

# Swiss Finance Institute Roundups

## Finance and the Green Transition

### Editorial



The transition to a green economy is no longer merely a political slogan. It is now a top priority for the private sector, which not only contributes to the transition, but also is being transformed by it. The financial sector is no exception. New opportunities arise to meet investors' new demands. But new risks also lie ahead: Some are due to the physical changes the planet is undergoing, some to regulation, and some to the transition itself. This SFI Roundup takes stock of the latest thinking on finance and the green transition. Experts from industry and academia discuss such key topics as: the interplay of government policies and private sector incentives, the role of the central banks, and the challenges and opportunities facing banks and asset managers in the green transition.

We wish you an enjoyable read.

A handwritten signature in blue ink, appearing to read 'F. Degeorge', with a horizontal line underneath.

**Prof. François Degeorge**

Managing Director

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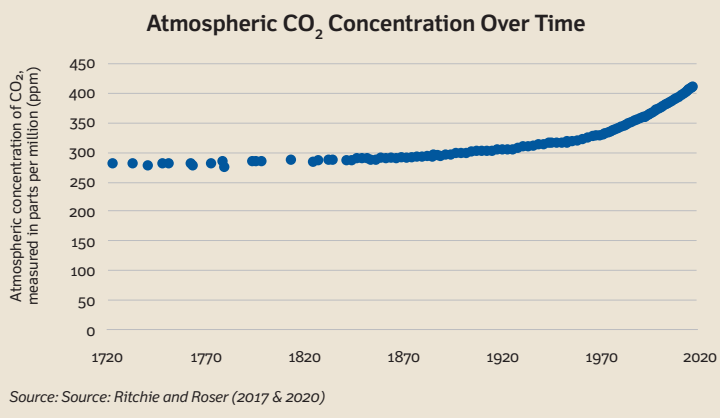
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# Facts and Figures

**The concentration of CO<sub>2</sub> and other Greenhouse Gases (GHG) in the atmosphere has steadily increased since the Industrial Revolution. How are these emissions measured at the firm level?**



**P. Krüger:** CO<sub>2</sub>/GHG emissions at the firm level are typically measured using a three-scope system. Scope 1 emissions are the direct operational emissions a firm is responsible for. Scope 2 emissions cover the emissions for which a firm is indirectly responsible, through its energy consumption. Scope 3 emissions include all the indirect emissions which occur, both upstream and downstream, in a firm's value chain. Currently, the focus is mainly on Scope 1 and 2, as firms have the most accurate data on these emissions and have the greatest ability to influence them. When it comes to Scope 3, quantifying emissions that occur downstream through product use is particularly challenging.

**C. Bolli:** To make investment decisions, Scope 1 and 2 are primarily used, when comparing firms with respect to their CO<sub>2</sub>/GHG emissions, due to the availability of data. Scope 3 emissions are closely monitored; but, as has been pointed out, the data are currently too inconsistent and too scattered to be used in investment decision-making. This will likely change in the near future, as firms are under increased pressure regarding their overall environmental impact.

**How do CO<sub>2</sub> emissions relate to other GHG emissions?**

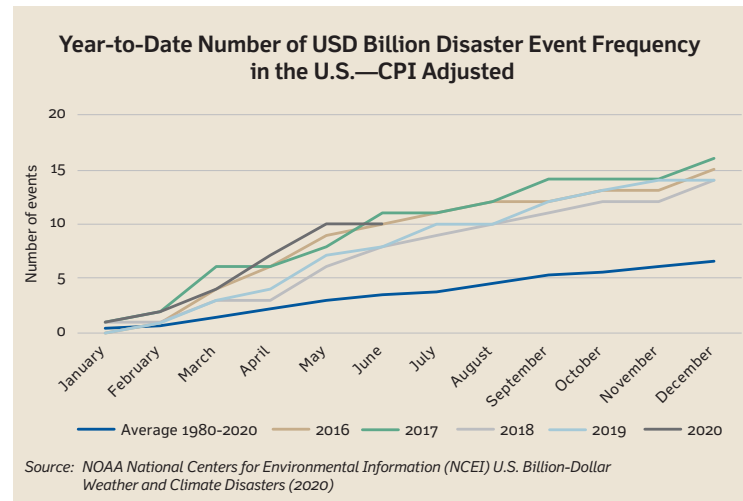
**P. Krüger:** Several different Greenhouse Gases exist, such as nitrous oxide, methane, and of course CO<sub>2</sub>. To ensure comparability between these diverse emissions, a conversion system has been developed which uses a ton of CO<sub>2</sub> as the baseline unit. This unit of measurement is the CO<sub>2</sub> equivalent. The CO<sub>2</sub>

equivalent takes into consideration the different global warming potentials of the various gases. Currently, for example, one ton of nitrous oxide is equivalent to more than 200 tons of CO<sub>2</sub>.

