The sustainable finance market: a stocktake

Sustainability has become a key issue and an important investment criterion on the financial markets. Supervisory reporting data from within the European System of Central Banks bear testament to the market growth in Europe, particularly in the area of green bonds. The data permit an in-depth analysis of the holder structure of green bonds, which indicates that long-term investors, in particular, such as pension funds show a preference for green bonds over conventional bonds.

There is a huge need for investment in sustainable projects, but given the lack of generally accepted definitions of "green" and "sustainable" and insufficient transparency about their use, it is unclear how the strong market growth observed in the recent past will continue to develop.

It is down to policymakers to set the course for the appropriate and efficient integration of sustainability criteria on the financial market. Uniform, reliable metrics make it easier to factor long-term risks relating to climate change and sustainability into investment decisions. The European Commission, in particular, is currently working towards introducing a common classification system for sustainable activities, i.e. a taxonomy, which will facilitate the reliable and transparent classification of financial products and strengthen trust in sustainable assets.

Improving the general framework for sustainable investment will provide guidance and help what began as a niche development driven partly by marketing to evolve into a mainstream product. The key task now is to create transparency, which is a prerequisite for pricing that is commensurate with inherent risk – and thus to strengthen the allocative efficiency of the capital market.

The growing importance of sustainable investments

Sustainability an important issue on the financial market

Over the past few years, financing instruments geared towards sustainability objectives have gained in importance on the financial markets, and the financial industry has expanded its expertise in this area. On the one hand, corporate finance and project finance aim at reducing current greenhouse gas emissions, while on the other hand serving as a way of investing in innovative, low-carbon technologies. The market segment was given a particular boost by the Paris Agreement in 2015. One of the aims set by the international community was "making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development".[1] In view of this, too, sustainability as an investment objective emerged as a key issue on the financial markets. At the same time, however, the question arose as to how financial market participants can channel investment into projects that are aligned with the aims of sustainable economic growth and mitigating (the impact of) climate change. Even though there is still no final answer to this question, the volume of sustainable investment has nonetheless grown strongly since then.

Increasing alignment of focus on values and generating value

The greater importance of sustainability on the financial market is also due to the fact that investors these days consider not just the return, conventional risks and liquidity when investing funds, but increasingly also factor in the risks associated with a lack of consideration for sustainability factors. With risk optimisation changing in line with this, the result is that a growing group of investors find that investments with a – purely financially motivated – focus on generating value increasingly align with investments with a values-based incorporation of sustainability objectives.

Huge need for investment in both public …

The aforementioned risks go hand in hand with opportunities for investors, however. From a medium to longer-term perspective, market participants consider the investment opportunities to be substantial. This is consistent with calculations of the investment volume required to achieve global development and climate objectives. In order to bring global economic growth into line with the Sustainable Development Goals[2] and the Paris Agreement, the OECD, the World Bank and the United Nations Environment Programme estimate that infrastructure investment alone would have to come to US$6.9 trillion a year up to 2030.[3] At present, it is not known what share of this will be taken on by private players on the financial market, having weighed up the opportunities and risks. Long-term planning certainty is likely to be one of the main prerequisites for a persistently high level of private capital provision.

… and private sector

Besides infrastructure investment, further growth in the market for sustainable finance is likely to be contingent on the extent to which enterprises perceive economic opportunities in revamping established product ranges in a sustainable way, making more sparing use of natural resources and reducing environmentally harmful emissions. German industry estimates that this kind of reorientation, which is likely to encompass not just new products but also new or radically altered production processes and supply chains, will require extensive investment.[4]

Significant market growth as a result

Financial market participants have responded to the huge need for investment in sustainable projects and are placing more and more emphasis on sustainability factors in their investment decisions. On the one hand, this is illustrated by increasing volumes of green bonds

1 See United Nations (2015), Article 2(1) letter (c).
2 The Sustainable Development Goals (SDGs) of the United Nations aim to reconcile economic growth with finite resources, environmental limits and social equity.
3 See OECD/World Bank/UN Environment Programme (2018), p. 15.
4 A study commissioned by the Federation of German Industry (*Bundesverband der Deutschen Industrie* – BDI) puts the amount of additional investment needed in German industry, depending on the chosen CO_2 reduction goal, at between €120 billion and €230 billion by 2050. In total, the additional investment needed in Germany up to 2050 is estimated at €1.5 trillion to €2.3 trillion (see The Boston Consulting Group/Prognos (2018)).

and sustainable investments, and on the other, by the growing number of investors signing up to the UN Principles for Responsible Investment (UN PRI; see the adjacent box) and thereby committing to considering sustainability factors (see the chart on p. 16).

