



# CAP<sub>2</sub> Position



## CO<sub>2</sub> reduction in portfolios: Implications for asset management

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## Asset managers issue climate pledges

In recent years, many asset managers have committed to reducing the CO<sub>2</sub> footprint of their portfolios. For example, if you want to keep your portfolio on a 1.5-degree path, you currently have to reduce the CO<sub>2</sub> footprint of your portfolio by around eight percent per year. If all companies were to align their economic activity with this target, the world as a whole would also be on a 1.5-degree path and the footprint of each portfolio would automatically follow this path. However, as this is not the case, it may also appear sensible and expedient for an investor who is indirectly responsible for emissions with his investments in bonds and equities to trim his portfolio to a 1.5-degree path by reallocating. This is because the investor then indirectly finances the companies that are compatible with this desired path.

In recent years, there has been increasing criticism of the CO<sub>2</sub>-oriented restructuring of portfolios, whereby it is not the objective but the actual success of these measures that is being questioned. Some experts doubt that the capital market alone can provide effective impetus for economic transformation and instead propose government regulations and global emissions trading as more effective measures. Academic studies support this view and show that financial restrictions often tempt companies to adopt more environmentally damaging production methods. This is particularly relevant for ESG-oriented impact investing, as portfolio shifts only have indirect effects via capital cost shifts. A recent paper by the National Bureau of Economic Research confirms that an increase in the cost of capital for environmentally harmful companies can paradoxically lead to even more harmful practices. Empirical evidence suggests that ESG investments sometimes bring little climate benefit because they favor companies that achieve relatively low absolute emissions reductions.

## CO<sub>2</sub> reduction is very easy for investors in the first few years

Despite these developments, there is still a broad consensus to restructure portfolios, especially to reduce the CO<sub>2</sub> footprint. Many asset managers have already committed to climate protection targets, which makes it almost impossible to withdraw. However, these shifts could bring further problems and challenges in the long term that many investors may not be aware of.

Reducing the CO<sub>2</sub> footprint in portfolios often starts easily by selling particularly CO<sub>2</sub>-intensive positions. However, once these obvious steps have been taken, it can become more difficult to maintain the desired strategic allocation. This is because companies often find it difficult to continuously reduce their CO<sub>2</sub> emissions. Companies, especially fast-growing ones, often find it difficult to achieve the desired reduction targets. As a result, portfolio streamlining requires major shifts year after year, which can lead to challenges in the long term.

## Simulation of portfolio effects through successive CO reduction<sub>2</sub>

But how big are these challenges? This question is not easy to answer, because nobody knows the future. However, the past is not such a bad guide on capital markets, especially when it comes to risks. Our test setup is as follows: We used the respective historical index members of the STOXX 600 Europe and the STOXX 600 North America to simulate portfolios that could have actually existed in exactly the same way. In a first step, around 80-160 shares per region were randomly selected from the 600 shares in each of the two indices to represent the region in the portfolio. The shares were weighted according to their market capitalization; the portfolios were always fully invested. The CO<sub>2</sub> footprint was determined for each of the portfolios generated in this way. In a second step, the CO<sub>2</sub> footprint was reduced to an extent selected by the random generator. The reduction was achieved

by reallocating or selling the previously selected shares of the original portfolio without CO<sub>2</sub> restriction. The reallocations (and in very rare cases the complete sales) were carried out in such a way that the expected tracking error to the respective benchmark (STOXX 600 Europe or STOXX 600 North America) as well as to the original portfolio was minimized. For each region and each year, 2,000 runs were calculated and it was recorded how the relative performance to the original portfolio, the tracking error to the benchmark and the absolute risk compared to the original portfolio changed as a function of the CO reduction. 2

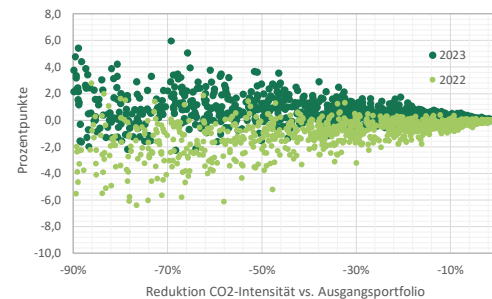
### Absolute and relative risks literally explode

The results are very consistent over many years and across both regions. For example, it can be seen that reductions in CO<sub>2</sub> footprint of more than 50 percent compared to the original portfolio lead to massive deviations in performance compared to the original portfolio. There are years in which a gradual CO<sub>2</sub> reduction leads to a certain outperformance, but there are similarly many years in which the exact opposite is the case, sometimes even to a very significant extent. For reasons of clarity, the following charts only show the results for the years 2022 and 2023, which are also very representative of the previous years in terms of their characteristics.