**Who are the world's biggest CO<sub>2</sub>/GHG emitters?**

**P. Krüger:** That depends, of course, on the scope used, but the biggest emitters are probably the energy supermajors, such as Saudi Aramco, Gazprom, or ExxonMobil. You could argue that the banking and finance sector has a high level of Scope 3 emissions, due to the financing it provides to firms in general. After all, every firm relies on services from the banking and finance sector. Obviously, estimating such Scope 3 emissions is complex and relies on assumptions, as well as on diverse modeling techniques which still need to be refined.

**The increase in the number of natural disasters is evident and exploding. What are the latest estimates of the cost of climate change and global warming on economic activity?**

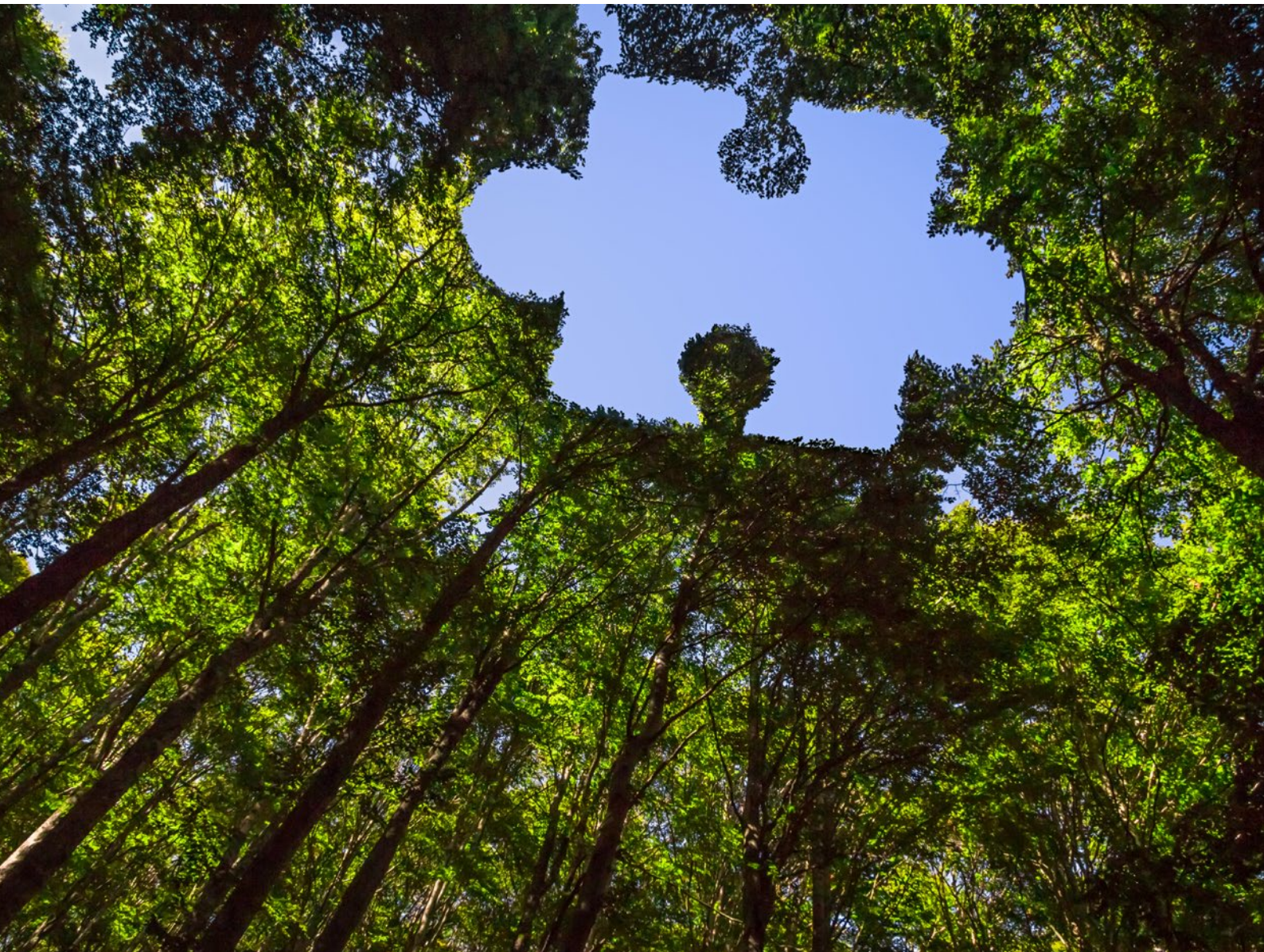


**J.-C. Rochet:** The figures given by economists regarding the cost of climate change represent only the tip of the iceberg. In my view, the key problem here is that there is actually no space for a conventional cost-benefit debate, as climate change issues must be tackled, the economy must be decarbonized, and the targets set by the scientific community must be met. Our focus, therefore, needs to be on how to do this in the most efficient manner, while explicitly accounting for environmental and human factors, not solely economic ones.