But lack of definition poses challenges

The concepts of sustainability and sustainable investment have not been clearly defined, however, and are therefore open to interpretation by investors and issuers alike. Although the EU is endeavouring to specify uniform requirements with its taxonomy – a classification system for sustainable economic activities – there is, at present, no framework at the global, European or national level which would allow sustainable investment of capital to be uniformly and clearly categorised and hence quantified. But reliable metrics are vital to enabling financial market participants to adequately evaluate the opportunities and risks of different investments and to efficiently fulfil the capital allocation function of the financial market. In particular, when matched with reporting requirements, common indicators are also a suitable means of reducing the risk of investors being misled about how sustainable their investments are.[5]

Responsible, sustainable and green investment: attempting to define terms

No definition, but some concepts established, including responsible investment …

Because there is no definition of sustainability on the financial market, it can be tricky for potential investors to choose where to invest their funds, especially since often a variety of terms are used that seem synonymous at first glance. The broadest concept is that of socially responsible investment (SRI). It typically encompasses the assets of all investors who have publicly committed to considering sustainability factors,

5 This phenomenon is referred to as greenwashing and describes the risk of investing in a security that is marketed as being sustainable but which, upon closer inspection, does not comply with standard sustainability criteria and the investor's requirements in particular.

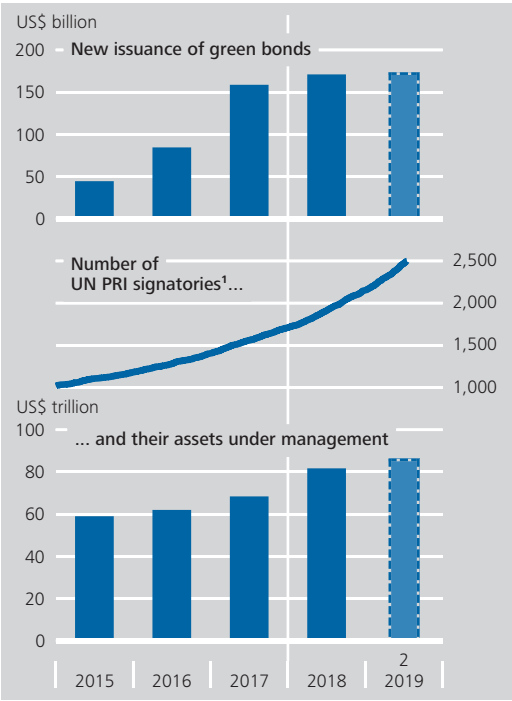
The Principles for Responsible Investment

Initiated by the then United Nations Secretary-General Kofi Annan in 2005 and supported by the UN, the UN Principles for Responsible Investment (UN PRI) define six principles which UN PRI signatories commit to apply on a voluntary and non-binding basis. A key objective of the principles is to incorporate environmental, social and governance (ESG) issues into the investment process.

To this end, the signatories undertake, first, to incorporate ESG issues into investment analysis and decision-making processes; second, to be active owners in their ownership policies and practices; third, to seek appropriate disclosure on ESG issues; fourth, to promote acceptance and implementation of the UN PRI; fifth, to work together towards these goals; and sixth, to report on own activities and progress towards implementing the UN PRI.

To date, around 2,500 asset managers, asset owners and service providers representing investment capital totalling over USD 86 trillion have committed to the principles (as at September 2019).

The global market for sustainable finance



Sources: Climate Bonds Initiative and UN PRI. **1** UN Principles for Responsible Investment. **2** As at September 2019.
Deutsche Bundesbank

for example by signing up to the UN PRI or by adopting their own general investment guidelines.[6] There is no scrutiny of the degree to which they actually follow through on this commitment at the level of the individual investments or portfolios. Instead, the sole focus is on the commitment made at the institutional level, which means that the design of specific sustainability criteria is of lesser importance.

