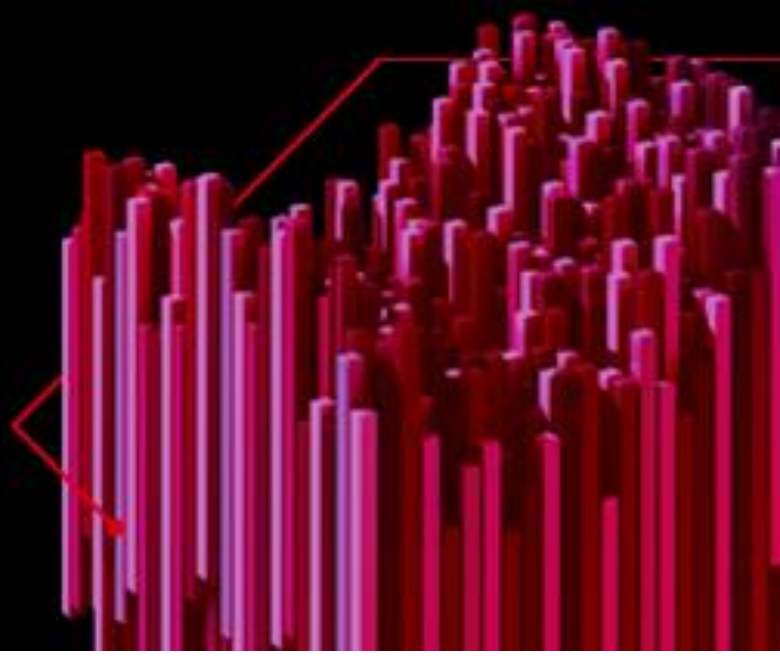
HSBC

Asset Management

Carbon Accounting

A framework for tracking a portfolio's emissions over time

August 2023



In Summary

Human activities are contributing to a growing concentration of carbon dioxide in the atmosphere, and the climate is warming up as a result. Encouraged by regulation, investors are paying increasing attention to control the CO2 emissions they finance through their portfolios. However, the task is not trivial. Investors must consider how these emissions should be defined and measured in a portfolio context. More specifically, investors are looking to measure the change in emissions over time. This paper presents different metrics that can be used. Some have been promoted by regulation or industry associations while others are less well known but overcome the drawbacks of the more popular metrics.

Measuring portfolio emissions in absolute terms - in carbon tons - allows industry bodies and regulators to aggregate quantities of emissions over time and across investors. These quantities can then be compared to the net zero carbon budget targets required to limit global warming.

When accounting for carbon tons across different asset owners and portfolios, the key challenge is to allocate the responsibility for carbon to the different stakeholders in each company that they finance, in order to avoid double counting the carbon tons as they will then be compared to the global carbon budget that a specific climate scenario dictates. This measure of carbon responsibility is referred to as the financed emissions (owned) of the portfolio. This paper focuses on analysing the financed emissions dynamics.

To compare portfolio managers or asset owners to one another we need measures that do not depend on the success of the investor in gathering assets. The emissions intensity "per dollar invested" measure, often called carbon footprint, has been introduced for this purpose.

However, emissions intensity presents an important drawback which is its tendency to move with asset valuation. Therefore, how we decompose portfolio emissions intensity is critical to defining portfolio carbon targets. To compute scale-free variations in emissions that neutralise the impact of inflows or outflows, we consider an index which corresponds to the portfolio strategy, scaled to 1 at a given baseline date.

Portfolio decarbonisation should ideally be achieved at the company level. The emissions of a buy-and-hold portfolio will fall only if on average the companies it holds reduce their emissions. This is often referred to as real world decarbonisation. However, a portfolio's emissions can also fall over time if the portfolio manager reduces the exposure to high emitters through rebalancing.

To provide better insight into the portfolio decarbonisation dynamics, we propose to attribute the changes of the financed emissions of the index into these two effects: firstly, the effect of the change in company emissions over buy-and-hold periods and secondly, the effect of portfolio rebalancing. We refer to this framework as carbon accounting which we apply here to the equity context.