▶ **S. Ongena:** Estimates are always useful, but the current Covid-19 crisis reminds us that large shocks are complex and their full impact is difficult to forecast. In the case of global warming, there are very large areas of uncertainty, as well as potential stark nonlinearities in the way climate may change. It is obvious that the cost and impact of climate change will be severe. Unfortunately, the modeling techniques and data we have today may not be capable of providing comprehensive and robust predictions regarding the indirect and often unexpected consequences of climate change.

▶ **C. Bolli:** Within the insurance industry, physical risks are extremely relevant. For example, the severity of floods and tropical storms will indisputably increase in the future, and quantifying the impact and location of these risks is already possible, based on existing data. From an insurer's perspective, diversification across risks, as well as across geographic locations, is key to remaining competitive. It may be that within the next decades certain risks will become unaffordable to cover and, as a consequence, not insurable anymore or only insurable through public-private partnerships.





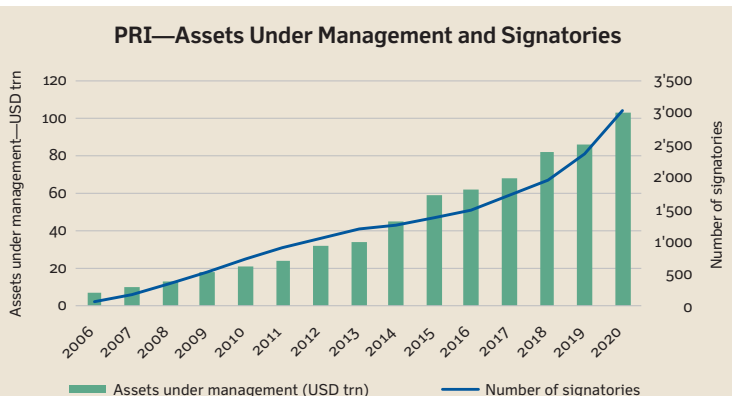
# The Climate Puzzle

## The jargon in the field of sustainability is vast. What do environmental, social, and corporate governance (ESG) metrics quantify?

**P. Krüger:** There is indeed a lot of terminology involved in the field of green finance, including a series of loosely related concepts. ESG has become an umbrella term in the financial industry. From a historical perspective, ESG metrics try to quantify the quality of a firm's environmental, social, and governance policies. They focus on processes and on the operations of the firm. The origin of ESG can be traced back to 2004, when Kofi Annan sent a letter to the world's leading financial institutions asking them to better integrate ESG issues into their financial management and investments. The trend in establishing a firm's ESG profile is now much more on quantifying the environmental and social impact of the firm's products and services. It is thus somewhat like the downstream part of Scope 3, discussed in the context of GHG emissions above.

## What about the Principles of Responsible Investment (PRI)?

**C. Bolli:** PRI is a voluntary investor initiative launched in 2006—the largest ever formed, with more than 3'000 signatories representing over USD 100 trillion in assets. It focuses on putting six different investment principles into practice. PRI signatories are required to report annually on their responsible approach and investments and can be removed from the overall initiative if they fail to keep their promises. There are some discussions around the cumbersome aspects of the reporting process. Such a process, however, is beneficial for reviewing one's commitments and progress. PRI has been decisive in providing comparable and transparent company reporting related to responsible investing in a world which lacks global standards. The network dimension of PRI is also very beneficial.



Source: Principles for Responsible Investing (2020)

**S. Döbeli:** PRI has been instrumental in growing sustainable investments and in helping to shift the debate to a professional level. The feedback firms obtain regarding the positioning of their peers provides a clear incentive for an industry to move forward as a whole. PRI is increasingly a must-have for asset managers, as the principles help convey the values of the green transition across the planet.

## And what about the Sustainable Development Goals (SDG)?

**P. Krüger:** SDG is a collection of 17 very broad goals that identify the major environmental and social challenges the world is facing. These goals were set in 2015 by the United Nations and adopted by the UN General Assembly in 2017. SDG has sparked a lot of interest in the finance sector recently. The broadness of the goals, on the one hand, makes them a free-for-all classification for financial investors, while, on the other hand, highlighting the ongoing challenges society faces. I think SDG is an interesting framework to think about when designing sustainable financial products.

**S. Döbeli:** Through the SDG initiative, the international community reached a global agreement for the first time on what sustainability means. ESG, PRI, and SDG all operate at different levels and complement one another. In a nutshell, ESG focuses on the operational functioning of an industry, PRI focuses on the role of the financial industry, and SDG provides a broad strategic framework on a country-wide level.

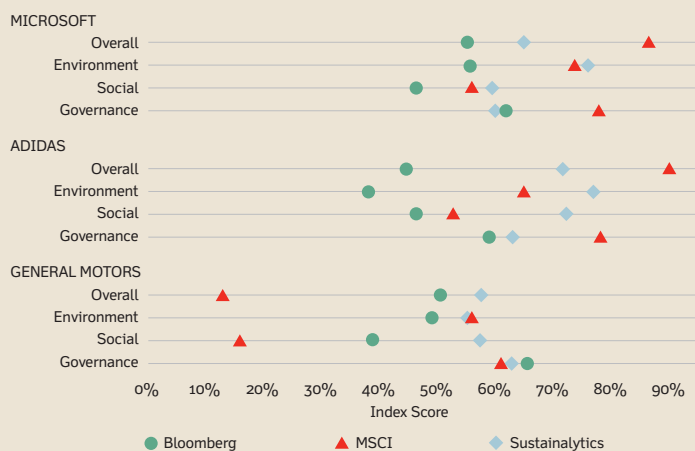
## Such measures, in particular the ESG metrics, tend to be highly heterogenous among data providers. Why is this?

