Transition Risk Management in Action

How Asset Managers measure and manage financial carbon risks

February 2024

Executive Summary

Carbon Price Exposure is growing rapidly and is forecasted to be the main driver of financial risk in the energy transition for the next decade.

In this White Paper, we explore the underlying drivers of carbon price exposure, how carbon price risk can be measured and what investors do today to actively manage this risk.

Carbon pricing has emerged as the primary tool of climate regulation – being used now in jurisdictions responsible for 50% of global GDP and growing. Prices are expected to increase significantly over time, and subsidies in the form of free pollution permits are phased out in nearly all systems. This trinity amplifies the impact of carbon pricing on corporates and the macro environment via inflation.

To measure carbon price exposure, a granular bottom-up model is required that incorporates the individual aspects of each market and corporate, including its operations, the regulatory framework, decarbonisation and trading strategies as well as the ability to pass through carbon costs.

Using such a model reveals significant exposure of equity valuations to carbon pricing. Cushon, an innovative UK pension provider, models that its "green" equity portfolio could suffer by up to 3.5% by 2030, while the Stoxx600 could see a decline of up to 10.9% by the end of this decade.

Cushon hedges this exposure with a natural capital allocation in carbon removal projects, anticipating a convergence with compliance carbon markets. They find that a Natural Capital Allocation of 6-8% could financially hedge their exposure to compliance carbon pricing.

Introduction: Carbon Price Exposure is surfacing

A Pigouvian tax is a tax on any market activity that generates negative externalities, so that the responsible entities have a financial incentive to reduce the externality. When it comes to CO_2 emissions, there are two approaches to putting a price on such externality: A (fixed) carbon tax, or a (floating) carbon price based on a cap-and-trade market. This paper will focus primarily on the latter, as prices are less predictable and impacts more difficult to understand.

There are 28 different cap-and-trade markets globally, and 8 more under development[1]. Each market has its own rules, but all function based on the same approach:

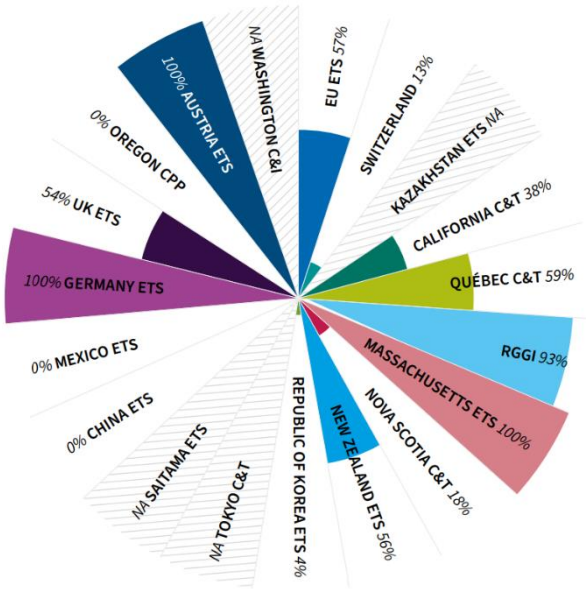
Emission allowances
The regulator creates emission allowances, which permit the holder to emit one tonne of CO_2

Declining supply
The total amount of allowances is fixed, and declines every year

Emission reductions
Polluters compete for the emission allowances, and the ones missing out are forced to reduce emissions

However, there is a little-known fact about cap-and-trade markets: Most of the emission allowances are handed out free of charge to polluters. Even worse, in most markets polluters initially receive more allowances than emissions. As allowances are usually bankable to subsequent years, polluters can build up a bank of surplus allowances. As a result, most polluters are not required to purchase emission allowances in the initial years of cap-and-trade markets.

Chart 1: Share of allowances sold by market



Source: ICAP ETS Report 2023

This "free lunch" period is however now coming to an end: In the most material carbon markets for investors (the EU and North American markets), the share of allowances handed out for free declines continuously in favour of auctioning. In the EU, free allocation is phased out by sector, whereas utilities generally have not received EU emission allowances (EUAs) since 2013, ship operators enter the system this year with zero free allocation and airlines will lose all free allowances by the end of next year.