… and sustainable investment

Where environmental, social and governance (ESG) criteria are factored into the individual investment decision, meaning that specific requirements are formulated at the security or portfolio level, this is referred to as sustainable finance or investment. Sustainable finance is not confined to climate and environmental protection issues, but also encompasses social aspects and questions about the composition and quality of management at firms in which investments have been or will be made. The subcategory of green finance, on the other hand, incorporates environmental aspects only (see the chart on p. 17).

Sustainability requirements when investing debt and equity capital

Thus, unlike responsible investment, sustainable investment is based on specific requirements and hence, where possible, on a harmonised understanding of suitable criteria. Yet choosing which benchmark to use is just as complicated as formulating appropriate minimum requirements for a security or its issuer with regards to their contribution towards achieving sustainability goals. This problem mainly affects the debt market, because when checking if bonds are sustainable or green financial products, it always comes down to the use of the proceeds, which means that the sustainability of the financed project has to be measurable. The capital raised by issuing sustainable or green bonds therefore always has to be allocated to relevant projects. On the stock market, however, investors generally consider the enterprise as a whole rather than individual projects. The primary input into their investment decisions is a comparison of the relative sustainability of the enterprises based on predefined metrics. Enterprises considered by shareholders to be (relatively) sustainable may not necessarily be able to issue green bonds – to do so, they would have to implement appropriate projects and finance them via bonds. Conversely, creditors may not necessarily class the issuer of a green bond as sustainable.

Sustainability on the stock market

Sustainable investment strategies for equity investors

Negative screening penalises poor performance, …

The above definition of sustainable finance, i.e. the integration of ESG criteria at the level of individual investments, has a long tradition

6 See Forum Nachhaltige Geldanlagen e.V. (2019), p. 20.

among equity investors, in particular.[7] Negative screening (the use of exclusion criteria), which can relate to individual firms as well as to entire sectors or countries, is not just the oldest[8] but also the most widely used sustainable investment strategy today.[9] One reason for this is that exclusions can be applied with relative ease and can be tailored according to individual needs. Even so, the exclusion of a specific firm from the investment universe is often grounded in extensive analyses.[10] A less onerous form of negative screening is norm-based screening, whereby all enterprises that do not uphold and support certain international norms and standards are excluded from the investment universe. For instance, failure to recognise the International Labour Organization's core labour standards, which prohibit forced labour and child labour, amongst other things, could be grounds for exclusion.

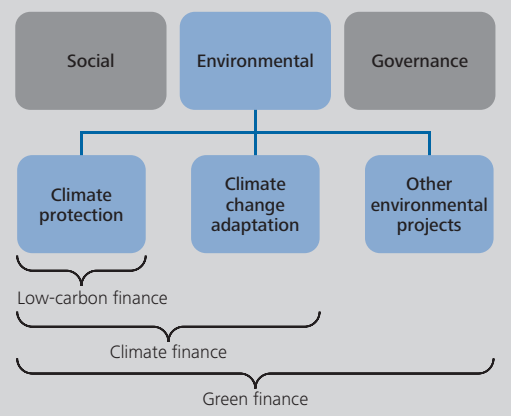
… positive screening rewards good performance

By contrast, positive screening explicitly includes companies in the investment universe. A widely used strategy in this approach is the best-in-class strategy, where the first step is to evaluate all companies in the theoretical investment universe – the benchmark, such as a global stock index – using predefined ESG criteria. A ranking is produced on the basis of these criteria, and the best companies in their respective sectors are added to the portfolio, contingent on a positive financial analysis. The aim is to promote sustainability in all sectors and to create incentives for ESG competition, as it were. A variation of this approach can reinforce the incentive mechanism and reward positive developments: rather than adding the best companies at the time of analysis to the investment universe, the investor adds those that have made the greatest progress over time in the inclusion of sustainability aspects. This is also referred to as a best progress strategy.

Narrow focus of thematic investing

With thematic investing, on the other hand, investors – especially in the private equity segment – specifically seek out sectors or issues so as to support companies in certain sectors, such as solar technology or sustainable agriculture, and to profit from positive anticipated market developments in the chosen area. The focus can also be broader, however, and include renewable energy in general, or support reaching a specific development goal such as access to water.