Source: HSBC Asset Management. Further formulae available upon request. Today, we and many of our customers contribute to greenhouse gas emissions. This is why HSBC Asset Management, together with other asset managers, have an important role to play in supporting the transition to a net zero economy. Step by step, we are developing strategies to reduce our own emissions and to help our customers reduce theirs. For more information visit: www.assetmanagement.hsbc.com/about-us/net-zero

Key Concepts

To discuss portfolio emissions, we must first understand the dynamics at a company level. There are different concepts of emissions, and the common standard involves distinguishing between Scope 1, Scope 2 and Scope 3 emissions. We elaborate on these below [1]:

Scope 1

Direct emissions occurring from sources that the firm controls or owns

Scope 2

Indirect emissions resulting from energy purchased

Scope 3

Indirect emissions, which are not included in scope 2 that include upstream and downstream emissions

The concepts we will discuss can be applied to any definition of emissions. It is recommended to analyse and report Scope 3 emissions separately due to their size, complexity and lower data quality as a result of calculating company emissions in their value chain instead of their direct operations. For simplicity, as the focus is on accounting methods, all illustrations will be using Scope 1 and Scope 2 emissions.

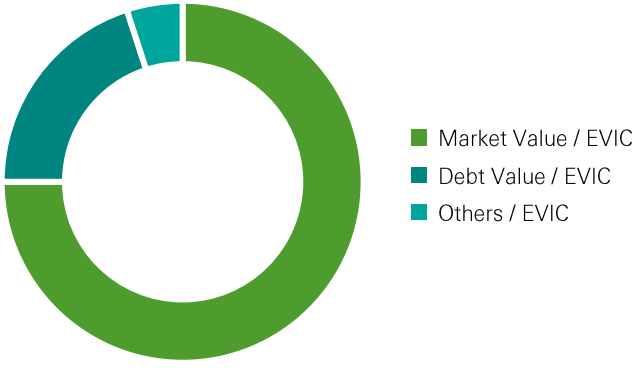


Illustration of the allocation of company emissions to equity holders, debt holders and others. This example is for illustrative purposes and represents a fictitious company.

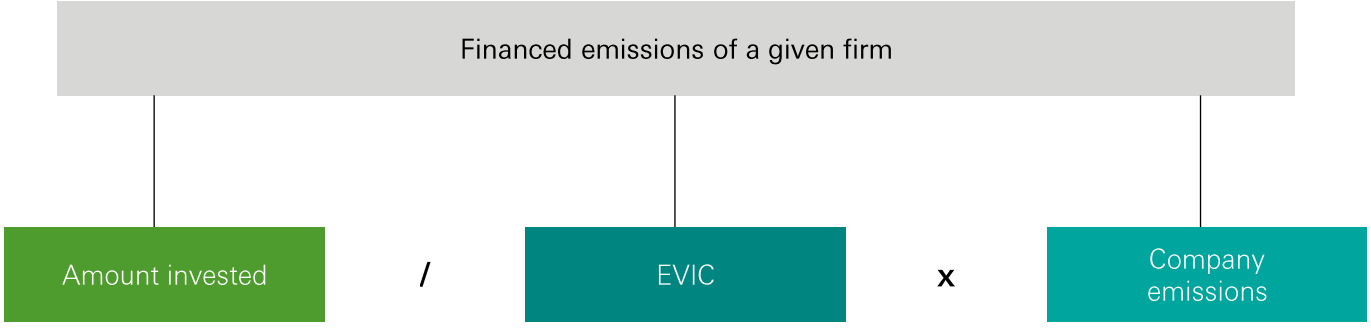
Once company emissions have been defined, they need to be allocated to different stakeholders. The consensus for asset owners is that emissions should be allocated to debt holders and equity holders in proportion to their weight in a firm's Enterprise Value Including Cash (EVIC), which is a measure of company size.

The allocation ratio described depends on market values, which are volatile due to their dependency on equity market prices, while the other components of EVIC are more stable over time (Debt Value and Others). Hence, this will affect equity holders' total carbon responsibility at a portfolio level.