**P. Krüger:** It is true that ESG metrics from different data providers can disagree strongly. Generally, the users of these data fall into two camps. The first camp believes disagreement is not a big issue, since ESG metrics are more like *opinions*, and it is always good to have a diversity of opinions. Obviously, traditional financial analysts also issue different buy, hold, and sell recommendations and have different opinions of the same stock; such disagreements have never been seen as being problematic. The other camp argues that, if capital is now increasingly being allocated according to ESG metrics, there needs to be some form of convergence of opinion. Recent research offers some explanation as to why ESG metrics from different data providers disagree: The problem is mainly due to measurement and scope divergence. Measurement divergence occurs when different data providers measure the same attribute using different indicators, while scope divergence occurs when the type and number of attributes used to generate a metric differ among data providers. Divergence is thus

related to the methodologies that different data providers use, making it more important, I think, to have more transparency concerning these methodologies. Once the methodologies are known, it will be up to investors to determine which data provider uses the approach that best matches their goals and visions.

**More and more firms and services, as well as consumer and financial products, are being labeled "green." Is there a risk of generalized "greenwashing"?**

### Heterogeneity of ESG Ratings



Source: Bloomberg, MSCI, and Sustainalytics (2013 to 2017)

**P. Krüger:** Clearly, there is a trend: Virtually all financial institutions are jumping on the green bandwagon. My research finds that 50% of global equities are now owned by PRI signatories, implying that green or sustainable finance is not niche anymore. Obviously, there is greenwashing among some of these investors, but the results don't suggest it is generalized. Some financial institutions "walk the talk," and others do less. It is important to increase the transparency around the actions these institutions are taking to promote the green transition. PRI plays an important role here, by having signatories report on their efforts to implement ESG, but regulatory action would probably be useful as well. France, for instance, has introduced Article 173, which requires investors to disclose how they factor ESG criteria into their decision-making. I think imposing such transparency laws is useful in fighting greenwashing.

**A. F. Wagner:** Considering the incentives for a firm to be perceived as green, we indeed do need to worry about greenwashing. There are two ways a firm can obtain a green label: by actually fulfilling the requirements, or by pretending to fulfill them. Green labels, like those in the food industry, do not necessarily mean the products and services are better. Measuring GHG emissions is difficult, as we've discussed above, opening the possibility for deceptive reporting. The annual rating of Swiss company reports conducted at the University of Zurich reveals that many Swiss firms promote their sustainable agendas in colorful reports with positive images, but fail to provide explicit data on their current GHG emissions or to detail their long term strategies.

**S. Döbeli:** Greenwashing has become a widespread allegation in political discussions and in the media. The EU is trying to address this topic by providing a taxonomy of what is and isn't green. But this approach doesn't solve the problem for sustainable investing. In my view, there should be shades of green, which would distinguish products and services that invest in green solutions from those that contribute to sustainable change in all sectors. For consumers to be able to make well-informed and intelligent choices, it is key to provide more information on different types of products.

**C. Bolli:** Greenwashing may be evident throughout the general economy, but the bond market clearly stands out as an exception here. Frameworks such as the International Capital Market Association's Green Bond Principles set requirements in terms of standards of transparency, disclosure, and reporting. From an investor's perspective, we use such standards to review our green bond portfolio on a yearly basis and to remove those investments that no longer meet the initially fixed criteria.

**A ton of CO<sub>2</sub> is currently priced at around EUR 25 on the EU Emissions Trading System which, as the largest cap-and-trade market for GHG, covers around 45% of the EU's emissions. What does this price reflect?**

▶ **J.-C. Rochet:** The price of a ton of CO<sub>2</sub> ultimately depends on the number of permits allocated each year. Your question therefore comes down to knowing if the number of permits issued is appropriate. My feeling is that this number is too lenient and that decision makers should follow the recommendations of the

scientific community more closely. The background challenge here is that we're not simply facing the usual tragedy-of-the-commons problem, similar to the prisoner's dilemma, where the international community needs to tackle the problem jointly. We're also facing a tragedy-of-horizons problem—where future generations are not represented in the decision-making process regarding climate change. I firmly believe that the solution is to educate citizens to care more about the future of the environment and to let them express their change in preferences to firms and policy makers alike.



