

The Cost of Going Green(er)

NOVEMBER 2023

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- This paper reviews the costs of transitioning from the STOXX 600 to three different portfolios, one is a similar Developed Europe portfolio and two using climate benchmark indices.
- Overall, a 10% market participation trading strategy provides the lowest cost for implementing all three portfolios.
- When transitioning from STOXX 600 to a climate index, there is little difference in implementation cost when transitioning between a “green” or a “greener” portfolio. However, the percentage of the components of implementation cost (impact + risk) varies depending on the trading strategy. This is an important factor to consider when assessing an investor’s appetite for risk.
- Using the transition from STOXX 600 to STOXX Developed Europe, and a 10% market participation trading strategy as a baseline, the implementation cost of transitioning to a “green” portfolio is 22% greater (139 bps vs 114 bps) compared to the reference transition. The marginal cost of transitioning to a “greener” portfolio is only 7 basis points or 6% greater than transitioning to the “green” benchmark. This marginal cost is accompanied by a 14% reduction in climate emissions intensity, relative to the benchmark.

Introduction

Two of the most significant trends over the past decade in investing have been the increased importance of climate-based selection criteria in portfolio construction and the continued growth of passive index funds.

After the [2015 UN Climate Change Conference \(COP21\) Paris Agreement](#), the development of ESG investing and the emergence of net zero emission policies, climate risk has become a key challenge for asset managers to manage. Climate investment policies may considerably change portfolio allocations and the investment framework of both passive and active investors.

At the same time, passive investing continues to expand. Investing in passive funds overtook active around August 2018 and was about 54% of the U.S. market¹ a few years later. Although the value of non-U.S. active equity funds is still larger, the trend indicates a continued growth of passive portfolios globally as well.

Given these two trends, the Cost of implementing a transition to a “green” portfolio is a key consideration for both producers and consumers of passive investment products. Here, we analyze the costs of transitioning to two versions of a climate-based portfolio and compare them to the implementation costs of transitioning to a non-green portfolio.

¹ <https://www.bloomberg.com/professional/blog/passive-likely-overtakes-active-by-2026-earlier-if-bear-market/>

We will measure the transition costs to three target portfolios from our STOXX 600 benchmarked base portfolio.

In order to have a frame of reference for a 'typical' (non-green) transition, we measure the cost of moving the benchmark index from the STOXX Europe 600 to STOXX Developed Europe. These are similar indices, both offering exposure to Developed Europe and comparable alternatives comprised of highly liquid stocks.

We then measure the implementation costs of transitioning from the STOXX Europe 600 to the [STOXX® Europe 600 Climate Transition Benchmark](#) ("CTB"). The CTB will serve as our "green" version of a climate-related index. Next, we examine the costs of transitioning from the STOXX 600 to the [STOXX® Europe 600 Paris-Aligned Benchmark](#) ("PAB"). The PAB will serve as our "greener" version of a climate-related index. Analyzing the switch from Europe 600 to PAB establishes the basis for going darker green.

We compare the cost of transitioning a 3.5 billion (EUR) portfolio with 4 different trading strategies having varying degrees of trading aggressiveness. The ISS LiquidMetrix Pre-Trade Cost Estimate model is used to forecast the estimated cost of implementing the transition.

Finally, we compare the resulting transition costs vs. the sustainability metrics of the portfolios.

Our headline conclusion is that while transitioning to a green index portfolio is generally more expensive than transitioning from the STOXX Europe 600 to the similar reference portfolio (i.e., the Developed Europe index). If, however, there is a motivation to move to a climate benchmark index there is only a slight difference in transition costs between a "green" versus a "greener" portfolio.

Index/Portfolio Construction

A brief overview of the indices used for this analysis is below. The STOXX Europe 600 is a leading benchmark for Europe that was launched roughly 25 years ago, while the more recently launched indices were designed to support targeted investor goals, per below.

	STOXX Europe 600	STOXX Developed Europe	STOXX Europe 600 Climate Transition Benchmark	STOXX Europe 600 Paris Aligned Benchmark
Index Objective	Targets largest 600 names in European Developed Markets	Targets 85% market cap coverage for European Developed Markets	Help investors in the transition to a low-carbon economy by adopting a decarbonization trajectory.	Help investors align investments with the overall long-term global warming target of the Paris Agreement.
Year Launched	1998	2022	2020	2020
Number of Components, Aug 2023	600	462	538	474
Tracking Error, 5yr Realized, Aug 2023	-	0.6%	2.2%	2.7%
Additional Regulatory Considerations			European Commission in the Technical Expert Group (TEG) Report on climate benchmarks	European Commission in the Technical Expert Group (TEG) Report on climate benchmarks

Source: STOXX

Using the tracking error of the indices to the benchmark STOXX Europe 600, one can get a sense of the differences between the indices to their benchmark. The “greener” PAB index also has a higher tracking error than the “green” CTB index, as one might expect. The full methodology for each of the indices is available at www.stoxx.com/indices.

