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Summary

To reach the climate goals in the Paris Agreement, carbon emissions must go down. The most efficient way to achieve this is to increase the price of emissions compared to today.

A low price on carbon emissions is a problem from both an efficiency perspective and a stability perspective. It means we are emitting too much, and the investments required to transition society to lower emissions are insufficient. In addition, transition risks arise since firms that do not adapt in time may experience profitability problems, or even be squeezed out, if the emission price they pay increases to levels that more accurately reflect the costs. This FI Analysis focuses on what firms can do to manage this transition risk.

In order to manage the transition that the Paris Agreement entails, firms need to prepare for higher emissions prices. One way is for firms to already incorporate in their internal processes a price higher than the market price, for example when assessing investments or making purchases. Internal carbon pricing can be designed in a number of different ways depending on what the firm wants to achieve with the measure, with different kinds of impact on firms' behaviour.

Working with internal carbon pricing can help firms to manage transition risks that could be associated with future climate measures. It can also strengthen incentives to transition to a more sustainable business model. Internal carbon pricing cannot replace a higher market price for emissions, but it can contribute to firms having better conditions for handling the transition to low emissions.

In order to be able to live up to higher transparency requirements regarding climate risks in their exposures, financial firms need reliable and relevant information about the businesses they are financing. Transparency from non-financial firms about how they are working with internal carbon pricing enables investors and other external stakeholders to identify transition risks in firms. It can also contribute to more capital being allocated to firms that are working actively to transition to improved sustainability. If more firms include in their calculations a higher price on emissions, this could also lower resistance to political decisions that raise the price of emissions around the world.



Low carbon prices imply transition risk

To reach the climate goals in the Paris Agreement, emissions must go down. The most effective way to achieve this is through an increase in the cost of emissions compared to the cost firms (and households) are experiencing today throughout the world.^{1,2}

One way for firms to prepare for higher emissions prices is to voluntarily incorporate today an internal price that is higher than the market price. This can be done in a number of ways, for example by charging an internal fee for the business's consumption of fossil fuels and on the in-house production's carbon emissions in addition to the emissions-related taxes and fees the firm already pays in various jurisdictions. Firms that use, or have used, internal pricing include Microsoft, Société Générale, Delta, QANTAS, BHP, Royal Dutch Shell and Mahindra & Mahindra Ltd.³

Using internal carbon pricing is one way for firms to better understand how an increase in the price of emissions could impact the business. It can also help firms steer their investment decisions in a sustainable direction and create driving forces to transition the business. In this way, internal pricing can create better conditions for firms to handle the transition.

For an individual firm, internal pricing can function like a so-called Pigovian tax. A Pigovian tax corrects incorrect pricing and steers individual decisions in an economically efficient direction. It can contribute to greater demand for non-fossil alternatives and encourage technological development.⁴ However, it cannot replace the need for political decisions on higher emissions prices to achieve climate goals since the use of internal pricing is voluntary. Businesses with high emissions can circumvent the steering effect, while those who actually use internal pricing bear a cost. Globally efficient resource allocation ultimately requires a higher global price.⁵

The UN, the Task Force on Climate-related Financial Disclosure (TCFD), and the CDP have advocated firms' use and reporting of internal pricing on their carbon emissions.⁶ In a recent report, public pension fund AP7 and the International Chamber of Commerce in Sweden recommend that firms introduce internal pricing on carbon emissions.⁷ Bill Gates has pointed to internal carbon pricing as an

1 In this analysis, we consider carbon dioxide and greenhouse gases to be the same thing.

2 See Hassler et al. (2020).

3 Addicot et al. (2019) describes in detail how several of these firms use internal pricing.

4 See Gates (2021).

5 Using economic governance tools to reduce emissions has a limited effect if they are only implemented locally since the climate is global. There is also a risk of a rebound effect, i.e. that reduced demand in some jurisdictions will lower the global market price on carbon-intensive input goods, thus increasing emissions in other areas. But the fact that some jurisdictions will be first can still contribute to more sustainable development by creating incentives for technological development that could make carbon-intensive energy production unprofitable in the long run and by increasing pressure on other jurisdictions to also raise their price.