[1] ICAP: Emissions Trading Status Report 2023

Most sectors will follow suit by 2030, and at the end of 2034 all EUAs will be auctioned and not freely allocated.

Carbon price exposure materialises fast, and investors start to take notice: Allianz published in its 2022 sustainability report an impact of up to 10% on its equity portfolio[2], Unilever sees up to one third of its earnings at risk[3] and the ECB estimates some €55bn at risk – all due to carbon pricing by 2030[4].

Carbon pricing will be a material financial driver on corporate and macro level, and investors must start measuring and managing now.

Here is how we see early adoptors acting:

Carbon Price Exposure Data

It is tempting to assume that "dirty" companies are negatively exposed to carbon pricing, and "green" companies will benefit from high carbon prices. However, it is a bit more complicated than that: The fragmented world of carbon pricing means that some heavy polluters might not be priced at all, while rather efficient producers are facing significant costs. Hedging strategies, surplus inventory and pass through abilities further complicates the assessment.

SparkChange has developed a granular bottom-up model to assess carbon price exposure on corporate level. The model evaluates four levels:

1. **Regulation:** Every cap-and-trade market has its own rules, ambition, and price. Therefore, exposure to carbon pricing must be assessed by market. This does not only allow to understand the sensitivity to particular trends (what if the US introduces a federal cap-and-trade market?), but also enables market-specific hedging.
2. **Operations:** Lofty 2050 net-zero targets are not relevant to understand carbon price exposure. What matters are the breakdown of emissions by jurisdiction, the decarbonisation on facility level and the origin of indirect emissions. For a carbon price exposure perspective, it matters whether a company reduces emissions in a location where there is no carbon price or in a jurisdiction that has a price on emissions.
3. **Strategies:** Some companies still use inventory emission allowances, while others sold surplus allowances a decade ago. Some companies proactive hedge future allowance needs, while others are buying in the spot market. Both have a significant impact on the realised carbon costs.
4. **Competitive environment:** Carbon costs can be passed through – but not by all companies. Pricing power and market structure determine which share of the costs must be borne by the polluter directly. Furthermore, carbon pass through benefits producers with low-carbon technologies – think renewable electricity producer which receive the same revenue per unit as fossil producers paying for carbon permits.

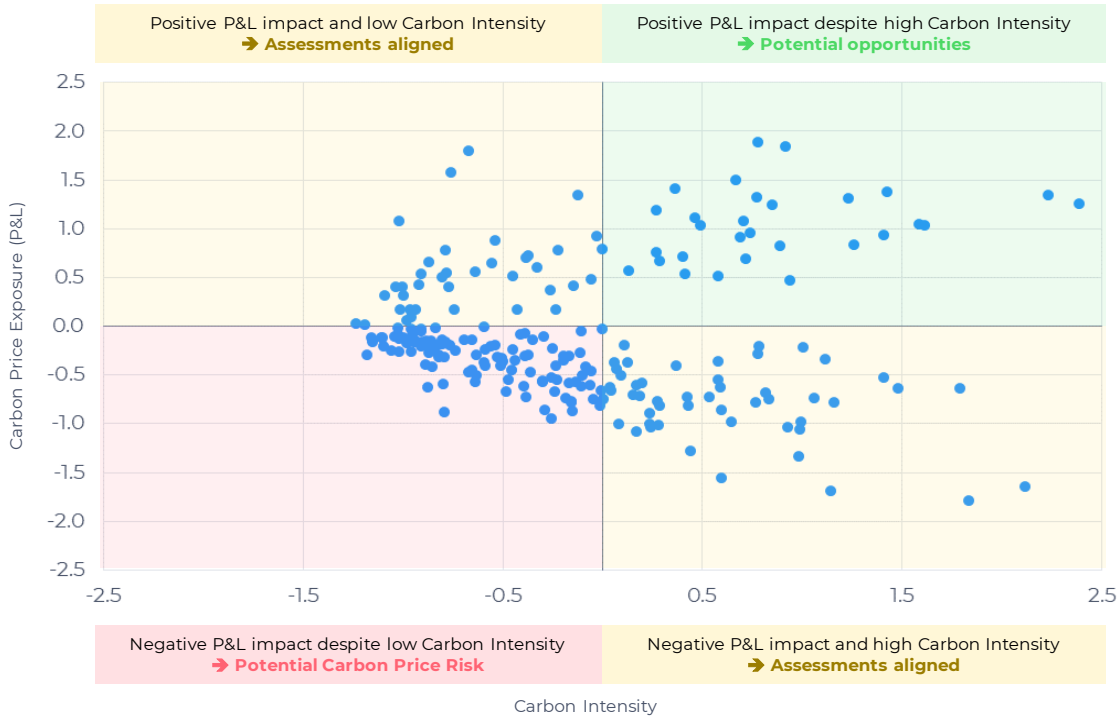
[2] Allianz 2022 Sustainability report
[3] Unilever 2022 Annual Report
[4] ECB 2022 Green Stress Test