The Cost of Transitioning

The ISS LiquidMetrix pre-trade model is used to estimate the costs of transitioning from the STOXX 600 to the three target portfolios. A sensitivity analysis for the cost of the transitions is done by modeling 4 different strategies, trading the transition at 5%, 10%, and 20% market participation, as well as using a Full Day VWAP trading strategy. This is done to determine the different answers to what is called the “Trader’s Dilemma.”

The trader’s goal is to try and implement the transition from one portfolio to another at the lowest possible cost. But how can one go about achieving this? One option is to trade aggressively and try to complete the trade as fast as possible. Trading shares that aggressively, however, can provide an information signal to the market that there is significant demand for these stocks. Potential sellers will then wait for the trader to cross the spread and pay the seller’s price to acquire the shares, increasing the cost of the trade.

The alternative is to be more patient and trade less aggressively. The potential downside with this is the risk of natural price volatility that might move the price away from you while you slowly acquire the shares to complete the trade.

The estimated cost of the transition is made up of these two components: Impact and Risk Cost.

Impact is the cost associated with aggressive trading, crossing the spread to secure the shares, and thereby raising the price. The more aggressive the trading (a higher participation rate) the greater the impact cost. The Risk Cost reflects the cost associated with the price moving away from you. It is calculated from the standard deviation of the daily price volatility scaled by time. The longer it takes to complete the order (a more passive, smaller market participation rate), the higher the cost associated with risk.

The trader's appetite for risk determines the choice of the trade-off between aggressive trading with a higher impact cost (but less risk) versus more passive trading for lower impact costs with greater risk. To examine the possible trade-offs we analyze 4 alternative trading strategy cost estimates reflecting different levels of trading aggressiveness.

Figure 1 below shows the costs associated with implementing the transitions under different trading strategies for a portfolio size of 3.5 billion (EUR). Overall, the POV 10% market participation strategy provides the lowest cost reflecting the tradeoff between impact and risk.

Figure 1: Trading Cost Overview

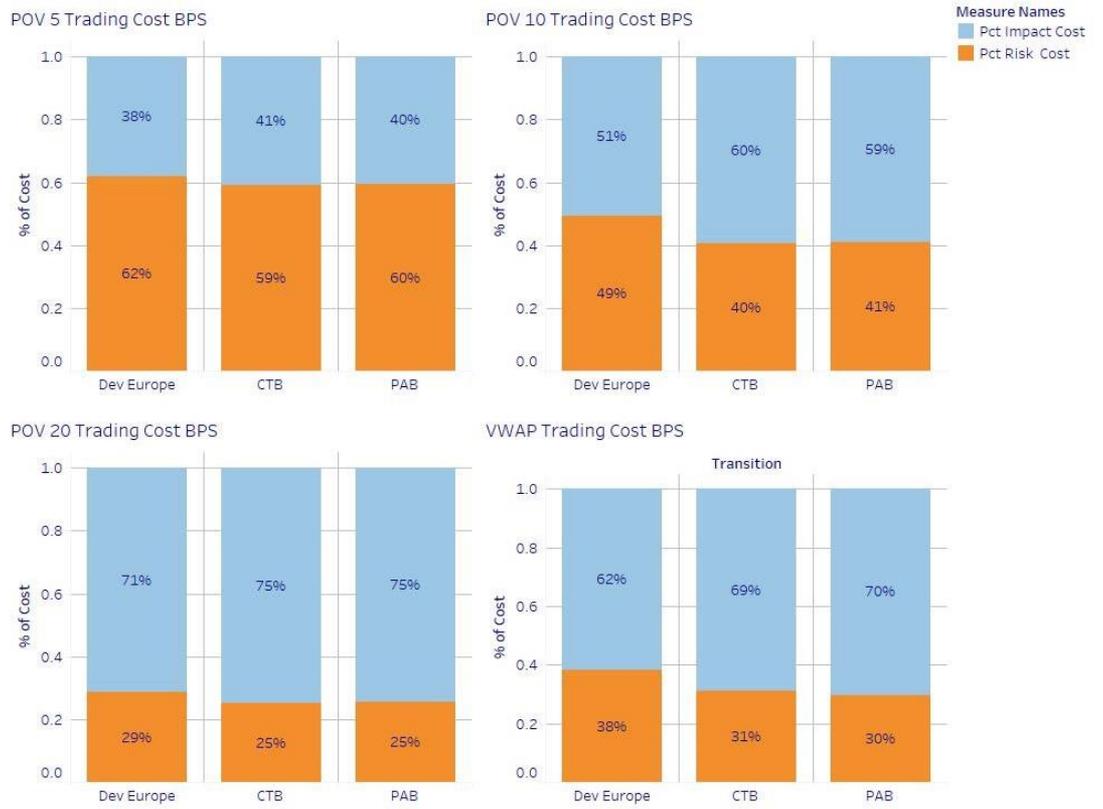
Strategy	Transition	Adv (%)	Duration (Days)	Impact Cost	Risk Cost	Total Cost bps
POV 5	Dev Europe	6.8	1.4	51	100	151
	CTB	8.9	1.8	57	81	138
	PAB	9.7	1.9	58	85	143
POV 10	Dev Europe	5.8	0.6	45	68	114
	CTB	7.9	0.8	85	53	139
	PAB	8.7	0.9	89	57	146
POV 20	Dev Europe	6.8	0.3	88	38	126
	CTB	8.9	0.4	113	35	148
	PAB	9.7	0.5	118	37	155
VWAP	Dev Europe	6.8	1.0	77	43	119
	CTB	8.9	1.0	107	30	137
	PAB	9.7	1.0	115	29	144