6 See Appendix 1.

7 See AP7 and ICC Sweden (2019).

example of what firms can do at the micro level, while waiting for the necessary policy decisions to be taken.⁸

FI has pursued a dialogue with both non-financial and financial firms in Sweden about how they use, or would use, internal pricing. For example, FI invited firms to a roundtable discussion on this topic. A number of Swedish firms already use internal pricing, and FI has made it clear that it encourages more firms to follow.⁹

Internal pricing is a multi-faceted tool that can be designed and applied in different ways. In this FI Analysis, we present the economic arguments in favour of using internal pricing, how firms can work with this tool, and how financial firms can use information about internal pricing from firms they are financing.

PRICES CONVEY INFORMATION

A well-functioning price mechanism is fundamental for efficient allocation of resources in a market economy. Prices gather and disseminate decentralised information to consumers and producers. Prices influence how much or little of a good is produced and in demand. It also influences the investments firms make and how the production capacity is distributed in the economy. In the longer term, prices influence technological development.

The financial sector plays a central role in society in identifying, measuring, and pricing risks and opportunities. The pricing of financial assets conveys information that enables financial firms to allocate capital to profitable investments.

CARBON EMISSIONS PRICES EXPECTED TO RISE

From an economic perspective, the price on carbon emissions and other greenhouse gases is too low in many parts of the world since the economic costs of emissions grossly exceed the costs borne by emitters.¹⁰ In other words, it is too cheap to use fossil fuels in many places, and to emit the carbon that this leads to. This means that firms and consumers are consuming too much carbon-intensive goods and services and too few alternatives that are more climate-friendly. Emissions are therefore too large from a social perspective. And the investments necessary to transition to a low-emissions society are insufficient, delaying technological development that would facilitate the transition.

Some countries and regions have introduced various policy measures to impose a cost on those emitting carbon, and more have announced that they intend to introduce such measures. The number of such initiatives has increased in the past ten years (Diagram 1). However, still only a small share of the total carbon emissions are priced. The cost of emissions differs between countries, and approximately half of

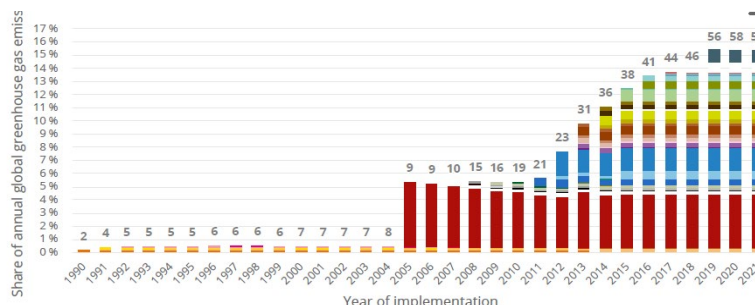
⁸ See Gates (2021).

⁹ See FI's Sustainability Report, published 18 March 2021 and the press release from 13 January 2020 entitled Increased transparency on carbon pricing can strengthen the financial system. English versions of both are available at www.fi.se.

