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Carbon Pricing: Where are We Going?

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The COVID-19 pandemic has shown the power of governments to address urgent challenges. Across the world, countries have implemented unprecedented fiscal measures in response to the crisis. This shows the power of governments to implement necessary change to ensure a sustainable and resilient future.

One of the key tools in governments' armoury has been to introduce a price on carbon emissions. An increasing number of countries and jurisdictions are implementing carbon prices, impacting the operations and asset valuations of companies across regions and sectors. This piece explains why investors should evaluate the impact of such measures.

Introduction

Governments aiming to reach low or net zero carbon emissions have many tools at their disposal, from cutting subsidies and political support for high-emitting fossil fuel industries to enabling the transition to cleaner, renewable energy.

The piece focusses on the use of market prices to limit anthropogenic carbon emissions, initiatives that many countries continue to adopt and expand as a key policy lever to reach net zero emissions. Given the increasing implementation of carbon pricing in many countries, investors will have to differentiate between companies that are taking steps to limit the risks stemming from carbon pricing and those that are failing to adapt. The latter are likely to face risk of increased liabilities, reputational damage and stranded assets.

Armed with this knowledge, we hope investors will be better equipped to decarbonise their portfolios and to see climate change — and the initiatives to tackle it — as both an ever-present risk that should be managed, and an opportunity to allocate capital accordingly.

The Inevitable Low Carbon Future

Recent years have seen a growing acceptance among academics, policymakers and the public that climate change is real and poses a threat to many aspects of our lives. The global annual temperature has increased at an average rate of +0.18°C since 1981 and the five warmest years since 1880 have all occurred since 2015.¹

Faced with increasingly dire predictions from the UN-backed Intergovernmental Panel on Climate Change's (IPCC), policymakers are committed to cutting carbon emissions and reshaping their economies.

As a result, investors should prepare for the inevitable policy responses from governments around the world, driven by evidence of the successful implementation of economic recovery packages focussed on environmental and social targets (for example, South Korea).

Encouragingly, global sustainability initiatives are continuing amid the pandemic, particularly in China, continental Europe and the UK. The European Union has ambitious plans to expand its Emissions Trading Scheme — the largest carbon pricing system in the world. Carbon pricing measures are growing globally, being utilised at both the national and company level. This trend is being driven by governments eager to implement a market price on the cost of pollution and due to pressure from investors looking to assess the risks associated with climate change on companies' earnings and assets. The transport (shipping and airlines) sectors are imminently expanding the use of carbon pricing measures.

China, which is the largest user of fossil fuels and largest emitter of greenhouse gases in aggregate, has continued to focus on green initiatives while tackling the pandemic. Chinese authorities are implementing several recovery packages that include carbon pricing, clean energy subsidies and targets for new energy vehicles penetration.

The global economic slowdown arising from the pandemic may delay this trend, but is unlikely to derail it. The revenues generated from carbon tax schemes currently equate to around 1% of global corporate earnings but could ultimately rise to 12x that, and therefore remains a long-term earnings headwind for many companies.² However, the direction of travel is clear. It pays to be structurally cautious of climate change laggards in these sectors as they face a potential double impact of lower earnings and lower multiples.

“ Investors should understand how companies are managing their emissions and their resilience to carbon pricing”

Aside from regulation, an increasing number of companies are adhering to voluntary disclosure frameworks. The Financial Stability Board's Task Force on Climate-related Financial Disclosures (TCFD) seeks to improve transparency through requirements for companies to improve climate-related financial risk disclosures. In its guidance, the TCFD asks companies in all sectors to 'provide their internal carbon prices'. This should result in many companies setting their own carbon price, regardless of national regulations.