Chart 2: The drivers of carbon prices on companies' earnings

Source: SparkChange

This approach addresses the unique aspects of carbon markets, and thus yields different results compared to conventional ESG metrics. Chart 3 plots a universe of entities on two dimensions: Carbon Intensity (horizontal) and Carbon Price exposure (vertical). One would expect that companies with a high carbon intensity are negatively exposed to carbon prices – and vice versa. However, model results suggest that there is no significant correlation between the two. There are corporates with a high carbon intensity that can still thrive in a high carbon price future, and there will be "green" companies that suffer.

Chart 3: Carbon Price Exposure versus Carbon Intensity



Source: SparkChange

Take for example SSAB, a Swedish steel producer that pioneers green steel production based on hydrogen. The company still has significant emissions today, but has a tangible decarbonisation strategy that will render them less exposed to carbon pricing going forward. However, from a carbon price exposure perspective it still loses out against companies like Salzgitter AG, another steelmaker who has hedged it emission allowance needs long in advance at a fraction of today's prices.

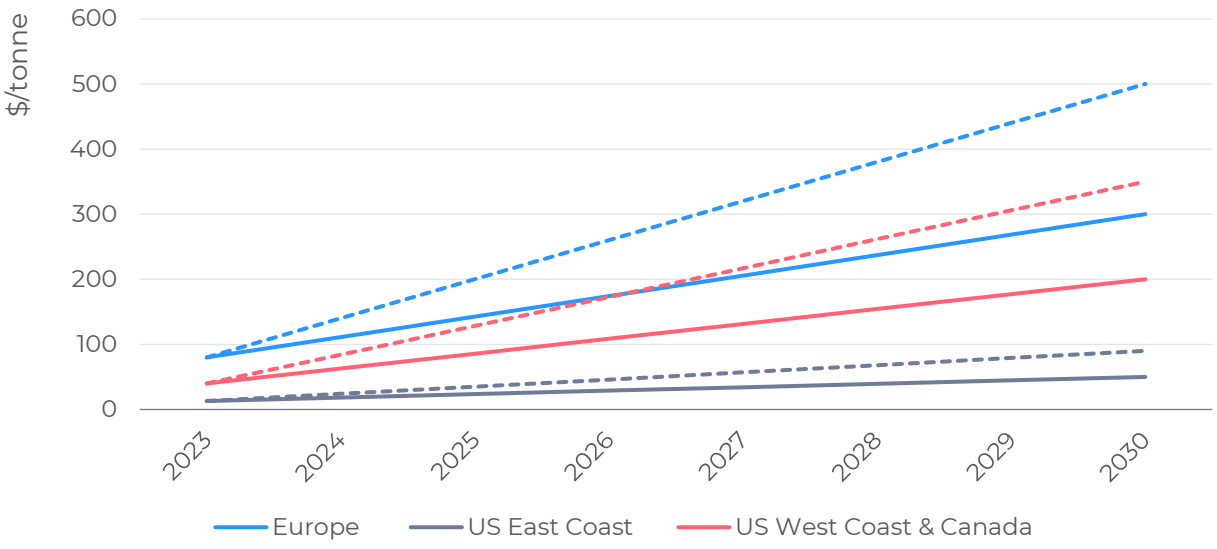
How Investors measure carbon price exposure

