass.

Vice Exclusions



We constructed strategies that excluded all companies in the GICS Chemicals and Tobacco industries, GICS Brewers, Distillers and Vintners, Casinos and Gaming, Packaged Foods and Meats and Soft Drinks sub-industries from the MSCI ACWI Index using data from July 1, 1995 to December 31, 2020. Source: Aperio Group and Barra Portfolio Manager. For illustrative purposes only.

Optimized Exclusion hugs the benchmark more closely than Simple Exclusion



Vice Exclusion portfolios rebalanced monthly, July 1, 1995–December 31, 2020.
Benchmark: MSCI ACWI Index. Source: Aperio Group and Barra Portfolio Manager. Past performance is no guarantee of future results. There is no guarantee that any forecasts made will come to pass. Please see slide 29 for notes on the calculation methodology.

Simple Exclusions carry a large-cap bias

Active Weights	Agricultural Products	Diversified Banks
Simple	0.02%	0.81%
Optimized	1.29%	0.13%

The active weight of an admissible security in a Simple Exclusion is given by

$$w_a = \frac{\gamma}{1 - \gamma} w$$

Average active sub-industry weights of the Vice Exclusion strategies, July 1, 1995–December 31, 2020. Benchmark: MSCI ACWI Index. Source: Aperio Group and Barra Portfolio Manager.

Optimized Exclusions carry a correlation bias

Active Weights	Consumer Staples	Materials	Consumer Discretionary	Financials	Information Technology
Simple	-4.78%	-2.21%	0.53%	1.80%	1.46%
Optimized	-2.40%	-2.01%	0.58%	0.27%	0.31%

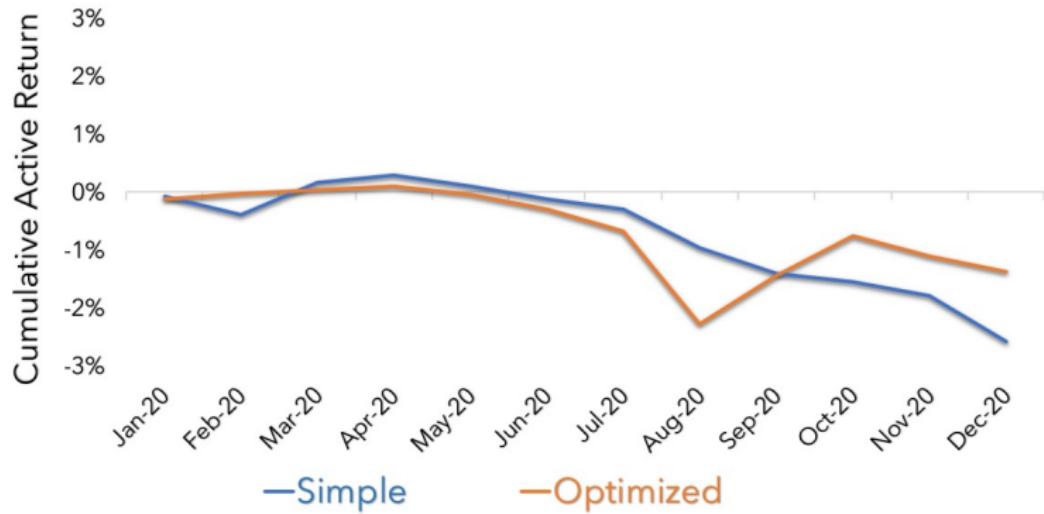
Average active sector weights of the Vice Exclusion strategies, July 1, 1995–December 31, 2020. Benchmark: MSCI ACWI Index. Source: Aperio Group and Barra Portfolio Manager.

Gender-based exclusions



We constructed strategies that excluded all companies whose boards were less than 30% female from the MSCI ACWI Index using data as of December 31, 2020. Due to data constraints, we restricted our analysis to calendar year 2020.
Source: Aperio Group and Barra Portfolio Manager. For illustrative purposes only.

Both the Simple and Optimized Gender Exclusion strategies underperformed



Returns of Gender Exclusion strategies, December 31, 2019–December 31, 2020. Benchmark: MSCI ACWI Index. Source: Aperio Group and Barra Portfolio Manager. Past performance is no guarantee of future results. There is no guarantee that any forecasts made will come to pass. For illustrative purposes only.