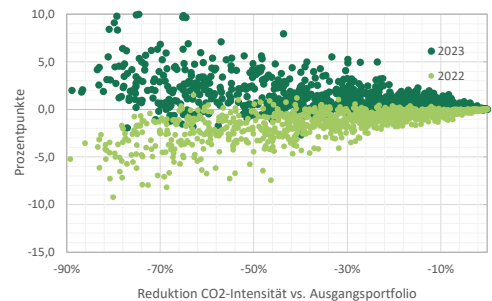
For example, portfolios in North America lost an average of around six percentage points in performance in 2022 if the CO<sub>2</sub> footprint was reduced by 80 percent. Among the 2,000 simulated portfolios, there were very few portfolio structures that benefited at all from a CO<sub>2</sub> reduction in that year. A similar picture emerged in Europe; more important than the respective sign of out- or underperformance is the enormous extent of the deviation from the performance of the original portfolio in percentage points after just one year! Many investors are probably not even aware of the relative risks they are taking when they describe the path to

climate-neutral portfolios via reallocations. Absolute risks also increase as soon as CO<sub>2</sub> restrictions are introduced. The tracking error to the benchmark also increases systematically when CO<sub>2</sub> restrictions take effect, which creates a new undesirable risk dimension.

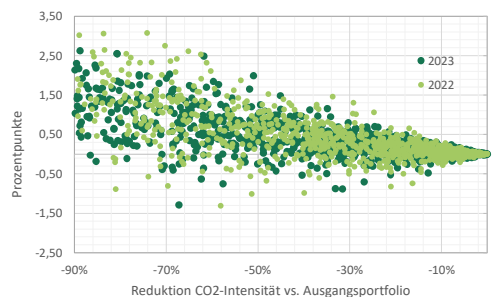
### Europe: Change in performance due to CO<sub>2</sub> reduction



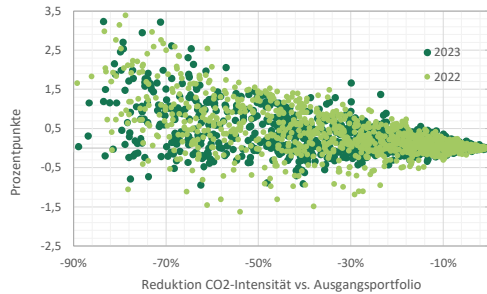
### USA: Change in performance due to CO<sub>2</sub> reduction



### Europe: Change in tracking error due to CO<sub>2</sub> reduction

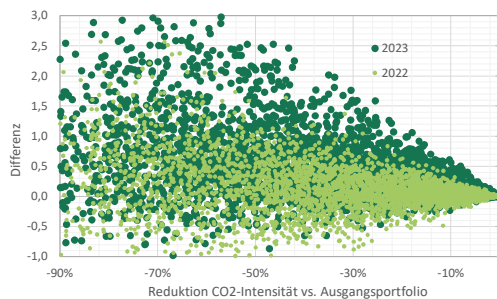


### USA: Change in tracking error due to CO<sub>2</sub> reduction

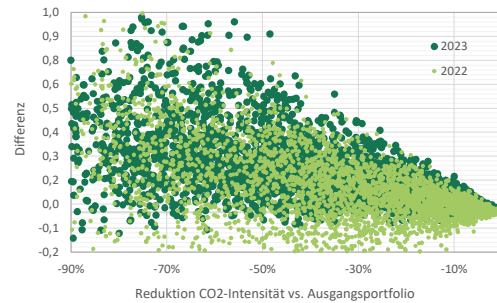


The dramatic nature of the shift in fundamental and statistical characteristics of portfolios due to CO<sub>2</sub>-induced reallocations is also made clear by the fact that factor skylines change completely as a result of these reallocations. This results in "bets" in investment styles compared to the investment styles originally targeted, which in case of doubt were never intended by the investor. We have simulated over 2,000 portfolios for Europe and North America and found that the return on equity increases significantly when the CO<sub>2</sub> footprint is reduced. Such an increase may seem positive at first, but during upswings, less profitable stocks in particular can perform better. Similar improvements in balance sheet quality metrics were accompanied by a higher portfolio valuation. These changes, often equivalent to half a standard deviation or more, represent a significant reshaping of the portfolio profile.

### Europe and North America: Change in return on equity due to CO<sub>2</sub> reduction



### Europe and North America: Change in return on equity due to CO<sub>2</sub> reduction



### CAP<sub>2</sub> instead of portfolio reallocations

In summary, it can be said that the decision to embark on the path of CO<sub>2</sub> reduction as an investor solely through portfolio shifts requires critical appraisal, and not only against the background of current theoretical and empirical research. As our simulations clearly suggest, investors will soon come up against the practical limits of portfolio construction and will have to think about alternative approaches.

CAP<sub>2</sub> offers the solution to this problem. With our approach, we determine the footprint of a portfolio, buy the same amount of European emission rights and retire them. It is also possible to add securities to the portfolio that have a decidedly negative carbon footprint by securitizing these emission rights. The advantage of our methodology is obvious: you regain your freedom in portfolio construction, do not run the risk of being forced to move away from your desired strategic allocation and can exploit your room for maneuver right up to the edge of the efficiency curve.



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