Sources: HSBC Asset Management. 1. Source: Greenhouse Gas Protocol "FAQ", Available at: https://ghgprotocol.org/sites/default/files/standards_supporting/FAQ.pdf

Financed Emissions

An investor provides a certain proportion of financing to a given firm and as a result, also finances a certain proportion of its emissions. For example, an equity holder owning 1% of a company's overall EVIC, inherits the same proportion of the company's emissions. Therefore, if the company has emitted 300 units of CO2 and the investor owns 1% of the company, it is responsible for 3 units of CO2. To calculate the portfolio financed emissions, we therefore calculate the sum of financed emissions for each firm in the portfolio, as shown below.



The key concept above is carbon responsibility, in other words, the emissions financed (owned) in the portfolio.

We note here that our paper is not covering any of the carbon efficiency measures of the companies held by the portfolio, that is, the amount of emissions generated by a firm per unit of output (often described by indicators like emissions per revenue or production units). Such carbon efficiency metrics are an important factor in climate strategies and peer-group comparisons but are not relevant when analysing financed emissions' dynamics.

Onwards, we consider portfolio financed emissions so we will refer to the terms portfolio emissions and financed emissions interchangeably.

Source: HSBC Asset Management.

Financed Emissions Intensity

Financed emissions are a good starting point when designing a climate policy. After all, the mechanism of global warming depends on actual emissions. However, financed emissions are not comparable across portfolios of different sizes. To make this metric comparable across portfolios, financed emissions intensity is often used which is calculated as portfolio financed emissions per dollar invested. Here, financed emissions intensity is equivalent to carbon footprint as per EU SFDR (Sustainable Finance Disclosure Regulation).

$$\text{Financed emissions intensity} = \text{Financed emissions} / \text{Portfolio value}$$

While financed emissions intensity allows investors to compare different portfolios in a scale-free way, relying on financed emissions intensity for measuring emissions trajectories presents drawbacks.

In particular, financed emissions intensity tends to move with asset valuation, falling in rising markets and rising in falling markets as changes in emissions are typically more muted than changes in asset values. This makes the comparison of emissions intensity across time more problematic.

The tendency of financed emissions intensity, measured by EVIC rather than revenues, is to move in the opposite direction to market prices. This is an undesirable characteristic which has been partially taken into account in the "inflation adjustment" recommended by industry standards such as the Partnership for Carbon Accounting Financials (PCAF)[2] and EU climate benchmark methodologies[3]. Both methodologies use a single adjustment factor for all the individual securities held in the portfolio or benchmark, which is calculated as an average EVIC growth (or reduction) over a calendar year for the investment universe. Whilst this corrects for the main directional effect of the upward trending market prices, it does not reflect the actual EVIC effect of the individual holdings. This means that the inflation-adjusted carbon reduction for any index or portfolio will deviate from the actual carbon reduction of the companies held.

Another challenge for portfolio management stems from the fact that the average inflation adjustment does not reflect the dynamic nature of portfolio weights throughout the measurement period.

Our proposal is to first address the need to adjust for portfolio and market price trends, by scaling intensity using a carbon index approach which we describe in the next section, and then to separate the residual effects of the Market/EVIC financial ratio from the 'pure' carbon reduction of the companies held and the portfolio rebalancing activity effects. The result is a full Carbon Accounting methodology which helps understand the changes in financed emissions intensity over time.

Sources: HSBC Asset Management. 2. "The Global GHG Accounting and Reporting Standard Part A: Financed Emissions. Second Edition.", PCAF, 2022, available at: https://carbonaccountingfinancials.com/en/standard 3. "Commission Delegated Regulation (EU) 2020/1818", EU Climate benchmark regulation, Official Journal of the European Union, July 2020, available at: eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32020R1818&rid=1

