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Avoiding the Tragedy of the Horizon

Designing effective portfolios for climate-related risk management and the transition to low-carbon economies

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Avoiding the Tragedy of the Horizon

Bank of England Governor Mark Carney's *Tragedy of the Horizon* speech brought renewed focus to a subject that we've been researching for many years — that of climate-related investing.

In this paper, we summarise some of our latest thinking and insights on how best to design portfolios to manage climate-related risks and the low-carbon energy transition.

Increasing evidence of climate change combined with increased regulatory action have been generating rapid innovation in climate investing. Now no longer confined to small satellite allocations in their portfolios, investors are seeking integration methods at the total portfolio level.

How Do Investors Meet the Latest EU Standards?

One example of the increasing regulatory environment is the latest European regulation on investment benchmarks. Part of the European Commission's Action Plan on Financing Sustainable Growth regulation has been amended, resulting in two important new measures regarding investment benchmarks.

The first is the creation of two types of climate benchmarks — the EU Climate Transition Benchmark (EU CTB) and EU Paris-Aligned Benchmark (EU PAB). The second measure is the definition of Environmental, Social and Governance (ESG) disclosure requirements that will apply to all investment benchmarks. The stated main objectives of the new climate benchmarks are to:

1. Allow improved comparability of climate benchmarks methodologies while leaving flexibility in methodology design.
2. Provide investors with an appropriate tool that is aligned to their investment strategy.
3. Increase transparency on investors' impact, specifically with regard to climate change and the energy transition.
4. Disincentivize greenwashing.

For many investors these new climate benchmarks will now be the gold standard to aim for. The question is: How should investors get there? To help investors, we present a summary of how our latest research feeds into designing effective portfolios that align directly to the benchmarks.

6 Portfolio-Level Designs for Climate Change

The specific portfolio construction approaches we examine here are related to three well-known general approaches to climate-conscious investing: divestment, climate mitigation, and climate adaptation.

The **divestment approach** is targeted at selling all ownership positions in the fossil fuel-based economy by removing exposure to the energy, utility, and material sectors. Collectively, these sectors contain over 80% of global carbon emissions and fossil fuel reserves. The **mitigation approach** involves an explicit objective to reduce the flow of heat-trapping greenhouse gases into the atmosphere and increase exposure to new energy and "green" companies. The **adaptation approach** involves an explicit objective to increase exposure to companies adjusting to actual or expected future climate impacts (i.e. the physical impacts of climate change).

Mitigation and adaptation are complementary approaches for reducing risks of climate change impacts over different timescales — and ideally align with the objective of most institutional investors to balance short-term risks with long-term opportunities.

We show the three main approaches integrated into six portfolio-level designs: three examples of Screening-Based Portfolios, aligned to the EU Climate Transition Benchmark (EU CTB) and three of Optimization-Based Portfolios, two again aligned with the EU CTB and one to the EU Paris-Aligned Benchmark (EU PAB).

Screening Based	**Optimization Based**
Approach 1: Screened Portfolio Targeting in the EU Climate Transition Benchmark This approach broadly involves excluding or screening out a set of securities from their investment universe. We study three specific cases: **Case 1: 30% Carbon Reduction Target (by screening 2.5%)** At each date, we screen out the worst 2.5% of polluters (measured by carbon intensity) in the benchmark. This results in an approximately 30% carbon intensity reduction. **Case 2: 50% Carbon Reduction Target (by screening 10%)** At each date, we screen out the worst 10% of polluters (measured by carbon intensity) in the benchmark. This results in an approximately 50% carbon intensity reduction. **Case 3: Exclude GICS E/M/U** At each date, we screen out all securities belonging to the Energy, Materials, and Utilities sectors (the three highest carbon emitting sectors).	*Approach 2: Optimized Portfolio Targeting in the EU Climate Transition Benchmark* In this approach, we use optimization to achieve a specified level of carbon intensity reduction relative to a market cap weighted benchmark, a portfolio that assigns market cap weight to all securities in its universe. **Case 4: 30% Carbon Reduction Target** **Case 5: 50% Carbon Reduction Target** *Approach 3: Optimized Portfolio Targeting the European Union Paris-Aligned Benchmark* Similarly to Approach 2, we use optimization to achieve carbon intensity reduction **Case 6: Target EU PAB** Now we also incorporate four additional climate metrics. Specifically, we target a reduction in fossil fuels, a reduction in brown revenues, an improvement in green revenues, and an improvement in climate adaptation.

Successful Climate Integration

In the next section we review some of our key observations but, in short, our research shows that climate considerations can easily be integrated into portfolios in a number of different ways.

Also, alignment to the latest EU benchmarks is obtainable in such a way as to also maintain a low tracking error (versus the benchmark MSCI World Index). We also find that substantial improvements in green revenue exposure and climate risk adaptation as well as significant reductions in carbon intensity, fossil fuel reserves exposure and brown revenue exposure are all achievable.