Cost of Pricing Carbon and Investment Implications

The World Bank estimates that governments raised US\$45bn from carbon pricing initiatives in 2019.³

This sounds inconsequential but it is a starting point. Consider the following:

- 1 Carbon pricing initiatives currently only cover an estimated 22% of global greenhouse gas emissions.⁴ Consider that this ultimately increases to 100% and the impact is over 4% of global corporate earnings.
- 2 Carbon prices are likely too low. The 'Report of the High-Level Commission on Carbon Prices' chaired by Nobel laureate, Joseph Stiglitz and leading climate economist, Nicholas Stern estimated that hitting the Paris Agreement emission targets needs a price of US\$40–80 per tonne on industrial emissions, or at least three times current levels. By contrast, the median tonne of carbon emissions is currently priced at US\$15 in existing schemes. As carbon pricing mechanisms spread, and governments and companies implement further energy transition regulations, we expect carbon prices to rise.
- 3 Assuming that 100% of global greenhouse gas emissions will eventually be subject to some form of carbon pricing, and that a minimum carbon price of cUS\$40/tonne is needed to meet the Paris Agreement commitments, the cost to global corporate rises to cUS\$540bn, equivalent to 12% of global 2019 corporate earnings. It is worth noting that some commentators have called for a substantially higher carbon tax than US\$40/tonne.
- 4 The Carbon Disclosure Project (CDP) highlights 1,600 large corporates globally (equivalent to around 8% of listed corporates) led by those in US, Japan, and China, that are using or planning to use an internal carbon price to help drive better resource allocation and decision making. We can assume the majority are larger, and therefore generally listed. Voluntary carbon offsetting has also grown sharply, and is currently the second most used carbon market type as corporate ESG awareness and investor pressure has grown.
- 5 This cost will be disproportionately born by a relatively small group of companies. Greenhouse gas emissions are concentrated in power generation (25%), industrial uses (21%), agriculture (25%), transport (14%) and real estate (6%).

Europe, China, and some other countries including Canada and Mexico have taken the carbon pricing lead. The US is involved in several regional and sub-regional initiatives such as the 'Regional Greenhouse Gas Initiative' (RGGI) and the 'Western Climate Initiative' (WCI). Furthermore, many US companies are subject to cross-border initiatives such as the EU Carbon Border Tax. Companies are increasingly using voluntary carbon offset and internal carbon pricing initiatives. Finally, many companies are facing pressure from investors to address their emissions.⁵

As the climate change threat becomes ever starker, we are seeing a sustained shift in energy use, away from fossil fuels towards renewables, driven by greater awareness of climate risks, cheaper renewable energy and the opportunity for fossil fuel-importing countries to gain economic independence.

Carbon prices will likely catalyse these trends by impacting companies' revenues and/or cost of goods sold, particularly in carbon-intensive industries, like energy and materials. Therefore, investors should understand how companies are managing their emissions and the implementation of carbon pricing in their region of operations.

Carbon Pricing Mechanisms

The scientific evidence linking rising carbon emissions with rising sea levels and more frequent and extreme events has been well established by the IPCC. In line with the need to limit emissions in accordance with the Paris Agreement, governments globally have introduced carbon pricing policies to capture the human and economic costs of climate change.

Rather than imposing a hard limit, a carbon price provides a market signal to companies that lets them choose whether to reduce emissions, or to continue to pay the price for polluting. The carbon price can also incentivise companies to invest in renewable energy and less polluting forms of production, thus enabling the transition to a low-carbon world.

There are two main approaches to incentivise behaviour to limit carbon emissions.

Carbon Tax

A tax rate on greenhouse gas emissions or on the carbon content of fossil fuels. With a carbon tax, the price on carbon is defined but the level of resulting emissions reduction is undefined.

Emissions Trading Scheme (ETS)

An ETS first caps total GHG emissions and then establishes a market price for emissions. High emitters can buy allowances from low emitters and low emitters can sell their extra allowances to larger emitters. The level of emissions reduction is defined but the price on carbon is undefined.

“ **A carbon price lets companies choose whether to reduce emissions or pay the price for polluting”**