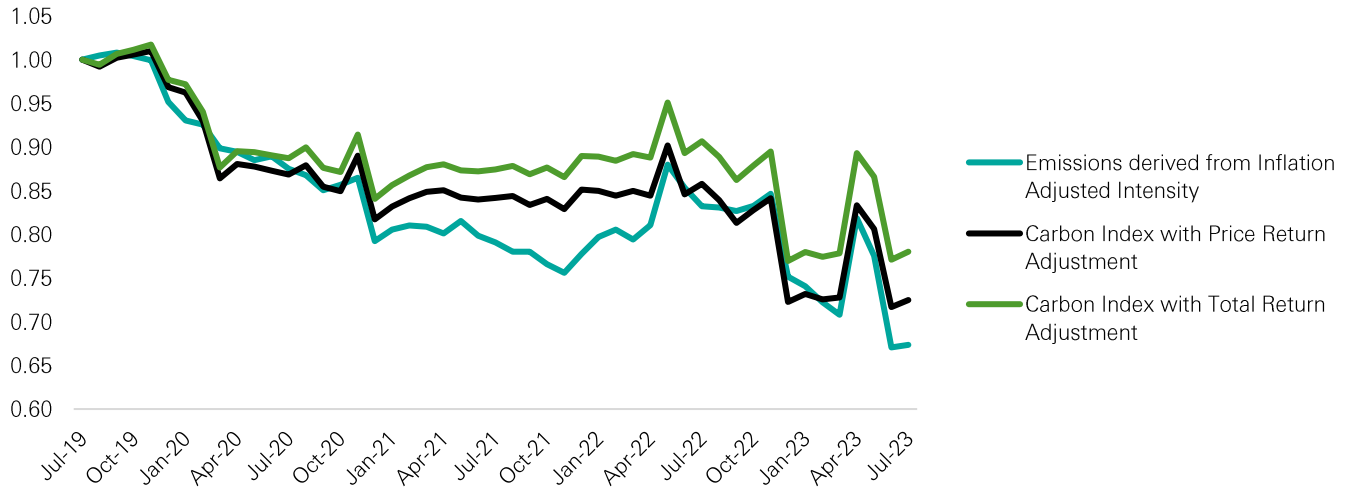
Scaling Intensity

To enable a scale-free measurement of the variations in portfolio emissions, we start by choosing a baseline date and then build carbon indices. We first associate to the portfolio two indices which respectively chain the price returns and the total returns of the portfolio. These are the price index and the total return index of the portfolio strategy. We then compute the carbon emissions of these indices as if they were portfolios, using the methodology detailed in page 3. Since the indices are independent of portfolio inflows and outflows, flows are neutralised in our calculations. Carbon indices are then obtained through rebasing these emissions.
Carbon indices measure the cumulated changes in the carbon emissions of the price or total return indices since the base date.

One can show that this approach is equivalent to applying a company-specific inflation adjustment to changes in intensity when computing changes in emissions. In contrast to the standard approach however, our adjustment is specific to the portfolio strategy and takes the dynamics of the portfolio into account. Our methodology therefore relies on portfolio weights throughout the period and on equity price returns or total returns selected in the index.

We illustrate this using the MSCI World Climate Change (CC) Index[4], which re-weights constituents of the MSCI World Index to increase exposure to companies participating in the transition to a lower carbon economy and decrease exposure to those prone to risks of the transition.

Carbon Index with different market growth adjustments – MSCI World CC



The final choice is then whether to use a total return or price return index, and this depends on the context. The use of a total return index naturally leads to a higher growth in the carbon index since dividends are reinvested and thereby increases the ownership ratios compared to those of the price return index. We note that the industry standard approach could derive significantly different outcomes, due to differences in the methodological choice.

4. "MSCI World Climate Change Index (USD) Factsheet", MSCI, June 2023, Available at: https://www.msci.com/documents/10199/18f2379d-4306-22d6-515c-1d3b50f94b0b