Sustainable finance and its subcategories



Source: Bundesbank representation based on United Nations Environment Programme (2016), p. 11.
Deutsche Bundesbank

Impact investing delivers double dividend

Another approach related to thematic investing is impact investing. Here, however, the intention is to generate social or ecological value added alongside the usual return, giving rise to a double dividend – i.e. financial and moral. This type of investment is made, for example, in companies that have committed to creating

7 The investment strategies described in this section have so far been applied mainly to equities, as the market for sustainable bonds focuses more on the financed projects than on the issuer. Nevertheless, the strategies cited here are also becoming increasingly important on the bond market.
8 Traditionally, values-based exclusion criteria are used mainly by religious investors. In the second half of the 20th century, factors such as environmental catastrophes caused by companies, the Vietnam War and the Apartheid regime in South Africa led a broad group of investors to increasingly withdraw capital from certain firms, some countries or entire sectors ("sin stock" sectors including weapons manufacturing and often tobacco, alcohol, gambling and pornography) (see Schäfer (2014)).
9 See Forum Nachhaltige Geldanlagen e.V. (2019), p. 14; and Global Sustainable Investment Alliance (2019), p. 3.
10 These track supply chains and calculate revenue shares; for a manufacturer of screws, for instance, the analysis would examine the share of screws delivered to arms manufacturers and whether to exclude not just the arms manufacturers but potentially also the screw manufacturer itself from the investment universe.

Sustainable investment strategies: an overview

Strategy	Implementation
Negative screening (exclusion criteria)	Companies are excluded from the investment universe based on specific criteria – e.g. their sector classification or failure to uphold international norms and standards – or on the basis of a risk assessment or the investor's values.
Positive screening	Companies are compared based on ESG performance and the best in each sector are chosen, either on the basis of the status quo (best in class) or recent progress (best progress).
Thematic investment	Investments (primarily funds) with a special thematic focus, e.g. renewable energy, eco-friendly agriculture, or a focus on specific development objectives.
Impact investing	Investments made with the aim of helping to solve social and environmental problems as well as generating a return.
ESG integration	Systematic inclusion of ESG issues in conventional financial analysis and investment decisions.
Engagement	Exerting influence on companies with regard to ESG issues by exercising voting rights, making applications at shareholder meetings, holding investor talks with management boards or taking a seat on the supervisory board.

Source: Bundesbank representation based on Forum Nachhaltige Geldanlagen e.V. (2019), p. 20.
Deutsche Bundesbank

jobs for minorities, or in microfinance projects in developing countries. Often, this entails concentration on a relatively small number of projects and investments and consequently low diversification.

ESG integration: financial analysis augmented by sustainability

Probably the most comprehensive sustainability strategy is what is known as ESG integration. In contrast to the approaches discussed so far, it is not simply an additional component alongside conventional financial analysis but forms an integral part of it. ESG criteria and associated opportunities and risks are explicitly and systematically integrated into the analysis of a security's risk/return profile. This means, for example, that drops in revenue stemming from reputational risk (following cases of corruption, environmental damage, etc.) or production sites threatened by extreme weather events can be incorporated into the investment analysis, allowing for a better assessment of the medium-term financial stability of the analysed company.[11]

Exercising shareholder rights

In addition, institutional investors, in particular, frequently engage with companies through active ownership, both informally and by exercising their formal rights as shareholders. This approach is referred to as engagement. Shareholders seek dialogue with decision-makers at the company in which they have invested, and thereby attempt to embed integration of ESG aspects within the company. They also influence policy using their votes and proposals at annual general meetings. If an investor owns a large enough share in a company, they can also participate in the company's decisions directly and give sustainability aspects greater prominence on the agenda by taking a seat on the supervisory board.

Strategy mix strengthens sustainability impact

The sustainable investment strategies given as examples here are not mutually exclusive. Many investors combine several of these approaches in order to give their influence on corporate sustainability the greatest possible impact. Negative screening is often paired with a best-in-class strategy, for instance. The engagement approach is also well suited to complement a best-in-class strategy, creating even stronger incentives to integrate ESG criteria.