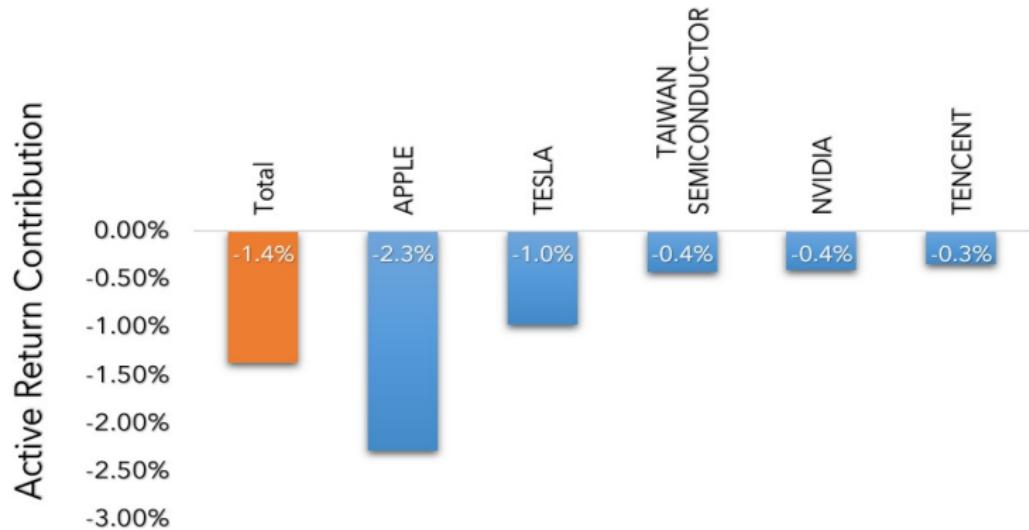
Apple drove the underperformance of the Simple Exclusion...



Security contributions to active return of the Simple Gender Exclusion strategy, December 31, 2019–December 31, 2020. Benchmark: MSCI ACWI Index.

Source: Aperio Group and Barra Portfolio Manager.

...and also the Optimized Exclusion



Security contributions to active return of the Optimized Gender Exclusion strategy, December 31, 2019–December 31, 2020. Benchmark: MSCI ACWI Index. Source: Aperio Group and Barra Portfolio Manager.

The performance difference between the Simple and Optimized Exclusions was driven by unintended bets

Active Weights	Information Technology	Industrials	Consumer Staples
Simple	-3.59%	-1.64%	2.23%
Optimized	-1.79%	0.13%	0.74%
Active Return	29.28%	-5.08%	-8.00%

Average active sector weights in Gender Exclusions and active returns of MSCI Sector ETFs: December 31, 2019 –December 31, 2020. Benchmark: MSCI ACWI Index. Source: Aperio Group and Barra Portfolio Manager. Past performance is no guarantee of future results. There is no guarantee that any forecasts made will come to pass.

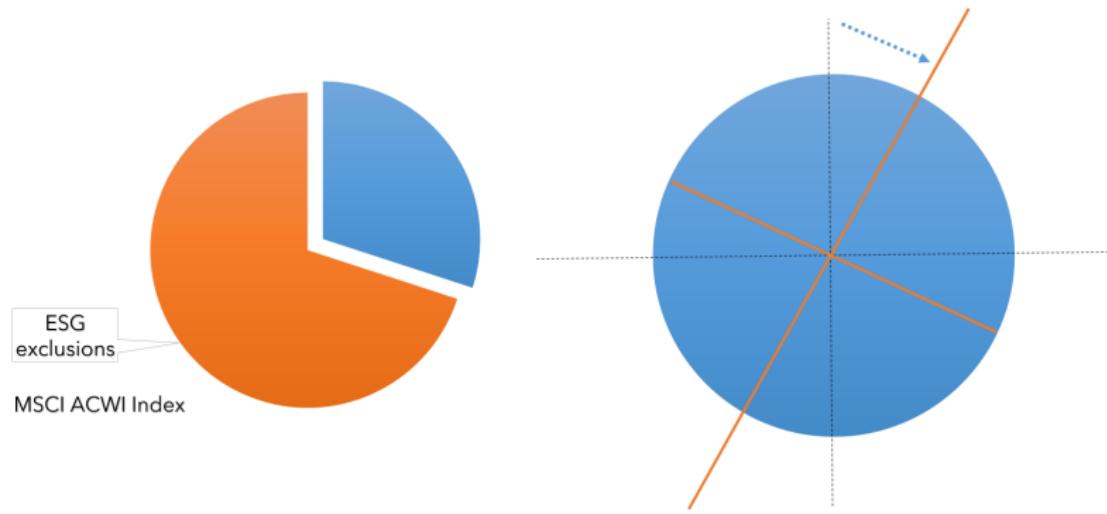
ESG scores drive portfolio construction

As ESG data have become more copious and more refined, rating agencies and other organizations have begun to provide scores on different aspects of ethical investing.