# Governments, Regulators, and Central Banks

**Eleven of the world's 15 largest CO<sub>2</sub>/GHG Scope 3 emitters, responsible for more than a third of global CO<sub>2</sub>/GHG emissions, are owned by governments. What does this tell us about governmental responsibility, and does a suitable transition plan exist?**

▶ **J.-C. Rochet:** The issue here is delicate. One solution could be that such state-owned companies become publicly listed. Public companies tend, in general, to have better governance structures than state-owned companies, because international NGOs and shareholder activism can better curb the behavior of companies that are publicly listed.

▶ **A. F. Wagner:** Among the key hopes here are technological advances. The governments of such countries need to be proactive and to invest in clean energy R&D, using their past and current revenues. By doing so, they can diversify their future sources of revenue and serve their best own interests—as well as the planet's.

**How do governments influence corporate behavior regarding carbon emissions?**

▶ **S. Döbeli:** Governments have a broad set of tools available here. First, laws and regulations provide clear guidance on what can and cannot be done. Second, carbon pricing within the cap-and-trade system can incentivize firms to gradually adopt more appropriate strategies. Third, agreements can be made with different sectors, such as was done in Switzerland with the Energy Agency of the Swiss Private Sector, which helps companies achieve CO<sub>2</sub> reductions.

▶ **P. Krüger:** The majority of governments have been targeting emissions directly, using some sort of command-and-control-type regulation, such as carbon taxes or cap-and-trade. In my opinion, there is an underused policy lever that could be beneficial: requiring firms to increase transparency with respect to their GHG emissions. In other words, governments could mandate that firms disclose their emissions in the financial reports they submit to their regulators. My recent research analyzing the introduction of such a transparency-oriented disclosure regulation in the U.K. shows that firms reduced their GHG emissions as a result of mandatory reporting requirements. Such regulations would also be highly beneficial for institutional investors, who increasingly require carbon data for their GHG decision-making.

**What examples are there of governmental interventions to limit CO<sub>2</sub>/GHG emissions in Switzerland?**

▶ **S. Döbeli:** In 1990, the Swiss government committed to reducing Switzerland's CO<sub>2</sub>/GHG emissions by 20% before 2020. Data from 2018 show a 33% decrease in emissions from the heating of buildings since then, demonstrating that the gradual increase in heating oil taxes worked well. The same data show no reductions whatsoever in the transportation sector, as the policy structure included too many exceptions. This shows that well-calibrated laws can be effective, while approaches with many loopholes will fail.

**Is the Covid-19 crisis the best chance we have to make the world greener?**

▶ **S. Ongena:** We're clearly experiencing a "fluid" moment. The situation we faced earlier this year was complex, and time was limited, but I believe it would have been more efficient for policy makers to distribute money along with a set of regulations on how to spend and invest it, instead of distributing the money first and coming up with the regulations later.

▶ **S. Döbeli:** Every crisis has a disruptive element, which forces us to rethink our processes. Hopefully, today's situation will push us to act rapidly regarding climate change. That said, the Covid-19 crisis calls for budget restrictions in many sectors, which will, at least in some countries, slow down the green agenda.

**How do central banks behave with respect to the green transition? And how should they behave?**

▶ **J.-C. Rochet:** In the case of Switzerland, imposing a political agenda on the Swiss National Bank, whose core mission is to ensure price stability, may open a Pandora's box regarding what is green and sustainable and what isn't. The case of the Eurozone is considerably different from the Swiss one, as the European Central Bank (ECB) is not only responsible for keeping prices stable, but also for supervising the robustness of the European banking system. The ECB could therefore, in its supervisory role, steer financial players away from carbon-intensive investments by adjusting the risk weights to reflect the actual threat that climate-related physical risks, as well as political risks, represent.



► **S. Döbeli:** This is a difficult question, as central banks are clearly very large financial players. It would be awkward if they didn't play an important role in the overall transition, while, at the same time, they have very different mandates. I believe the specificities of their roles depend on the mission of each bank. Nonetheless, through their "Network on Greening the Financial System (NGFS)," the central banks are cooperating in developing an approach to addressing climate change. They are also developing tools to support governmental actions during the green transition.

► **P. Krüger:** This is a great question, and one that is currently under-researched. We do not have a good theoretical understanding of whether and how a central bank should support

the green transition. Obviously, the banks' different mandates might restrain their possible actions, but clearly some central banks are exploring their options. Looking east might give us some clues: For instance, the People's Bank of China (PBOC) accepts green bonds as collateral in liquidity operations. The PBOC is also experimenting with requiring lower regulatory capital for banks with environmentally cleaner loan books. I think much more effort is needed in these areas. A lot of green or sustainable finance now focuses—and has focused in the past—on secondary markets, mainly on equities and traded bonds, but the real impact of a financial institution is through its lending activities, which are highly dependent on the actions of the central banks.