Most investors do not yet actively track carbon price exposure of their investments. There is no regulatory reporting requirement, and data availability is poor. Furthermore, investors do not find significant correlation between equity performance and carbon pricing, which is not surprising given the history (see introduction).

However, there are some that start paying attention, and Cushon is one of them: As an innovative pension provider, they started measuring the exposure of their investment portfolio in early 2023. Their portfolio has a quite low carbon intensity, with a footprint 60% lower compared to the parent benchmark. As we have learned in the previous section, however, this is not necessarily good protection against rising carbon prices.

Cushon created a range of carbon price scenarios that would stress the portfolio. For each market there are two price curves, a high but plausible scenario, and an extreme case. Chart 4 shows the assumptions for each of the major markets.

Chart 4: Carbon price assumptions

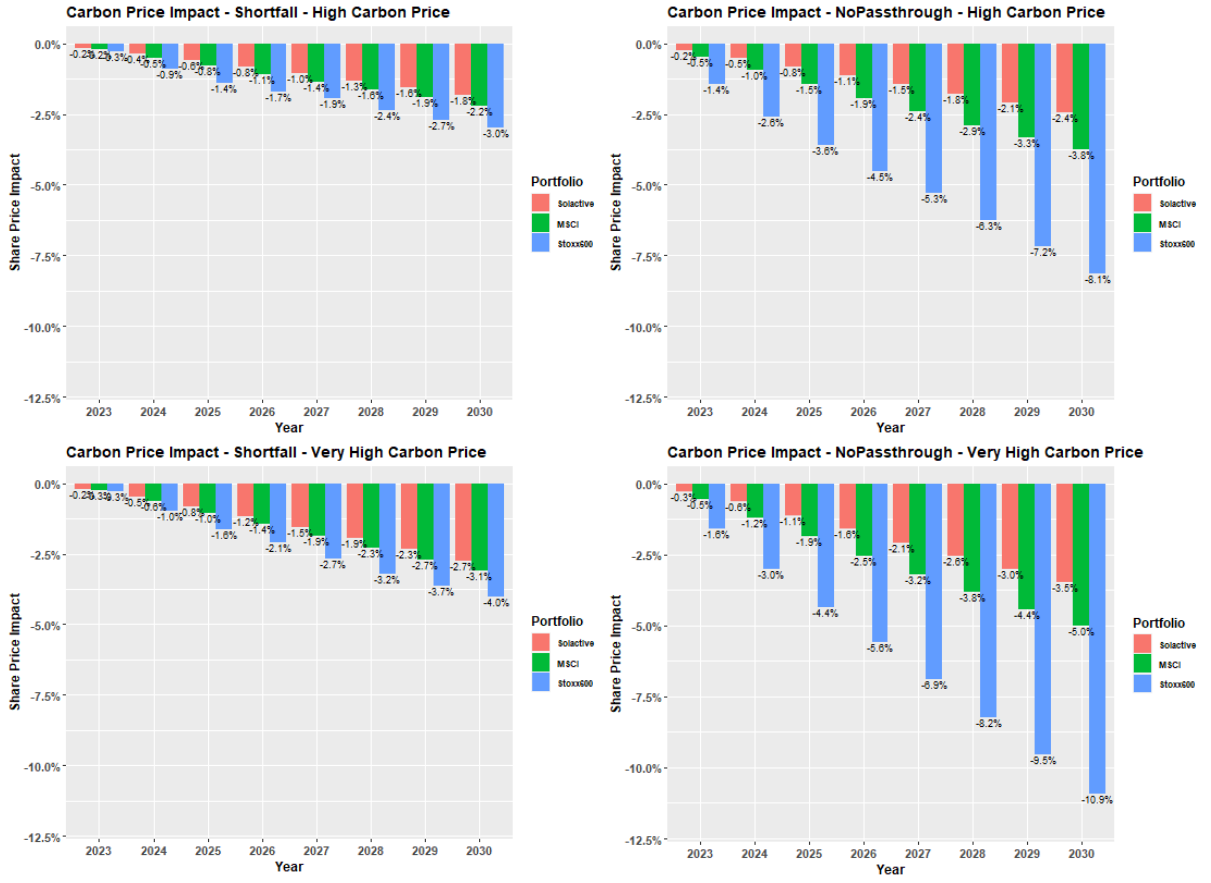


Source: Cushon

When applying these price curves to the exposure analysis of the portfolio, Cushon finds a significant negative exposure to carbon pricing. To stress the results further, the analysts varied the pass-through rate up to the point that no carbon costs can be passed through by any company. In the base case, it is assumed that companies pass through all costs of their allowance shortfall (the

"effective costs" - the difference between annual emissions and allowances received free of charge). Chart 5 shows the results for different price and pass through assumptions for 3 portfolios: Cushon's own portfolio ("Solactive"), a global diversified portfolio ("MSCI") and the largest European corporates ("Stoxx600").

Chart 5: Impact of carbon prices on share price based on carbon price assumption and pass through



Source: Cushon

The analysis suggests that Cushon's portfolio will lose 1.8%-3.5% by 2030. The delta to the global diversified portfolio ("MSCI") results from the screening process, and the comparison against the EU portfolio is a proxy for the impact if the (ambitious) EU carbon market would be expanded globally.

Overall, Cushon found a significant exposure to rising carbon prices.

Mitigating Carbon Price Exposure

There is no silver bullet to hedge carbon price exposure, but a range of mitigation strategies available. We outline three different ways below, but this is just a fraction of possible solutions:

1) Portfolio optimisation: As shown earlier, carbon pricing brings both opportunity and risk. There are companies that benefit from rising carbon prices – even in sectors deemed "dirty" such as steel, cement, or energy. Adjusting investments to other companies within the same target is an "organic" way of

mitigating carbon price exposure – but is often difficult to implement due to strategy restrictions or performance considerations.

2) Hedging with emission allowances: Getting exposure to emission allowance pricing is the most straightforward hedge to mitigate the effects of carbon pricing. However, this requires a basket of allowances, as the exposure in globally diversified portfolios differs per market, and the respective markets are trading uncorrelated. There are existing solutions to get exposure to emission allowance pricing, for example via exchange traded commodities or funds, such as SparkChange's EUA backed CO2.L or the CCA based KCCA.

3) Hedging with carbon credits ("offsets"): The compliance carbon markets and carbon credit or offset markets are two distinct concepts, so this approach sounds odd at first. However, some cap and trade markets selectively allow surrendering carbon credits against the compliance obligations, and the scope of markets admitting high quality offsets is expected to increase. Equally, the same public policy lever that increases compliance market carbon prices should also drive up voluntary carbon prices, given each is synonymous with transition over the long term. So, for long-term investment portfolios, a natural capital allocation in removal projects might prove as a hedge against the financial risks from carbon pricing.

Contact Us

Combining extensive industry experience across carbon markets and data analytics, our team shares a passion for SparkChange's mission: To link the financial world to carbon markets.

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About SparkChange

SparkChange is an intelligence provider that supports integrating the financial risks and opportunities of climate regulation in the decision making process of investors globally. Founded in 2018, the company built proprietary datasets and bespoke model frameworks to assess how carbon pricing will impact the bottom line of corporates and macro variables such as trade flows or inflation. Its intelligence is used by asset managers, asset owners, banks, hedge funds and regulators. For more information, visit: https://sparkchange.io/ .

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