¹⁰ See Carbon Pricing Leadership Coalition (2017) and Hassler (2020).

the emissions that are covered are priced at less than USD 10 per tonne of carbon.¹¹

1. Number of governance tools for carbon pricing and share of annual global emissions covered



International and national climate goals indicate that the price firms pay for carbon emissions should be higher than what it is in large parts of the world. A higher price on carbon throughout the world is by many experts considered to be the single most important policy measure to be able to limit climate change. The price will need to be raised even more in the future to reach the climate goals. The IMF estimates that the price will need to be in the range of USD 10–40 in 2030 and USD 40–150 in 2050. An expert group that was appointed by the World Bank in 2017 came to the conclusion that to reach the goals in the Paris Agreement, the price should have been at least in the range of USD 40–80 in 2020 and would need to be in the range USD 50–100 in 2030.¹²

Carbon taxes and emissions trading systems set a price on emissions

A carbon tax and emissions trading systems are the policy tools that are usually used to reduce the difference between the price firms and households pay to emit carbon and the economic cost of emissions. Sweden was one of the first countries in the world to introduce a carbon tax when it did so in 1991. Sweden is also part of the EU Emissions Trading System (EU ETS). The basic principle is that all carbon emissions that occur in Sweden must be covered by either the tax or EU ETS, with a few exceptions.¹³

The Swedish carbon tax amounts today to around SEK 1,200 per tonne, which is high by international comparison. However, in other countries, fossil fuels can also be covered by other types of taxes, which means that the actual difference in taxation is not quite that large, particularly compared to the rest of the EU.

For many years, there was a large surplus of emissions rights in EU ETS, which meant that the price was low; for a long time it was around SEK 50 per tonne (Diagram 2). In 2019, a so-called market stability reserve was introduced, and

¹¹ World Bank (2020)

¹² IMF (2020), Carbon Pricing Leadership Coalition (2017), and Hassler et al. (2020).

¹³ See Martinsson and Strömberg (2020) and Martinsson et al. (2020). For example, diesel in machinery used for agricultural, forestry and aquaculture activities is granted a reduction in the carbon tax.

surplus emissions rights were removed from the system. As a result, the price stabilised at a higher level. Emissions covered by EU ETS currently cost around SEK 400 per tonne. This price, which applies to the entire EU, is higher than in most jurisdictions outside the EU

2. Price of emission allowances within the EU ETS



One risk associated with price-inflating policy measures at the national or regional level which are mentioned in the debate, is that they might induce firms to move carbon-intensive activities to other jurisdictions. This does not resolve the problem that emissions are too high globally, and the jurisdictions that raise their prices first could potentially lose revenue. With the aim of reducing the risk of this kind of leakage, and thereby increasing the efficiency of climate policy, the European Commission announced that it was reviewing the possibility of adjusting the price of imported goods from regions with a lower price on emissions than in the EU to the extent to which the lower emissions price would otherwise generate a cost advantage. However, some also take the position that carbon leakage is not a major problem since customers and investors are becoming increasingly climate-conscious and can punish firms that choose to move their operations in order to avoid having to take climate in consideration.

MORE EXPENSIVE EMISSIONS IMPACT PROFITABILITY

In recent years, climate change has been identified as a significant source of financial risk at both the micro and macro levels. In its Global Risks Report, the World Economic Forum compiles every year assessments from 750 international decision-makers on the most important global risks. In the 2020 report, the five largest perceived long-term risks were all related to developments related to the climate and the environment.¹⁴

A higher price on carbon emissions will change the playing field for some types of businesses. In general, firms with business models that are based on a continued low price on emissions may be vulnerable to an increase in carbon prices. This applies in particular to businesses that emit large amounts of carbon or are dependent on fossil input goods. Other firms, for example those that produce alternatives that are less emissions-intensive, may benefit from such a development. From an economic perspective, this is a desirable development since the economy's resources are allocated more efficiently if prices to a larger extent reflect the full costs of emissions.

¹⁴ World Economic Forum (2020).

The structural transformation that the transition entails will cause firms to experience profitability problems, and some firms will be squeezed out. Changes in the price on carbon emissions and the requirements on emissions reductions are therefore transition risks that firms need to assess and manage in order to ensure that they will manage, and perhaps even benefit from, the transition. Correspondingly, financial firms that in various ways finance these businesses need to assess and manage these risks to avoid stranded assets, i.e. when assets fall sharply in value or become worthless.