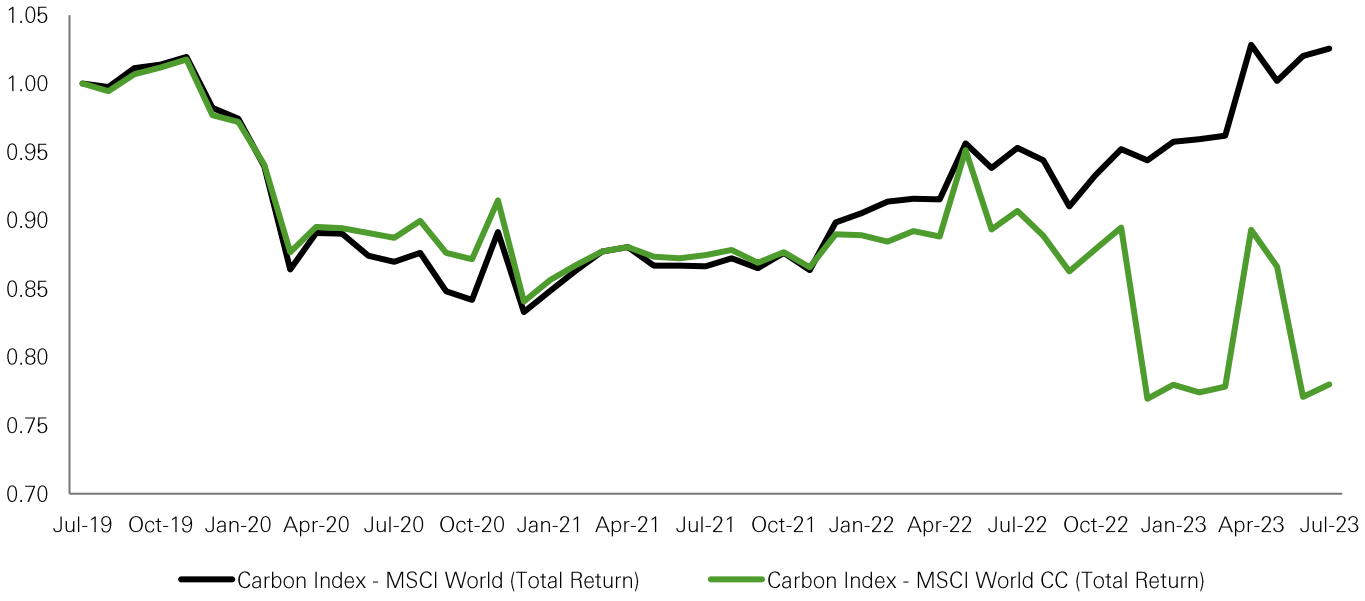
Sources: HSBC Asset Management. MSCI indices as of August 2023 for index composition. Refinitiv Quantitative Analytics Direct (as of August 2023) for stock prices, total return data company market capitalisation and financial reporting data. S&P Global Trucost (as of August 2023) for emissions data. Figures are annualised, log returns. The MSCI information may only be used for your internal use, may not be reproduced or redisseminated in any form and may not be used as basis for or a component of any financial instruments or products or indices. None of the MSCI information is intended to constitute investment advice or a recommendation to make (or refrain from making) any kind of investment decision and may not be relied on as such. Historical data and analysis should not be taken as an indication or guarantee of any future performance analysis, forecast or prediction. The MSCI information is provided at an "as is" basis and the user of this information assumes the entire risk of any use made of this information. MSCI, each of its affiliates and each other person involved in or related to compiling, computing or creating any MSCI information (collectively 'the MSCI Parties') expressly disclaims all warranties including, without limitation, all warranties of originality, accuracy, completeness, timeliness, non-infringement, merchantability and fitness for a particular purpose with respect to this information. Without limiting any of the foregoing, in no event shall any MSCI Party have any liability for any direct, indirect, special, incidental, punitive, consequential (including, without limitation, lost profits) or any other damages. (www.mscibarra.com). If you have any doubts about the suitability of this investment, you should contact an independent financial adviser.

Scaling Intensity

We illustrate how we can use the carbon index calculation proposed earlier to analyse the difference in decarbonisation pathway between two portfolios over time. This represents the financed emissions evolution from the baseline. As shown below, the Covid-19 related reduction in activity during 2020-2022 has likely played a significant role in the carbon dynamics, and the difference between the two benchmarks is growing since the index started integrating decarbonisation pathways.