Some Key Observations

Low tracking error is possible: Optimized portfolios that integrate additional climate metrics and align with the EU PAB can be built with low tracking error. Only 32 basis points of tracking error is needed to achieve substantive improvements in green revenue exposure and climate risk adaptation alongside reductions in carbon intensity, fossil fuel reserves exposure, and brown revenue exposure. This approach offers a powerful way to incorporate alternative and/or forward-looking climate variables.

Screening can exhibit reasonably high tracking error, as much as 1.38% for Case 3 where the energy, materials, and utilities are excluded. In other words, if relative returns are normally distributed, then roughly two-thirds of the time, the portfolio's returns would be expected to fall within -138 basis points and +138 basis points of the benchmark.

The **same amount of carbon reduction** that is achieved through screening (30% and 50% for Cases 1 and 2) **can be achieved at lower tracking error**. The optimized portfolio is more compelling, particularly for investors who want minimum deviation of tracking error from their market cap weighted benchmarks.

Screening results in a loss of exposure to green revenues. This happens because the screening approach excludes companies from the materials and utilities sectors, which have higher concentrations of green companies.

Active returns for all six portfolio-level designs are small and positive: Sharpe Ratios are equivalent to the market cap weighted benchmark; and Information Ratios are positive. These results indicate that climate considerations can be easily integrated in a range of different ways.

Performance Summary of Hypothetical Cases

Climate Summary
(% Improvement versus MSCI World)

		Screening-Based			Optimization-Based		
	Ref	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6
	MSCI World Index	30% Carbon Reduction	50% Carbon Reduction	Exclude GICS E/M/U	30% Carbon Reduction	50% Carbon Reduction	EU PAB Strategy
Annual Return (%)	9.94	9.99	10.25	11.09	10.05	10.07	10.30
Annual Vol (%)	11.46	11.55	11.51	11.54	11.44	11.42	11.43
Sharpe Ratio	0.87	0.86	0.89	0.96	0.88	0.88	0.90
Active Return (%)	–	0.05	0.31	1.15	0.11	0.13	0.36
Tracking Error (%)	–	0.19	0.43	1.38	0.14	0.19	0.32
Information Ratio	–	0.26	0.72	0.84	0.78	0.70	1.15
Maximum Drawdown (%)	-13.31	-13.52	-13.43	-13.16	-13.28	-13.16	-13.13
Beta	–	1.01	1.00	1.00	1.00	1.00	1.00
Number of Stocks (avg)	1636	1595	1473	1326	1078	1030	928
Effective No. of Stocks (avg)	350	341	313	282	347	336	325
Carbon Intensity	–	32.2	55.3	65.0	30.0	50.0	50.0
Fossil Fuel Reserves	–	-1.2	26.8	99.2	-3.7	-4.2	50.0
Brown Revenues	–	9.5	36.9	97.5	11.2	21.1	50.0
Green Revenues	–	-6.9	-27.1	-34.3	1.5	-7.6	100.1
Adaptation Score	–	-0.1	0.0	0.7	0.0	-0.5	10.0

Source: SSGA, as of December 2019. Academic research for illustrative purposes only. The returns shown above are hypothetical and gross of fees. Please see back page for further important information around these results.

What's Next?

Screening-based or exclusionary approaches have been the most widely used portfolio-level solution for building climate-aware investment portfolios. Fossil fuel divestment, for instance, gained popularity in the 2000s, generating high profile headlines, before experiencing a backlash in the 2010s because of its impact on financial performance.

With advancements in data and portfolio construction, investors can use a variety of new portfolio construction frameworks to help them meet their carbon reduction and climate-related investment objectives, while also minimizing the amount of risk they have to assume in deviating from their policy benchmarks.

Here, we've outlined the notion of using optimization-based portfolio construction techniques to embed climate mitigation and adaptation approaches in equity portfolios. When contrasting these to screening-based portfolio construction, it's clear that optimization-based approaches can achieve stated climate goals with less active risk. In other words, they are more risk efficient.

As climate considerations and sustainable investing issues become increasingly important for all types of investors, we expect to see further innovations in data integration, portfolio-level techniques, and climate finance research. In particular, there are a number of outstanding questions around the relationship between climate-related metrics and traditional investment approaches — from the potential impact on portfolio tail risk, to whether carbon is priced into markets, and within which asset classes over various time horizons.

Finally, we expect governments and regulators to take significant action in the coming decades as nations attempt to further support the Paris Agreement. However, even without the intervention of governments, we know that climate-related research is likely to be an ever-increasing, important field of finance, and institutional investors who are focused on long-term value creation will be critical to help avoid the tragedy of the horizon – the good news is that there are clearly steps that investors can relatively easily take now to be part of the solution.

Further Reading

1 Bender, J., Bridges, T. A., & Shah, K. (2019). Reinventing Climate Investing: building equity portfolios for climate risk mitigation and adaptation. Journal of Sustainable Finance & Investment, 9(3), 191-213.

2 EU Technical Expert Group (2019). Report on Benchmarks. European Union.

3 IPCC (2014). Climate Change 2014: Synthesis Report. Geneva, Switzerland.

4 PRI. (2019). The Inevitable Policy Response: Act Now. London: United Nations .

5 United Nations (2015). Paris Agreement.

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