Rising carbon prices affect firms' market value

The Swedish occupational pension company Alecta has calculated how the value of its shareholdings will be affected due to higher prices on carbon emissions. In its climate report for 2019, Alecta shows the impact on the shareholding if the price of emissions would increase in such a way that we limit the temperature rise to two degrees. Alecta makes the assessment that the value of the shareholding would decrease by between 5 and 29 per cent. A scenario where the carbon prices are adapted to limit the increase to 1.5 degrees would mean a drop in value of between 23 and 48 per cent.¹⁵

Asset manager Schroders has developed a model to assess how a firm's profits could be impacted by stricter climate regulations. It estimates that the revenues for almost half of the global listed firms would fall by more than 20 per cent if the cost of carbon was to rise to USD 100 per tonne.¹⁶

There are numerous examples already today where future climate measures have a significant financial impact on firms. Oil companies such as Chevron, ConocoPhillips, BP, Equinor, and ExxonMobil have written down the value of large oil assets in the past year. In June 2020, for example, BP recorded an impairment of more than SEK 160 billion. The decision was based on several factors. One of these factors is that BP makes the assessment that policy decisions related to the environment will substantially decrease the use of fossil fuels in the long term. This means that the extraction of large oil reserves will no longer be profitable. During the year, Vattenfall also wrote down the value of its coal-fired facilities Moorburg in Hamburg, in part due to Germany's decision to phase out coal. In December, the company announced that the power plant will be closed earlier than planned.¹⁷

Internal pricing can pinpoint risks and foster transition

One way for firms to prepare for rising carbon prices is to use internal carbon prices. This means that firms use a price in their internal processes that is higher than the market price. Internal pricing brings a central matter related to the transition into focus, namely the risks that

¹⁵ Alecta (2019).

¹⁶ <https://www.schroders.com/en/ch/asset-management/themes/climate-change-dashboard/carbon-var/>

¹⁷ Vattenfall announced at the same time that the company is receiving compensation from the German state to phase out the plant.

are associated with a low carbon price. In this way, the internal pricing could help the firm adapt its strategy and business model to manage risks and benefit from opportunities that are expected in the long run. Internal pricing can thus constitute an important tool in the firm's work to integrate climate-related factors into the governance of the operations.

A firm may have different reasons for introducing an internal carbon price, depending on its business and strategic goals with regard to emissions reductions.

Internal pricing could be part of the firm integrating transition risks into its risk management. By using internal pricing, a firm can better understand the short- and long-term risks and costs associated with climate regulation. The firm can then also better take into account transition risks in its risk management.

An internal price could be part of a firm's work to transition its own business. A firm can use internal pricing as a tool to identify climate-related opportunities and reach its own goals on reduced emissions.

A firm could introduce internal pricing to meet the demands of customers and investors. Customers and investors are placing increasingly high demands on firms to transition their businesses to align with the goals of the Paris Agreement. They also want firms to communicate their climate-related goals and how they are working to achieve these goals.

Firms can use internal prices in different operational processes. For example, firms can use them for

- comparing and evaluating how profitability in new investments is impacted by higher emissions costs,
- identifying how assets, such as real estate, or production processes need to be adapted to meet stricter demands on emissions or energy efficiency,
- reducing emissions when purchasing products and services, or for requiring that suppliers reduce their emissions.

At an aggregate level, if an increasing number of firms introduce internal pricing on carbon emissions, this could lead to a necessary transition in the private sector.¹⁸ Reaching consensus at the policy level on a global price for emissions has been difficult so far. If more firms were to act as if a higher price on emissions was already in place, this could reduce the resistance to – and also increase the support for – required policy decisions that raise the price on emissions, both locally and internationally.

¹⁸ Using local economic governance tools to rectify a global climate problem could be problematic (see Footnote 4). In this analysis, we are focusing on internal prices as a tool to identify, manage and highlight transition risk in firms rather than its potential to function as a governance tool at an aggregate level.