In particular, we notice the economic activity recovery led to an increase in emissions for the MSCI World. Meanwhile, the MSCI World CC had to compensate due to the linear compounding decarbonisation targets it is subject to. If this trend continues in the coming years, we can expect climate benchmarks to experience much higher active risk relative to the parent index.

Carbon Index for MSCI World and MSCI World CC (Total Return adjustment)



Once we have a scale-free carbon index as shown above, we can decompose the change of the carbon index over time to better understand the dynamics behind portfolio decarbonisation which is covered in the next section.

Sources: HSBC Asset Management. MSCI indices as of August 2023 for index composition. Refinitiv Quantitative Analytics Direct (as of August 2023) for stock prices, total return data company market capitalisation and financial reporting data. S&P Global Trucost (as of August 2023) for emissions data. Figures are annualised, log returns.

Carbon Accounting

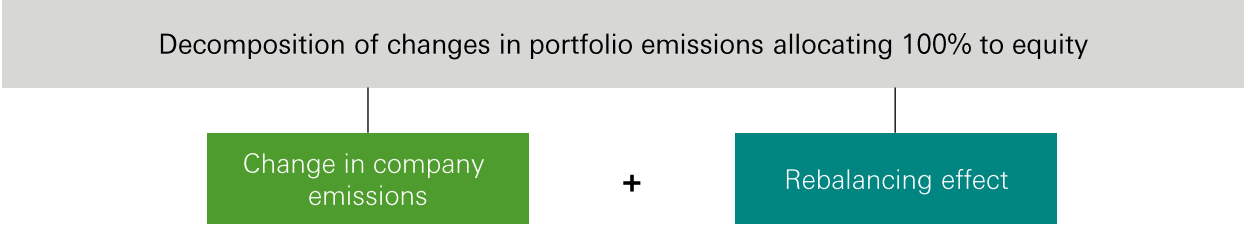
Portfolio decarbonisation can be achieved in two ways. There might be an ongoing trend towards emissions reduction at a company level in the context of the continued efforts towards achieving the net zero objectives and technological progress. However, portfolio decarbonisation can also be achieved by divesting from industries like energy production, commodities extraction or utilities and investing into lower carbon stocks.

To provide better insight into the portfolio decarbonisation dynamics, we propose to decompose the changes of portfolio emissions into the following main components, assuming that 100% of a company's emissions are allocated to equity:

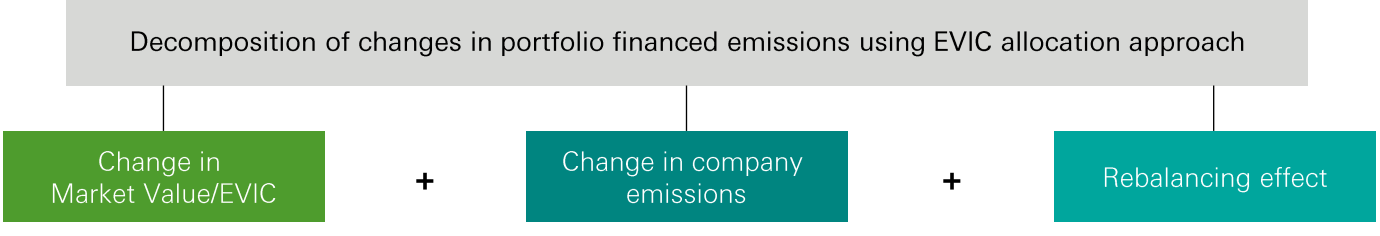
1. Change in company emissions [5] ("pure carbon" effect)
2. Rebalancing effect[6]

"Change in company emissions" below relates to the change in portfolio financed emissions, assuming no change in the number of shares invested. "Rebalancing effect" refers to the impact of the change in number of shares invested due to rebalancing activity during a specific time period. Please refer to the paper by Rabault and Karp (2023) [7] for more details on the decomposition.

The portfolio manager controls the rebalancing effect while the change in company emissions is determined by exogenous factors. This gives clarity over what can be directly controlled by the portfolio manager to achieve portfolio decarbonisation and can help to tailor the portfolio objectives in a more specific and appropriate way.