Keeping with our theme of the impact of portfolio construction, we'll look at how a Tilt compares to Simple and Optimized Exclusions.

Once again, data constraints relegate us to considering only calendar year 2020.

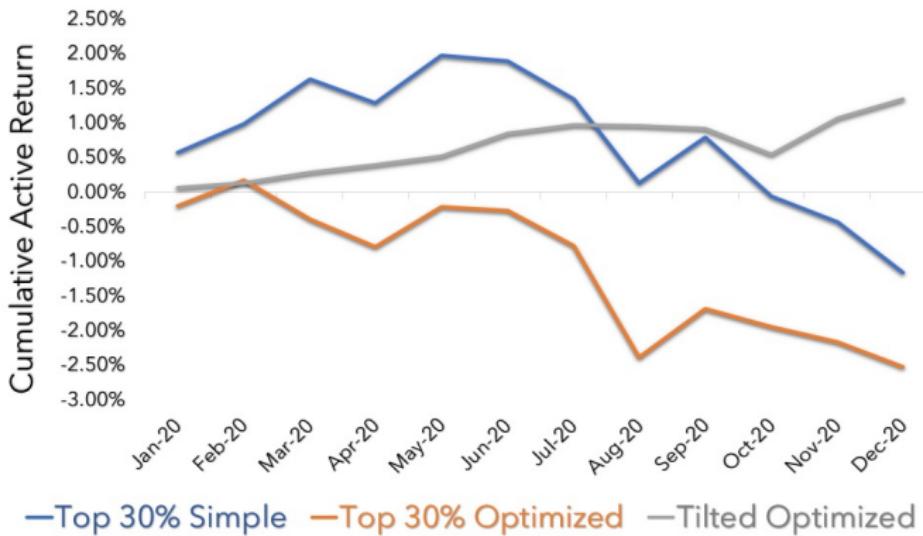
We applied three portfolio construction methodologies to a single score



We constructed Simple and Optimized exclusions using the top 30% of companies.

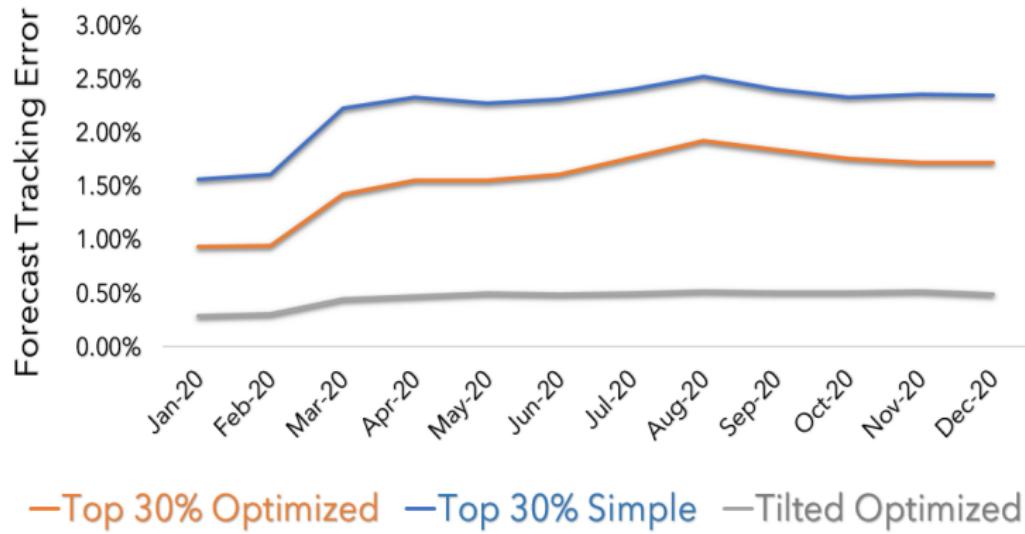
Then we constructed a tracking error minimizing tilt, using all the companies in the MSCI ACWI Index, which matched the score of the optimized exclusion.
For illustrative purposes only.