INTERNAL PRICING CAN BE DESIGNED IN DIFFERENT WAYS

There is no one correct design or level for internal pricing. Rather, it depends on what the firm wants to achieve. The following three methods are most common among firms that currently use internal pricing. Firms can also use a combination of the methods.

A firm can charge an **internal levy** for carbon emissions, i.e. an internal price for each carbon unit it releases and that deviates from the market price. When internal pricing is used in this way, it can strengthen the firm's ability to steer resources in its business, for example in conjunction with new investments, as if the market price was more in line with the social cost. Internal pricing then works as a controlling tax, a so-called Pigovian tax. There are also examples of firms using the internal provisions resulting from internal pricing to pay for carbon-reducing measures that mitigate the firm's impact on the climate.

A firm can use a **shadow price** for carbon emissions in its long-term business planning and investment strategy. The shadow price is a theoretical cost that the firm does not charge but that can be used as part of its decision basis for new investments. A shadow price can help firms identify which investments will continue to be profitable and which will become unprofitable if the cost of emissions rises. The firm can also use different shadow prices to evaluate how sensitive profitability in an investment is to higher prices on emissions.

A firm can calculate an **implicit price** on its carbon emissions based on its costs for meeting existing climate requirements, for example requirements on improved energy efficiency. This enables the firm to identify its actual costs for emissions and whether measures to reduce emissions could lower these costs. Some firms use an implicit price as a first step before introducing internal pricing.

There are also challenges that firms using, or considering to use, internal pricing need to manage. Given the substantial uncertainty about how the market price will develop, a key question is which price should be used. Prices can also develop differently in different countries and regions. Firms may thus need to work with several different internal prices for different parts of their operations. It could also be a good idea to create scenarios where the price of emissions changes over time, rather than assuming a single, higher level.

Firms may also need to analyse the effects different scenarios will have on prices. When internal pricing is used in this way, it is not a question of a single internal price but rather of a price interval. This can create a complexity that can be difficult to communicate, both internally and externally. However, by calculating the effect of several price levels, the firm can also better understand how it is impacted in scenarios where the price increases at different rates. This can help the firm identify the measures that create conditions for managing the uncertainty of the future price level.¹⁹

Firms will also need to determine the scope of the operations to which the internal price will be applied. Some emissions are easy to calculate, such as emissions from fuel consumption or own

¹⁹ I4CE and EpE (2016).

production, particularly when they are already subject to policy measures such as taxes or emissions trading systems. Other emissions, however, can be more difficult to measure, for example when it comes to input goods or in-house production indirectly contributing to other participants emitting more.

Transparency on internal pricing is of use to financial firms

In order for financial firms to be able to live up to demanding standards on transparency of climate risks in their exposures, they need to have reliable and relevant information about the businesses they are financing. A firm that openly reports information about how it uses internal prices on carbon, can help financial firms and other stakeholders to better understand if the firm is taking a long-term approach as it adapts its business and thus has the ability to manage the transition. In other words, it increases the possibility for financial firms and other stakeholders to identify, in a forward-looking perspective, the financial impact of the transition on different businesses. This, in turn, helps them better integrate transition risks into their risk management. It can also increase their possibilities for contributing through their investment decisions to the transition of the industry.²⁰

There are currently no requirements on firms to use or disclose information about their internal price on carbon. However, the TCFD advocates this, and it impacts the ongoing development of reporting requirements and standards at the global, regional and national levels.

There are firms that are voluntarily applying internal pricing and, in some cases, also reporting it. In 2019, 699 firms reported to CDP that they use internal pricing, an increase of 15 per cent compared to two years earlier. In addition, 915 firms reported that they intend to introduce an internal price in the next two years.

Of the firms reporting information about their internal pricing, some choose to only report the price they use in internal calculations without describing in detail how they use the tool. Other firms go further and also report that way in which they are using internal pricing in their internal decisions processes and how this impacts the future direction of the business.