When the EVIC allocation approach is used (see financed emissions calculation in page 3), we can also isolate the effect of changes in the Market Value to EVIC ratio.



The term "Change in Market Value/EVIC" is a consequence of the financial structure of the company. This term moves with market prices and debt issuance and is therefore, outside of the control of the portfolio manager. Meanwhile, the term "Change in company emissions" is in the control of the companies held in the portfolio and the portfolio manager can aim to select companies with better policies and potentially influence company management through engagement. Finally, the "Rebalancing effect" is fully in the control of the portfolio manager who decides on the weights of the portfolio constituents.

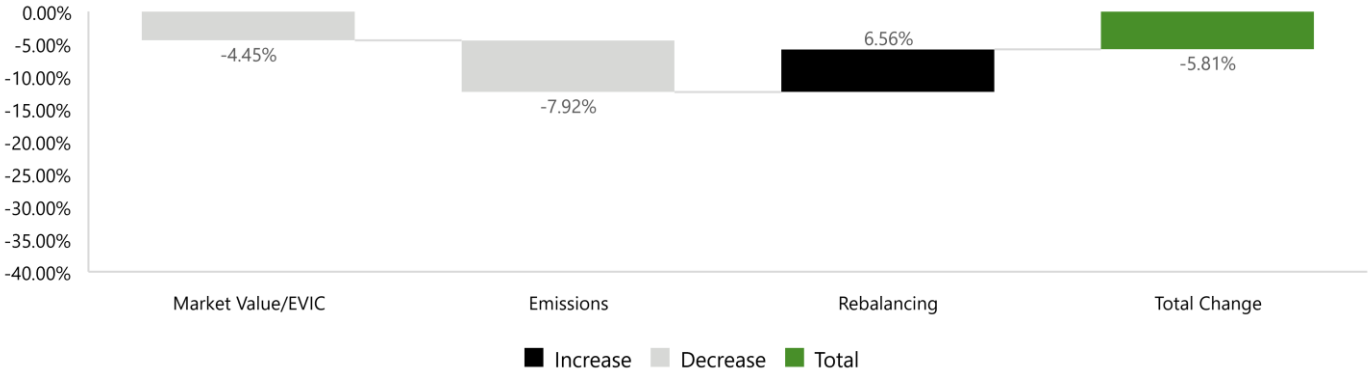
Sources: HSBC Asset Management. 5. These are reported or estimated by carbon data providers. 6. Any action that leads to a change in the portfolio holdings would contribute to the rebalancing effect 7. "Fundamental Portfolio Accounting", Rabault, Guillaume and Karp, Vadim, (January 20, 2023). Available at SSRN: https://ssrn.com/abstract=4335269

Application

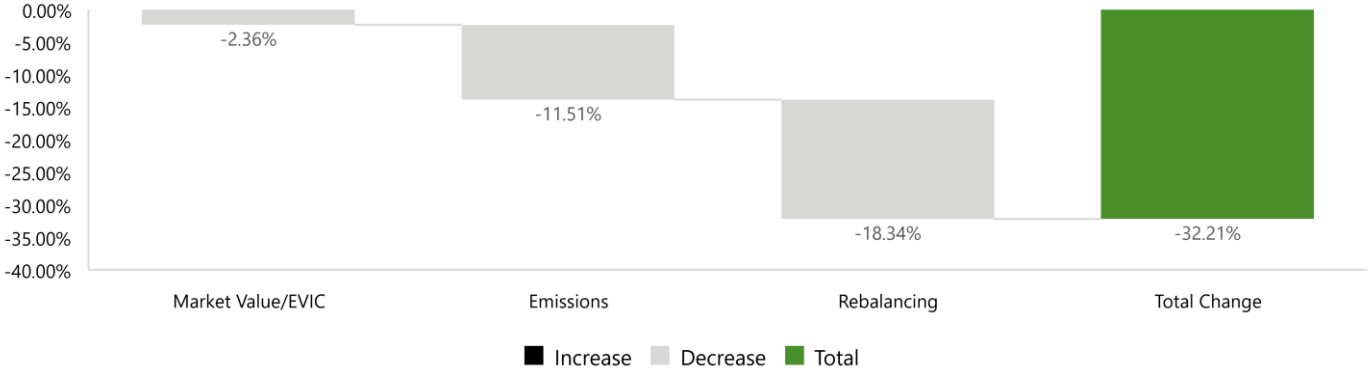
Once the carbon index is constructed for a portfolio, we can apply the carbon accounting framework to decompose the change in the index over time into the effect of a change in emissions data and the effect of rebalancing. When EVIC is used to define the financed emissions, we separate the effect of the changes in allocation of emissions to the equity portfolio due to the Market Value/EVIC ratio.