The tilt tracked its benchmark more closely than the exclusions



Returns of ESG Exclusion strategies and Optimized Tilt, December 31, 2019–December 31, 2020. Benchmark: MSCI ACWI Index. Source: Aperio Group and Barra Portfolio Manager. Past performance is no guarantee of future results. There is no guarantee that any forecasts made will come to pass.

Time series of forecast tracking errors tell the same story



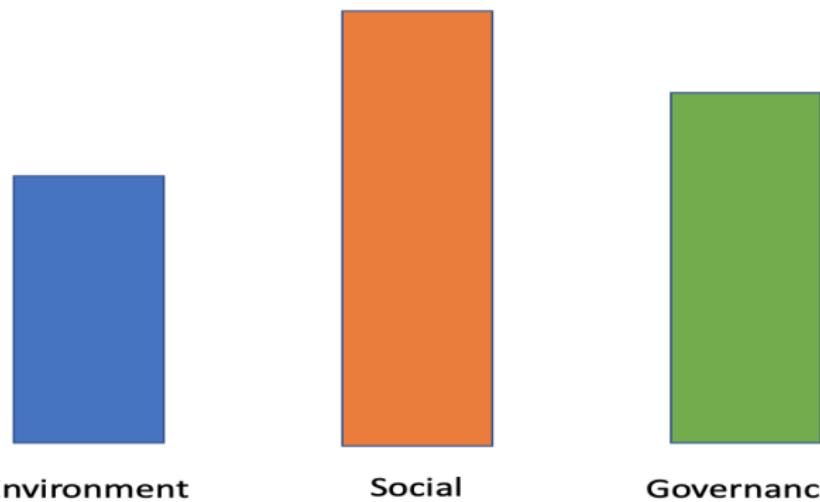
Risk of ESG Exclusion strategies and Optimized Tilt, December 31, 2019–December 31, 2020. Benchmark: MSCI ACWI Index. Source: Aperio Group and Barra Portfolio Manager. For illustrative purposes only.

ESG ratings lack standardization

A growing body of research, including Berg et al. (2020) and Dimson et al. (2020), documents **disagreements** across ESG scores from different providers.

Sources of the disagreements include absolute rating versus best-in-class, different issue areas, different yardsticks for a given issue, different weighting schemes...

We constructed a family of ESG scores...

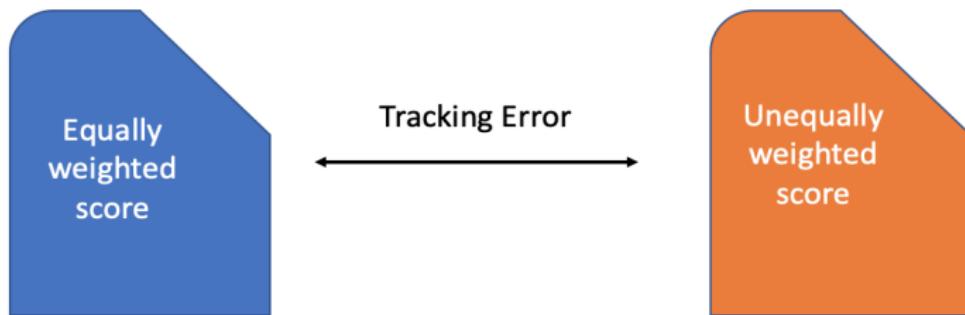


We varied the weights of the MSCI E, S and G pillar scores between 0 and 100% in increments of 10%.