The fact that the tool can be used for different purposes and in different ways means that firms' information is not necessarily directly comparable. In addition, it can be difficult for external parties to, based on the information the firm provides, understand how the firms are using internal pricing and how it influences their behaviour. If internal pricing has a limited real impact on the firm's business decisions, the information loses its intended effect and instead risks making businesses with a poor environmental profile look better than what they are, so-called greenwashing.²¹ Investors therefore may need

²⁰ For a more detailed discussion on the reporting of sustainability-related information, see Finansinspektionen (2021) and Strömsten (2020).

²¹ In 2019 the oil company Exxon was sued in the USA for having misled investors by disclosing an internal price that was higher than the price the company actually used in its long-term planning. Ultimately, Exxon was cleared of the charges, but the case shows that

to have an active dialogue with the firm about how it uses internal pricing and the actual changes in the businesses it contributes to.

Some firms also take the position that it could impact their competitive advantage if they openly report the internal price that they use. There is also a concern that external parties will interpret the information as truth, and that investors can punish a firm if it turns out in the future that the firm had set its price incorrectly.

But, in any case, firms can disclose that they are working with internal pricing as a tool and provide some information about how they are using the tool. For example, firms could disclose information in the sustainability report that many firms are already obligated to publish, and that many other firms choose to publish voluntarily.

there can be consequences for firms that abuse the reporting of internal prices, either legal or in terms of reputational risk.

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Appendix 1. Recommendations on disclosures of internal carbon pricing

TASK FORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURE (TCFD)

TCFD was appointed by the Financial Stability Board (FSB) and tasked with developing a framework for how companies can report climate-related financial risks and opportunities. TCFD recommends that companies, where relevant, report the following:

- the internal carbon price they use
- metrics related to climate-related opportunities, for example revenues from products and services that have been adapted to a society with lower emissions.

TCFD has not issued a recommendation on the particular level of the internal price that a company should use.

The TCFD status report from June 2019 includes examples of information on internal pricing reported by several firms.

THE EUROPEAN COMMISSION

In 2018, the European Commission published a supplement to its previous non-binding guidelines on how a company can report the information required in the Non-Financial Reporting Directive (NFRD)²². The objective of the recommendations is to contribute to greater comparability in the information companies disclose.

In the guidelines, the European Commission specifies that investors and other stakeholders need to receive information about how a company identifies climate-related risks, the principal risks that the company has identified, and how the company manages these risks. The Commission furthermore specifies that companies can “disclose how scenarios and/or internal carbon pricing are used for risk management actions”.

The European Commission has not issued a recommendation on the level of internal price a company should use.

CDP

CDP (previously Carbon Disclosure Project) is an international not-for-profit charity that promoting that investors, companies, and cities, by measuring and understanding their environmental impact (on the climate, water and forest), should implement measures that contribute to sustainable development. CDP supports companies and cities in their work to report their environmental impact and gathers information in a global reporting system. More than 8,400 firms and 800 cities report information through CDP.

Since 2013, CDP has requested that companies provide information on the internal price on carbon that they use. Since firms can use

²² Directive 2014/95/EU.

internal pricing in different ways, CDP also requests information on how companies use the metric.

CDP has not issued a recommendation on the level of internal price a company should use.

UN GLOBAL COMPACT

UN Global Compact was founded in 1999 in conjunction with the World Economic Forum at the request of the secretary general of the UN at that time, Kofi Annan. The objective was to develop a number of international principles on sustainability for companies to adhere to. Ten principles were developed relating to human rights, labour law, the environment and corruption. Companies are encouraged to use an internal price of at least USD 100 per tonne of carbon. In other words, companies are encouraged not only to report which internal price they use but also if the price exceeds a certain level. This recommendation is therefore stricter than the recommendations of the organisations mentioned above.