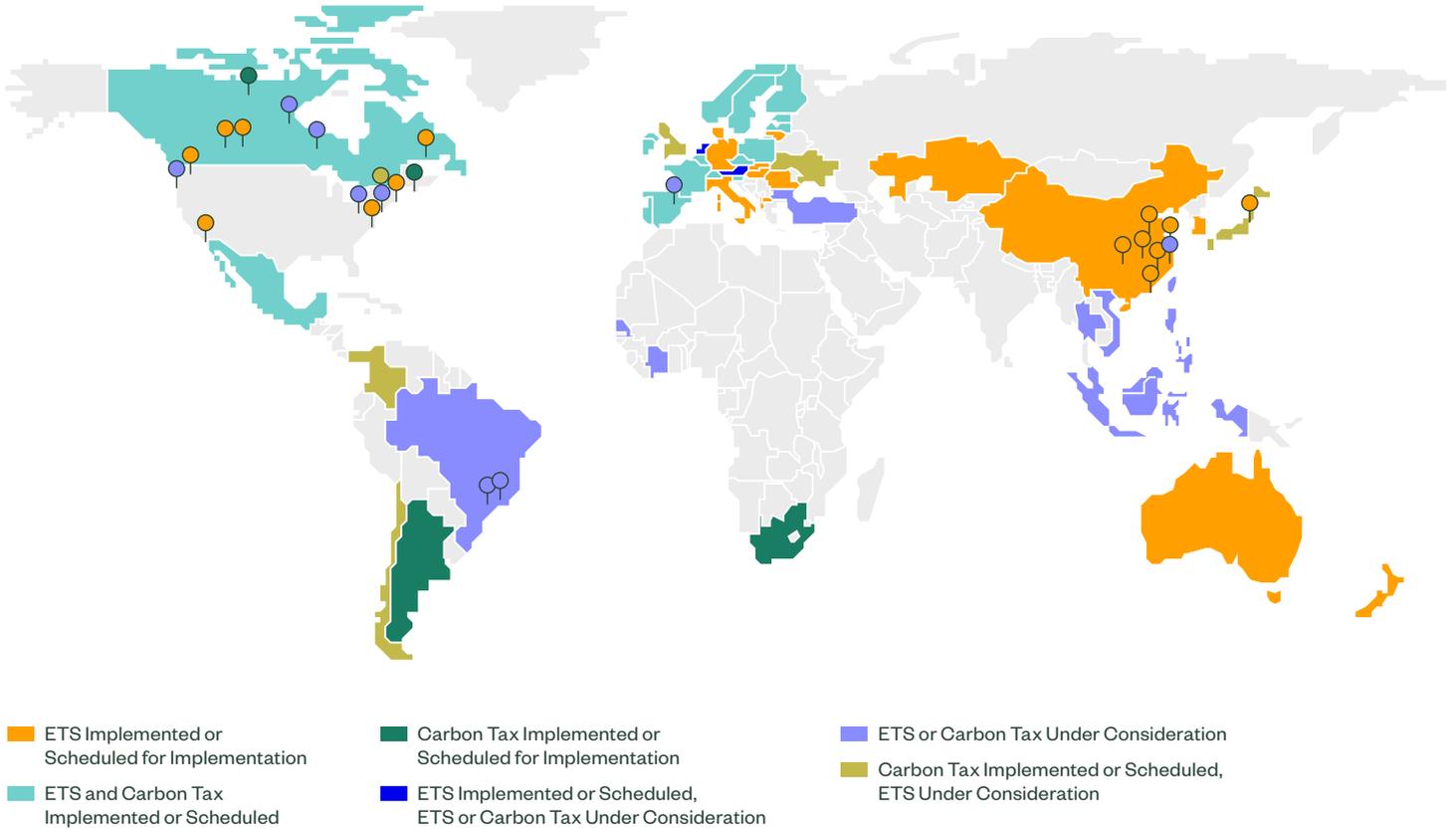
Governments can also use other more indirect methods to reduce emissions, including fossil fuel taxes and the removal of fossil fuel subsidies.

Another approach is carbon offsetting where governments or companies plant trees or use technologies to store carbon deep underground. Carbon offsets play a role in tackling climate change, and can be used alongside carbon pricing, but in isolation they do not address the need to cut or eliminate the source of emissions.

The Global Picture

Below is a snapshot from the World Bank's Carbon Pricing Dashboard, which shows the range of carbon pricing initiatives either implemented or scheduled by authorities around the world as of 1 February 2020.

Figure 1
Map of Regional, National and Subnational Carbon Pricing Initiatives



Source: World Bank (2020).