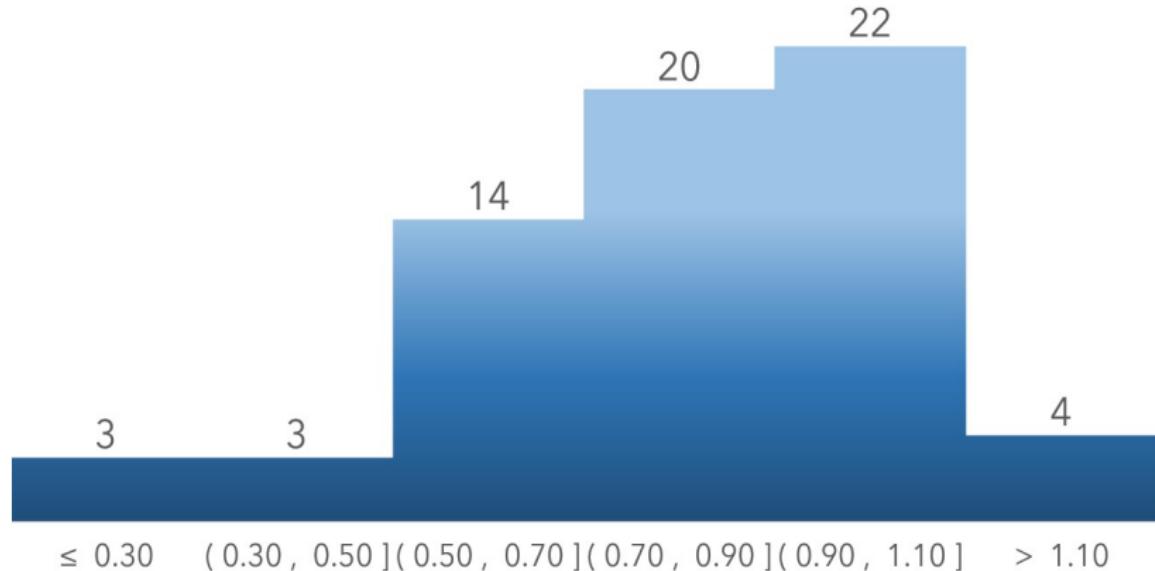
...and a corresponding family of ESG tilts

We set the tilt on each score to 1.3 to times the benchmark score.

Finally, we calculated the distance, measured by forecast tracking error, to the tilt that equally weights the scores.



The distance exceed 1.10% for some portfolios



Histogram of tracking errors between tilts based on ESG scores with variably weighted E, S and G pillars and a tilt based on an equally-weighted score. December 31, 2020. Benchmark: MSCI ACWI Index. Source: Aperio Group and Barra Portfolio Manager. For illustrative purposes only.

Some Takeaways

Portfolio construction methodology can materially impact ESG strategy performance in many unintended ways.

Simple versus optimized exclusions provide a tradeoff between unwanted risk and unwanted exposures.

Strategies based on arbitrary cutoffs may be driven by unintended bets, resulting in exposure to risk factors not intentionally targeted.

Relative to an exclusion, an optimized tilt may facilitate achieving a targeted ESG exposure with lower risk.

Varying E,S, and G pillar weights in the determination of an ESG score leads to differences in optimized tilts.

ESG-based portfolio strategies face many complex challenges!

References

- Berg, F., Kölbel, J. F. & Rigobon, R. (2020), Aggregate confusion: The divergence of esg ratings. MIT Sloan Working Paper.
- Dimson, E., Marsh, P. & Staunton, M. (2020), 'Exclusionary screening', *The Journal of Impact and ESG Investing* 1(1), 66–75.

Index Description

The MSCI ACWI Index is an equity benchmark for global stock performance. It is a capitalization-weighted index covering large and midsize companies. The index includes approximately 3,000 stocks from 23 developed market countries and 27 emerging market countries. You cannot invest directly in an index.

Notes on Calculation Methodology

The portfolio construction process we used relies upon an optimization model built and designed by MSCI Barra. The model utilizes a mathematical objective function which seeks to minimize active risk (i.e., forecast tracking error), all while also meeting the conditions presented by a series of simultaneous equations, the values of which are, in part, populated by data based upon the securities being analyzed. With respect to measuring potential equity risk, Aperio also uses and relies upon MSCI Barra risk models. You should note that such use and reliance of the MSCI Barra models in the optimization and equity risk analysis presents model risk, which is defined as the potential for adverse consequences from decisions based on incorrect or misused model.

The model may have fundamental errors and may produce inaccurate outputs when viewed against the design objective and intended business uses. The mathematical calculation and quantification exercise underlying any model generally involves application of theory, choice of sample design and numerical routines, selection of inputs and estimation, and implementation in information systems. Errors can occur at any point from design through implementation. In addition, shortcuts, simplifications, or approximations used to manage complicated problems could compromise the integrity and reliability of outputs from those calculations. Finally, the quality of model outputs depends on the quality of input data and assumptions, and errors in inputs or incorrect assumptions will lead to inaccurate outputs. The model may be used incorrectly or inappropriately. Even a fundamentally sound model producing accurate outputs consistent with the design objective of the model may exhibit high model risk if it is misapplied or misused. Models by their nature are simplifications of reality, and real-world events may prove those simplifications inappropriate.

Disclosure

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