Performance of sustainable equity investments

Impact of sustainability on performance

Sustainable investment strategies restrict investment opportunities. This typically worsens the risk/return profile of an investment, because the a priori selection of permissible investments results in portfolios that bear concentration risk and are more exposed to unsystematic risk.[12] However, corporate profits can

11 Similar analyses are now also conducted by numerous credit rating agencies, which increasingly consider ESG aspects when determining a company's creditworthiness.
12 According to Modern Portfolio Theory, pioneered by Markowitz (see Markowitz (1952)), a broadly diversified portfolio generates a better risk-adjusted return (see also Elton et al. (2017), who summarise the current status of the research). Values-based negative screening and other non-financial factors in decision-making would thus worsen the risk/return profile. This logic suggests that ESG integration is the sustainability strategy with the smallest negative impact on the risk-adjusted return, as it makes ESG criteria an integral part of conventional financial analysis.

also depend on risks that were previously disregarded in financial analysis, such as climate risks. By helping to make previously neglected risks more visible, sustainability analyses and criteria can thus enable investors to make financially successful decisions.[13] The fact that investing in sustainable enterprises can be financially attractive to investors, or at least does not have to put them at a disadvantage, is exemplified by a comparison between the very broad stock index MSCI World and its sustainable sub-index MSCI World ESG Leaders over the past ten years as well as by a comparison of their European counterparts over the same period (see the adjacent chart).[14]

Strong market growth, but so far at low level

Against this backdrop, even investors with a primary focus on generating value are increasingly considering ESG criteria. In Germany, for example, the volume of sustainable investment grew by over 70% between 2014 and 2018, in keeping with the global trend.[15] But despite this strong market growth, it is clear that sustainable investment still plays a fairly small role overall. The share of sustainable investment in the German market as a whole is estimated at less than 3%.[16]

Relative performance of sustainable and conventional stock indices

31 July 2009 = 100, daily data, log scale

Source: Bloomberg. **1** Environmental, social and governance.
Deutsche Bundesbank

The market for sustainable bonds

Standards and definitions in the green bond market

Lack of uniform definition of green projects stifling market growth

The basic difference between a green bond and a conventional bond is the use of the proceeds for an earmarked purpose. However, the inability to clearly define and classify green projects means that green bond supply in the market is still low at present. Over the past decade, the framework for issuers and investors regarding transparency and provision of information has continued to improve. International dialogue between various stakeholders from political and economic spheres paved the way for this, and continues to do so today. This has led to the development of a broad range of volun-

13 Empirical studies frequently find a significantly positive correlation between the financial success of firms and their integration of ESG criteria. For the most part, however, these analyses cannot establish causality, and neither the sustainability aspects incorporated into the various studies nor the underlying criterion for a company's financial success are necessarily comparable. Friede et al. (2015) evaluate the results of over 2,000 analyses on this topic (with a very small portion of the analyses also considering investment of debt capital) and conclude that more than half of them show a significantly positive correlation compared with less than one-tenth that find a significantly negative correlation between financial success and ESG integration. Other overview studies arrive at similar findings (including van Beurden and Gössling (2008)). To date, however, there is no academic answer as to whether and to what extent sustainability aspects can provide a structural and causal explanation for investment returns.

14 While the MSCI World (Europe) includes over 1,600 (400) medium-sized and large companies from 23 (15) countries throughout the world (Europe), the MSCI World (Europe) ESG Leaders comprises the approximately 800 (200) best-performing companies according to MSCI's internal ESG requirements. Alongside this best-in-class approach, negative screening is also used in the construction of the ESG Leaders indices.

15 See Forum Nachhaltige Geldanlagen e.V. (2019), p. 13 ff.

16 See Stapelfeldt (2018), p. 123; and Backmann (2018), p. 224. Note that this figure serves only as a rough estimate given that there is no definition of sustainability. This is also pointed out by an EU expert group, which estimates an even lower share for the EU as a whole (see EU High-Level Expert Group on Sustainable Finance (2017), p. 42).

Types of green bonds

Type	Description
Standard green use of proceeds bond	Standard recourse to the issuer. Identical credit rating to a conventional bond from the same issuer.
Green revenue bond	No recourse to the issuer. Cash flows (e.g. revenue, commissions, fees) give rise to credit risk.
Green securitised bond	Bond collateralised by one or more green projects. Cash flows of the projects are the first source of repayment.
Green project bond	Investor has direct exposure to the risk of the project(s). Additional recourse to issuer is possible.