Key highlights:

- There are 60 carbon pricing initiatives globally (40 countries and 20 cities, states and provinces). These cover 12 gigatonnes (Gt) of CO₂e, representing 21.3% of global GHG emissions.
- Of these 60, three ETS initiatives are scheduled — in China, Germany and the state of Virginia (US). As the world's largest total global carbon emitter, the relevance of China's initiatives cannot be underestimated.
- Countries are split almost 50/50 on which mechanism they have introduced or plan to introduce with 29 carbon tax initiatives implemented and 31 ETS implemented or scheduled.
- Canada and Mexico have implemented both carbon tax and ETS initiatives, while several EU countries have implemented national carbon taxes, in addition to the regional EU ETS (e.g. France, Spain, Sweden and Poland).
- Carbon pricing initiatives are being introduced at the national, regional and sub-national levels. China has scheduled an ETS at the national level, while further ETS are being piloted at the province level. In the US, the Federal government has not introduced a national initiative but three states (California, Washington and Massachusetts) are introducing their own initiatives.
- The aim here is to show that almost all investors will have portfolio exposure to one form of carbon pricing or another in the coming years as governments aim to achieve the Nationally Determined Contributions (NDCs) ratified in the Paris Agreement.⁶

The European Picture

The European ETS scheme is a cap-and-trade system where companies generating GHG emissions buy allowances to cover their emissions. The price of these carbon credits fell 30% during the COVID-19 equity market sell-off, but have since recovered, helped by a change in the ETS structure introduced in 2019.

To help prevent repeat of the oversupply-driven slump seen in carbon prices following the global financial crisis, 24% of surplus ETS credits are now removed every year, effectively shrinking the market and supporting prices. This 'Market Stability Reserve' drove carbon prices up 400% in 2019 and made carbon credits one of the best-performing asset classes for the year.

The European Commission wants to extend the ETS scheme to new industries, such as shipping and airlines, with the broader transport sector the fourth largest polluter. The shipping industry has tightened environmental regulations significantly, and over 65% of respondents to the 2020 Refinitiv Carbon Market Survey thought the shipping industry would be included in Europe's ETS market eventually.⁷ With fleets grounded through most of this year, including 2020 levels is problematic, however.

The airline industry is also under pressure to limit emissions. Airlines have thus far generally resisted the pressure to decarbonise. That may change, however, given state-led bailout conditions and the UN emissions-trading 'Carbon Offsetting and Reduction Scheme for International Aviation' (CORSIA) program. In 2021, 70% of global airline emissions were scheduled to enter CORSIA, capping them at average of 2019–2020 levels.⁸

Some European nations are forcing airlines to make green commitments in exchange for financial aid, including investing in cleaner fuels, replacing polluting short-haul flights and reducing fleet age. This has been seen in recent support from the French and Austrian governments, but was loosened in Lufthansa's recent €9bn government bailout by the German state.⁹

Environmental rules have often been extended at time of crisis, for example, in the wake of the 2015 Volkswagen emissions scandal, when the government imposed strict new emissions rules.¹⁰

The European Commission also plans to impose a Carbon Border Tax on imports from foreign polluters — effectively forcing others, such as China, India and the US to price emissions adequately.

The Carbon Price Gap

“ Less than 20% of global carbon emissions are priced”

Policymakers planning to implement a price on carbon have encountered two challenges. One is that pressure to resist any form of pricing is strong, largely from incumbent industries that rely on emitting carbon and others that distrust such initiatives. This explains why less than 20% of global carbon emissions are priced, according to the World Bank.

Second is the issue that carbon prices remain at relatively low levels. Currently, a median tonne of carbon emissions is priced at only \$15 but one estimate suggests it needs to be \$50–\$100 by 2030 to fulfil the Paris commitments.¹¹ To meet the Paris Agreement goals in 2040, the International Energy Agency calculated that the carbon price per tonne in the US needed to rise from \$5 in 2019 to \$140,¹² while the IPCC calculated a required rise to \$230 per tonne.¹³

In 2018, the OECD examined carbon pricing across 42 OECD and G20 countries and calculated the gap between current carbon pricing and that required to meet the Paris Agreement goals.¹⁴ If the trend were to continue, the gap would only close by 2095, far too slow to limit global average temperature increase to less than 2°C above pre-industrial levels.