Source: ISS LiquidMetrix, STOXX

The overall cost of implementing either the CTB or PAB portfolios is virtually the same whether one trades with a more passive 5% POV market participation strategy compared to a more aggressive 10% or VWAP strategy and only slightly more costly with an ultra-aggressive 20% participation strategy.

However, the composition of the total cost varies significantly depending on the degree of aggression of the trading strategy. Figure 2 (below) shows how the percentage of cost attributable to impact versus risk changes by trading strategy with different levels of aggression.

Figure 2: Percentage Impact vs. Risk Cost by Transition and Strategy



Source: ISS LiquidMetrix, STOXX

While an ultra-passive 5% participation trading strategy provides lower impact costs, trading this slowly requires an average of 2 days to complete (with some relatively illiquid names taking multiple days to implement). The result can be greater risk costs associated with overnight price movements. Conversely, a 20% participation strategy has a large impact cost but a lower associated risk cost as the time needed to complete the order is less.

The Marginal Cost of a Green(er) Transition

Figure 3 shows the marginal cost of implementing the climate portfolios compared to the STOXX Developed Europe reference transition.

Figure 3: Cost Difference of Reference vs. Climate Sensitive Portfolios by Strategy



Source: ISS LiquidMetrix, STOXX

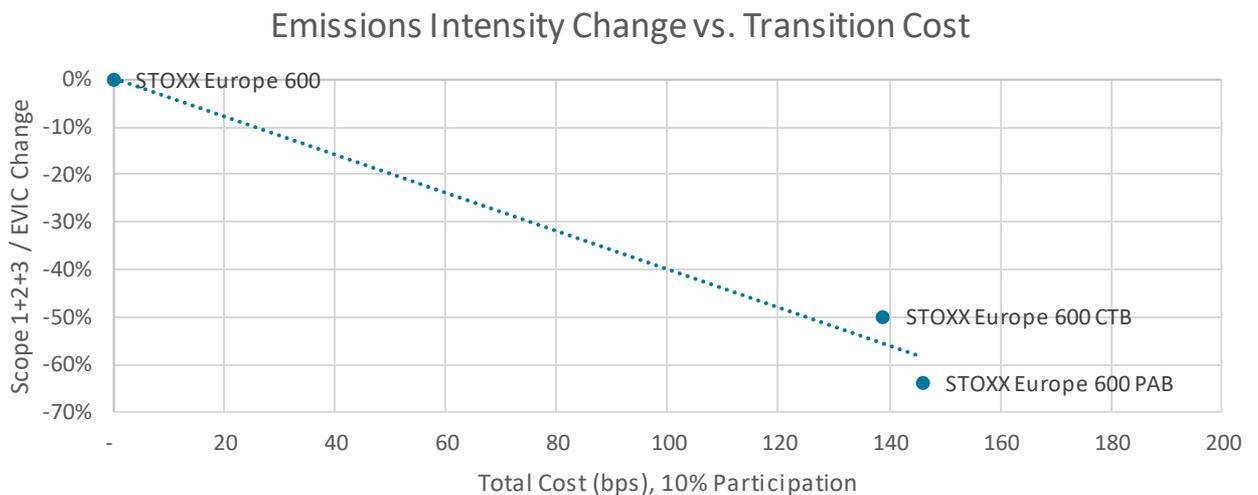
Using a 5% market participation trading strategy, the costs of transitioning to the “green” or “greener” portfolio are less than the cost of the reference transition. While the impact of trading passively is similar for all three benchmark indices, there is more price volatility risk in the Developed Europe portfolio.