# Corporations

## How do sustainability metrics impact stock returns?

▶ **P. Krüger:** While the literature documents a positive correlation between ESG metrics and financial performance, little is known about the exact mechanisms through which this relationship arises. In a recent paper, I find that some of the recent outperformance is due to investors' increasing interest in sustainable investing, which puts positive price pressure on stocks with good ESG scores. However, these findings also imply that firms with high ESG scores might be overvalued and will earn lower returns in the future. In another paper, I find that more-sustainable firms, and firms operating in more-sustainable sectors, typically pay between 10% and 20% lower wages, which could also give rise to a positive correlation between sustainability and firm performance. This "Sustainability Wage Gap" is more pronounced for high-skilled workers and is increasing over time. The sustainability wage gap suggests that environmentally responsible firms can get a better deal when it comes to hiring the most-skilled workers, thus generating financial outperformance.

## Firms can choose to offset their emissions. How well do these offsetting schemes cover the damages caused?

▶ **S. Ongena:** Offsetting seems like an attractive alternative, but further research needs to be conducted on how such initiatives actually affect the environment. The moral component in the act of offsetting emissions is nonetheless very important, as it allows people to express their preferences. These, in turn, will hopefully push regulators to deal with negative environmental externalities in a more permanent and widespread manner.

▶ **C. Bolli:** If you have to choose between offsetting or doing nothing, then offsetting is obviously preferable. But avoiding causing environmental damage in the first place is clearly better than offsetting it.

## Could today's corporations and governments be held accountable for the damage caused by CO<sub>2</sub>/GHG emissions?

▶ **J.-C. Rochet:** Holding firms and governments accountable for local pollution—such as the damage caused by an industrial spill in a river—is possible, as it's easy to determine who caused the damage and to assess its extent. In the case of CO<sub>2</sub>/GHG emissions, it's far more complex, due to the sheer number of emitters, the fact that emissions move around freely, and that the damage they cause takes time to materialize. The combination of these factors means that our current legal and liability environment can't operate as we'd expect. The most efficient way out of today's carbon-intensive world is to educate people so that they steer their values and preferences toward a more sustainable world.

▶ **A. F. Wagner:** The classical way to solve a problem of negative externalities is to assign property rights, as these clarify who has to compensate whom. The cap-and-trade system does just that. Another aspect of market discipline is that society at large, as well as the financial markets, value responsible firms.

▶ **P. Krüger:** I think such accountability could happen in the future. It might also happen for lenders. The principle of environmental lender liability has existed in the U.S. since the 1980s: Under certain circumstances, creditors may be found liable for damages to the environment caused by their debtors. In the case of carbon emissions, an important prerequisite would be that emissions are measured and accounted for accurately. But once we have a track record on firms' emissions, we might be able to take action in the future. This represents a risk for lenders, especially considering that the political leaders of tomorrow are very serious about reducing the human impact on climate change.

### Would mandatory disclosures of corporate CO<sub>2</sub>/GHG emissions reduce those emissions and would such disclosures hurt the corporate world?

► **C. Bolli:** Corporate carbon disclosure is highly valued from an investor's point of view. We monitor the carbon footprints of our investments and analyze the underlying risks, and consider the results in our investment process. Although the climate reporting process is costly, in particular for small and medium-sized enterprises (SMEs), investors tend to view that no information is bad information.

### What is the best course of action for existing shareholders, regarding the green transition?

► **S. Döbeli:** Investors have a variety of strategies at hand, and these can also be combined. First, they can engage with a firm's management. If this strategy doesn't provide tangible results, they can divest from the firm that refrains from climate action and invest in one that is more active. Investors with similar views also need to consider pairing together, as no single investor alone has the ability to change the behavior of today's large corporations.

► **P. Krüger:** I think it is important that shareholders be "active owners." They should exert their shareholder rights and practice shareholder engagement to further sustainability issues in their portfolio firms. This is particularly important in today's stock markets, where an increasingly large amount of assets is managed passively. Often, the extent to which passive investors can divest from firms is limited, making their engagement even more important.





# Banks and the Financial Sector

## What is the financial sector's role in the green transition? Is it the main actor, or a simple messenger?

▶ **S. Döbeli:** The answer lies somewhere in the middle, as both banks and investors have roles to play and therefore need to pair up. The banking sector plays an important messenger role, particularly when it comes to informing investors of the carbon footprint of their investments. Investors need to make good use of the information that is available, but they also need to keep requesting more complete and more relevant information.

▶ **A. F. Wagner:** The financial sector is clearly an important player in the green transition process. I believe it can steer us in the right direction. But the decision to move forward still belongs to the real world—that is, every individual, including actual corporate decision-makers, must decide whether or not to "go green."

▶ **P. Krüger:** I think banks play a crucial role in the green transition. In my opinion, banks and the financial sector as a whole have focused too much of their attention on incorporating sustainability issues into secondary markets. I strongly believe that the real impact banks have, in terms of sustainability, is through their lending activities. After all, there is no economic activity without bank lending. It is time for banks to step up to their responsibility and facilitate the green transition through lending.

## Who is currently supporting carbon-intensive firms?

▶ **S. Ongena:** Recent research suggests that the cost of capital of some carbon-intensive firms has increased over recent years, pushing them out of the capital market and into the banks' loan market. These results mean that some large international banks are taking advantage of today's regulatory environment and are moving in swiftly to support the carbon industry, just as the bond market is starting to divest from it.