Below we apply the framework to the MSCI World CC[8] and MSCI World from July 2019 to July 2023 in order to decompose the change in their emissions. We use a price return adjustment for the illustration. Please note that when a total return adjustment is used, there will be an additional component for dividend yield.

Change in carbon index – MSCI World



Change in carbon index – MSCI World CC



In both cases, the carbon indices have fallen over the period. The reduction is significantly more prominent for the MSCI World CC, which is partly due to changes in emissions data (the second effect measured in the bar chart above) stemming from the companies held. This is comforting as MSCI Climate Change indices claim to gain exposure to transitioning companies. However, we note that the rebalancing effect led to an even greater reduction in emissions. This is driven by the fixed year on year decarbonisation targeted overall in the MSCI World CC.

Sources: HSBC Asset Management. MSCI indices as of August 2023 for index composition. Refinitiv Quantitative Analytics Direct (as of August 2023) for stock prices, total return data company market capitalisation and financial reporting data. S&P Global Trucost (as of August 2023) for emissions data. Figures are annualised, log returns. 8. MSCI World CC refers to the MSCI World Climate Change Index.

Conclusion

It is essential to accurately track and understand changes in emissions to assess progress in achieving climate objectives. Using portfolio financed emissions is a good starting point but presents challenges since absolute emissions are not comparable across portfolios of different sizes. To overcome this, financed emissions intensity is often used which normalises emissions by portfolio AUM. As the prices, market values and EVIC used in these metrics generally trend upwards more than emissions, the resulting tendency of financed emissions intensity is to fall over time. This is taken into account by the current industry standard adjustment methodologies. However, the recommended calculation for the EVIC inflation adjustment can make it irrelevant to the specific portfolio strategy and structure when expanded to an individual portfolio. Therefore, while the industry standards are easy to implement and give an indication of index carbon pathways, they do not necessarily provide the insights required to monitor the carbon performance of live equity portfolios effectively.

To overcome this, we propose to first use a carbon index which takes into account the dynamics of the financed emissions intensity and portfolio growth, also neutralising portfolio inflows and outflows. The carbon index is a scale-free index of the portfolio financed emissions. It is comparable across different portfolios (once a base date has been chosen) and takes each portfolio strategy into account.

Secondly, we advocate decomposing the changes in the carbon index into a component which reflects bottom-up decarbonisation, reflecting the 'pure' change in the emissions of the portfolio holdings, and a component accounting for the rebalancing effect which reflects the changes in the portfolio structure due to portfolio management activity.

We applied this to illustrate the change in the carbon index of the MSCI World CC and MSCI World from July 2019 to July 2023 and found that, in both cases, the carbon indices have fallen over the period. The reduction is more prominent for the MSCI World CC. However, this occurred against the backdrop of Covid-19 which allowed easy decarbonisation. If emissions were to rebound, the MSCI World CC index might have to rely on significant rebalancing to honour its decarbonisation commitment.

In this paper, we proposed an approach to measuring the carbon pathway in an equity portfolio which allows asset owners and asset managers to clearly identify the sources of carbon reduction in the strategy implemented. Therefore, this monitoring toolkit can enrich the dialogue about how such mandates can support the lower carbon transition, achieve clients' net zero targets and also help clients adapt their strategies to the continuously evolving trends of the real economy decarbonisation over time.

Sources: HSBC Asset Management. Further formulae available upon request.

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