Otherwise, regardless of trading strategy, the incremental cost of implementing a climate-sensitive portfolio is in the range of 15% - 30% more than the reference transition (again with a shift in composition from impact to risk-associated costs). If, however, the fund chooses to move to a climate-related portfolio, the difference in cost of transitioning to the “greener” PAB index is approximately 6% greater than the cost of transitioning to the “green” CTB index.

Cost Relative to Exposure

Having established the marginal cost of the “green” to “greener” portfolios, we can now compare these costs to certain green objectives of the indices. As the primary objective of the indices focuses on climate, we start with climate intensity. For consistency, we will use the definition of intensity found in the index construction, namely Scope 1,2, and 3 emissions, divided by Enterprise Value Including Cash (EVIC). The emissions are shown as percentage relative to the benchmark, STOXX Europe 600.

Figure 4: Emissions Intensity vs. Transition Cost

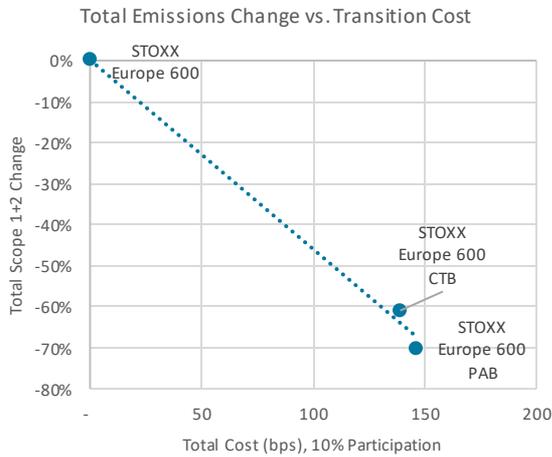
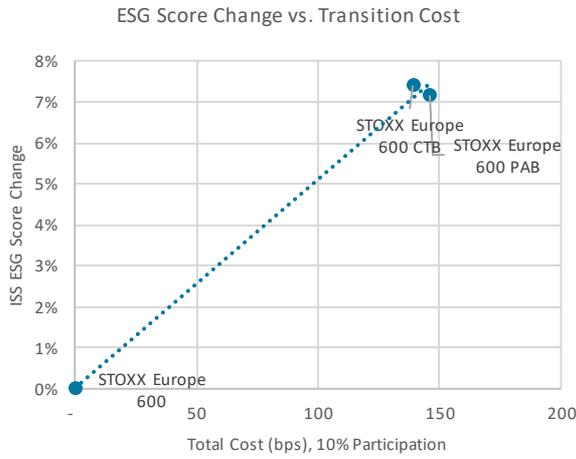


Source: STOXX, ISS LiquidMetrix, ISS ESG

Focusing on the 10% participation strategy, as the figure illustrates, the PAB shows a favorable tradeoff vs. the CTB, in terms of cost vs. emissions reduction. For a 7 bps increase in total costs there is a further 14% decline in emissions intensity vs. the benchmark. Had the relationship between emissions and cost been linear, one would have expected to require a higher trading cost to achieve that level of emissions reduction.

To provide a more complete view of greenness, we also look into other sustainability measures – ESG score and Total Scope 1+2 Emissions, below. Similar to Figure 4, the metrics are shown relative to the benchmark STOXX Europe 600.

Figure 5: ESG Score and Total Emissions vs. Transition Cost



Source: STOXX, ISS LiquidMetrix, ISS ESG

In these figures, we observe less of an efficient-frontier type of relationship. There is little difference from an ESG score perspective between the CTB and PAB, and a slightly more linear relationship for Total Emissions. However, it is worth noting that these metrics are not explicitly targeted in the indices' portfolio construction, making this an outcome that is within expectations.

Conclusion

With sustainable investing moving to a mainstream consideration in Europe, much has been written about the tradeoffs investors need to consider when shifting a policy benchmark allocation. Much of this literature, however, has been focused on [investment risk](#) and [exposures](#). In this article, we attempt to bring transaction costs into the equation, as another dimension to consider in potential allocation shifts.

Transaction cost analysis is a critical part of any transition planning, though its specialized nature may limit its usage in the earlier stages of planning. There are unique insights, however, that can be drawn from incorporating a cost-aware view among traditional risk/exposure analyses. Our case study in this article highlights the potential cost efficiency of darker green portfolios, which also varies depending on the trading method chosen.

The combination of unique datasets, portfolio construction techniques, and analytics are at the heart of many recent innovations in financial services. The results of these combinations, such as those presented here, will continue to help provide investors with the ammunition needed to make better-informed decisions.

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