▶ **A. F. Wagner:** Banks need to be cautious about taking loans to carbon-intensive firms into their financing portfolios. Increasingly, equity investors also need to take into account the implicit risk they are taking on with carbon-intensive investments. But, as of now, there are still investors who are comfortable with the amount of risk and with the potential reward for that risk.

## How large of a problem is the carbon bubble?

▶ **S. Ongena:** Most of the large energy firms are already seeking sustainable solutions to diversify from the carbon-intensive part of their activity. These firms typically have deep pockets and have

historically relied on R&D to thrive, suggesting that they have the resources to shift their businesses toward greener ones. But reality shows that they also have a strong incentive to buy themselves time and to further exploit the oil, gas, and coal fields they invested large amounts of money to discover in the past.

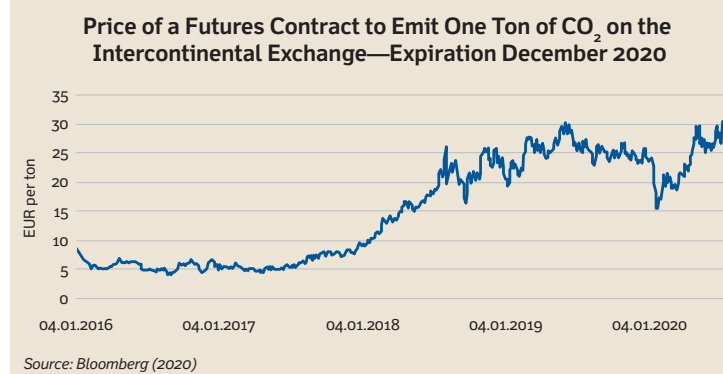
▶ **C. Bolli:** Bonds and firms have different durations. Carbon-intensive energy companies are very likely to be able to refund and renew their bonds within the next few years, but this doesn't mean that those same firms will be around in 50 years' time.

## How efficient would a solution based on appropriate carbon pricing and tradable emission permits be?

▶ **J.-C. Rochet:** This solution is clearly the backbone of the green transition. But to implement it, two main conditions must be fulfilled—that the number of permits is set correctly and that the entire international community operates with a single set of rules. I unfortunately don't see either condition being fulfilled in the short run.

▶ **S. Ongena:** My intuition is that the current number of permits doesn't adequately reflect what needs to be done to save the planet. This is reflected in the near-zero prices of these permits, as we've observed for many years in the recent past.

▶ **S. Döbeli:** The number of permits is clearly too high, and the current market price of a ton of CO<sub>2</sub> is not what it should be. But, interestingly, there has been a strong increase in the number of hedge funds and energy traders betting on higher carbon prices, based on their expectation of a tightening regulatory environment. Prices are not yet at EUR 100 per ton, as I believe they should be, but they have increased from less than EUR 10 per ton three years ago to about EUR 25 per ton in mid-September 2020.



**Is too much money chasing too few sustainable opportunities, and does this pose a risk?**

▶ **S. Ongena:** This is a delicate question, and the answer may also depend on which investment horizon we consider. Commercial banks typically have an investment horizon of a few years and review their portfolio strategies every so often. Investment banks tend to hold considerably more long-term investments, which come with increased risk in terms of both duration and illiquidity. Banks and investors need to be aware of this.

▶ **C. Bolli:** Empirical research suggests that firms with higher ESG ratings tend to provide higher risk-adjusted returns, in particular during times of market volatility, so it's up to the financial players to decide whether they believe in the benefits ESG investing can provide or not. Our investment portfolio confirms these results, as we've publicly stated.





# Consumers, Retail Investors, and Pension Funds

## How can retail investors navigate the sustainable investment landscape?

▶ **S. Döbeli:** I believe retail investors need to determine their values and set their objectives, confront different banks with them, and partner with the bank that is the most knowledgeable and convincing. Unfortunately, there is no easy way for retail investors to compare different products and to check if they match their needs.

## How do pension funds perceive climate risk? How do they address it?

▶ **A. F. Wagner:** They are increasingly aware of it. But it is interesting to see where institutional investors' focus lies when a crisis occurs. Recent research reveals that during the Covid-19 crisis, institutional investors actively moved into high-cash and low-leverage stocks, and increased the value of their holdings in these stocks, even beyond what would have happened simply because their share prices went up. By contrast, institutional investors passively accepted the increase in value of ESG stocks, but did not pile additional funds into them. These findings suggest that when a tail risk realizes, institutional investors prefer "hard" measures of a firm's resilience.

▶ **S. Döbeli:** Pension funds are becoming increasingly aware of the risks that surround climate change. Large players, in Switzerland and internationally, are addressing this risk with the appropriate tools. But for smaller players, it is much more difficult to take such factors into account and to identify a pragmatic, yet effective, approach. Exclusion-based approaches are frequently used.