The OECD finds that countries with a low gap tend to emit fewer emissions (in total and per unit of GDP) compared to countries that hardly price any carbon emissions. A low gap signals to investors that a country is set for decarbonisation and that its companies are incentivised to compete and thrive in a low-carbon economy. A higher gap means that firms are more likely to miss out on opportunities that arise in a low-carbon economy and will be left to face higher transition risks.

Failure to transition to a low-carbon economy can also increase sovereign risk. An economic slowdown could result from declining fossil fuel demand arising from greater climate change awareness, technological improvements, the increasing attractiveness of renewables, regulation or policy.

At a sector level, the gap is lowest for road transport and highest for industry. The OECD reports that the vast majority of emissions in industry, and the residential and commercial sectors remain entirely unpriced, and that the gap will remain, even after China implements its national emissions trading scheme.

The ideal solution for insufficient carbon pricing would be a global uniform carbon tax, however, we should not expect this anytime soon. The absence of a global uniform tax means accurately measuring carbon footprints, particularly for products or services traded across different jurisdictions is very challenging.

To overcome this issue, next year the EU is planning to implement a 'border carbon adjustment (BCA) mechanism', essentially a tariff on countries that have not implemented carbon pricing. There are practical complications of this approach from being excessively complicated to implement, to risking a form of protectionism. Time will tell whether such initiatives close the carbon price gap.

The key takeaway is that while carbon prices remain low currently, the cost of emitting carbon is likely to significantly increase in the future.

Addressing the Slow-Burning Pandemic

Governments have a unique moment to re-evaluate their economic models, the impact of our reliance on fossil fuels and the direction we are heading in the fight against climate change. This dynamic provides a perfect opportunity for governments to widen the scope of carbon pricing to shift the balance in favour of renewable energy. A carbon tax could stimulate much-needed employment and growth in the clean low-carbon industries and technologies that we need to tackle climate change.

As we have seen, the signs are encouraging. China's adoption of a new national carbon emissions trading scheme is particularly noteworthy, given its position as the world's largest total carbon emitter.

While the holy grail of a uniform global carbon tax remains beset by complexities in practical implementation, we are encouraged that many governments are implementing carbon pricing at the national or local level. Companies, in turn, are increasingly addressing the carbon intensity of their operations and improving transparency and reporting, aligning to the TCFD and other frameworks.

An understanding of carbon pricing can empower investors to build more resilient portfolios, while also contributing to the transition to the low-carbon future. In turn, investors will be far better equipped to deal with inevitable climate-related risks and better positioned to take advantage of the swathe of opportunities that will arise across regions and sectors.

Endnotes

- 1 US National Centers for Environmental Information (2020).
- 2 'On Account of Carbon: The Carbon Price of Changing Behaviour', HSBC (2020)
- 3 'State and Trends of Carbon Pricing 2020', World Bank Group (2020).
- 4 'Report of the High-Level Commission on Carbon Prices', Carbon Pricing Leadership Coalition (2017).
- 5 'On account of carbon: The carbon price of changing behaviour', HSBC (2020).
- 6 Nationally Determined Contributions (NDCs) are the efforts each country in the Paris Agreement is taking to reduce their emissions and adapt to the impacts of climate change.
- 7 'Global Carbon Market Report', Refinitiv (2020).
- 8 'Carbon Offsetting and Reduction Scheme for International Aviation (CORSA)', ICAO (2020).
- 9 'No Green Strings Attached in Lufthansa's Bailout Package', Bloomberg Quint (2020).
- 10 "'Dieselgate' — a timeline of the car emissions fraud scandal in Germany', Clean Energy Wire (2020).
- 11 'High-Level Commission on Carbon Prices', co-chaired by Joseph Stiglitz and Nicholas Stern (2019).
- 12 'The importance of real-world policy packages to drive energy transitions', IEA (2018).
- 13 'Mitigation Pathways Compatible with 1.5°C in the Context of Sustainable Development', IPCC (2019).
- 14 'Effective Carbon Rates 2018: Pricing Carbon Emissions Through Taxes and Emissions Trading', OECD (2018).

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