▶ **P. Krüger:** Climate risks are relatively novel for investors. Typically, we distinguish between physical, regulatory, and technological climate risks. My research shows that institutional investors regard the regulatory and technological risks as more financially material than the physical risks. This might be because regulatory and technological risks are more tangible and easier to quantify, and there is less uncertainty about when they are going to materialize. When it comes to climate risk management, there is no real state-of-the-art technique yet. In further research, I asked a large sample of institutional investors how they managed climate risks and found that they currently took many different approaches. The most common was to analyze the carbon footprints of portfolio firms, even though carbon data is still lacking in terms of quantity and quality. Interestingly, I also found that fewer investors use divestment to manage climate risks; collectively, investors prefer to engage with portfolio firms on climate risk issues.

## How can we measure the sustainability of pension funds?

▶ **S. Döbeli:** The sole global benchmark in sustainable investing is PRI; we're still in need of a global metric to measure the sustainable footprint of pension funds, institutional investors, asset managers, and asset owners. That said, progress is being made: Swiss Sustainable Finance (SSF) is working on ways for asset managers and asset owners to align their reporting on the sustainability of their portfolios in a fair and pragmatic manner. In the same vein, the CFA Institute recently published a consultation paper on setting global standards for ESG investment products.

## Is it possible to invest in carbon-intensive industries while supporting the green transition?

▶ **C. Bolli:** Yes, it is. This is not a black-and-white situation with a marked breaking point. Almost all firms are open to discussing their future business strategies and their potential environmental improvements with their investors—what is known as engagement—and many firms are willing to implement changes. Collaborating with investee companies can be a successful way to trigger the green transition at the corporate level. Companies in carbon-intensive sectors are part of the solution and, therefore, at the core of the transition to a low carbon economy. Divesting should be considered a last resort—when the risk is no longer bearable from an investment perspective.

## Are decisions at the household level more effective than those at the financial market level?

▶ **S. Ongena:** Environmentally supportive initiatives at the household level are the key to the transition process, whether in terms of consumption or investment decisions, as they reveal the preferences of the population. Knowing which is more effective depends on numerous factors specific to each and every type of decision.

## How can decisions at the consumer level trigger changes?

▶ **J.-C. Rochet:** Citizens are central to the overall green transition, and they need to claim back their share of power and influence from both governments and firms. To achieve this, citizens need to rely on the advice of truly independent experts. They must understand that they can support this vital initiative not only via financial investment channels, but also via political involvement, activism, and consumer decisions.



► **S. Ongena:** Having openly available information of high quality is crucial, as it allows consumers to make the appropriate decisions—both in terms of consumption and their investments, primarily through their pension funds—with respect to what is environmentally sustainable. Policy makers need to respond actively and to ensure that the appropriate laws are written.

#### Does the limited number of investment opportunities in green firms pose a risk of financial herding to investors?

► **S. Ongena:** From a theoretical perspective, yes, as restricting the spectrum of firms you can invest in mechanically increases risk. But from a pragmatic perspective, all firms need to adapt rapidly to survive. Therefore, uniquely engaging with firms for environmental reasons may make sense only in the short run.

► **A. F. Wagner:** My recent research reveals that funds awarded the Low Carbon Designation by Morningstar, a fund information provider, are somewhat riskier, but this is a consequence of the way the label is designed. As it does not reward the best performers in each industry, but effectively rewards the exclusion of particular industries. Such funds will be better prepared for upcoming regulatory moves, which will weaken carbon-intensive stocks and portfolios, but in the meantime they offer more limited diversification to investors.

#### Do investors care about carbon information? How do they respond to it?

► **A. F. Wagner:** Retail investors in mutual funds typically don't look into the specifics of the firms within the funds they hold, but, interestingly, they do react when information about the overall sustainability performance of a fund is put in front of them. In particular, research shows that large quantities of investments flow toward those mutual funds awarded the "Globes" of Morningstar or their Low Carbon Designation. This result has interesting implications for the mutual fund industry, which is increasingly under cost pressure from exchange traded funds (ETFs), as it means that being a climate-responsible fund provider provides a competitive advantage. Thus, active investment strategies experience a second life.

► **S. Döbeli:** In the case of Switzerland, the Federal Office for the Environment has set up PACTA—the Paris Agreement Capital Transition Assessment. This tool provides carbon information to investors, helping them adopt a forward-looking approach on climate change by determining how their financial portfolios align with the Paris Agreement. The initiative has been a success, as many asset owners have used PACTA to screen their portfolios. Yet the tool itself is a bit of a black box, providing only limited information on how a given portfolio could be improved. Hopefully this aspect will be tackled in the near future.

► **P. Krüger:** In a recent paper, I study the stock market's reaction to the introduction of mandatory, standardized, and prescriptive carbon-emission disclosure regulations for all firms listed on the London Stock Exchange. I find that stock prices decline for firms that disclose emissions exceeding the level of their industry peers, and rise for firms disclosing emissions below their peers'. I also find that institutional investors divest from firms with high emissions. These results show that stock investors increasingly do care about carbon information.

## Swiss Finance Institute

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