Source: Bundesbank representation based on Green Bond Principles (2018).
Deutsche Bundesbank

tary guidelines, standards and frameworks. Moreover, some countries such as China, France and India have also initiated national regulatory measures to promote the establishment of a domestic green bond segment.

Green Bond Principles – voluntary guidelines for green bond issuers

In 2014, the International Capital Market Association (ICMA) published the Green Bond Principles (GBP) with the aim of increasing the transparency, integrity and acceptance of green bonds. The principles are voluntary guidelines designed to support potential issuers in issuing a new green bond; they define four basic types of green bond (see the table above). To be recognised as a green bond as defined by the GBP, a bond must be issued in alignment with the four core components[17] of the GBP. One of these four components relates to the use of the proceeds, for example. Various green project categories are identified which relate to environmental protection (e.g. renewable energy, clean transportation, energy efficiency, etc.). The GBP also contain additional recommendations, such as an external review of the four core components (e.g. by external consultants, external auditors, certification companies, research and rating agencies) and the preparation of a communication strategy on the compatibility of the new issue with a company-wide sustainability strategy.[18]

Climate Bonds Standard – first step towards a taxonomy

Similarly to the ICMA's GBP, the Climate Bonds Initiative (CBI) developed the Climate Bonds Standard (CBS) and an associated certification scheme. The Standard consists of two complementary components. The overarching framework specifies the management and reporting process. However, the centrepiece of the Standard is a classification system (taxonomy), which classifies individual sectors and economic activities as environmentally sustainable on the basis of selected technical eligibility criteria for green projects and assets.[19] The European Commission is taking a similar approach with its plan to adopt an EU taxonomy guided by the GBP and CBS, which is intended to serve as the basis for an EU green bond standard (see p. 27).

Market developments in Europe and Germany

First green bond issued in 2007

In 2007, the European Investment Bank (EIB) laid the foundation for the green bond segment when it issued its first Climate Awareness Bond. Since then, green bonds have become more attractive and accepted, particularly among investors interested in sustainability. But despite appreciable growth rates, outstanding green bonds only account for just under 2% of the international bond market as a whole.

Green bonds increasingly used as additional source of funding

The cumulative outstanding volume of green bonds in Europe has risen to €198 billion since 2015 (see the chart on p. 21). The positive market growth in Europe also shows that green bonds are an increasingly used source of funding. While the European market grew year by year over the observation period, the outstanding volume in Germany experienced significant fluctuations at times. In 2017, the outstanding volume doubled for the first time, climbing from €4.4 billion to €8.8 billion on the year.

17 The four core components of the guidelines are use of proceeds, project evaluation and selection, management of proceeds, and reporting.
18 See Green Bond Principles (2018).
19 See Climate Bonds Initiative (2018a).

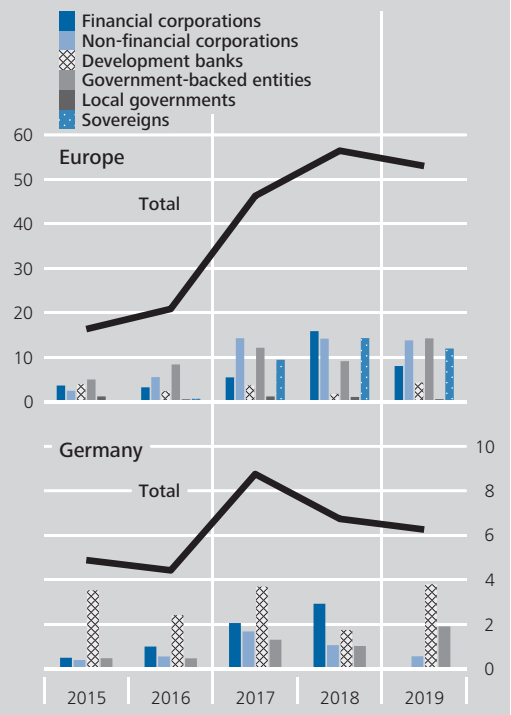
After a dip in 2018, the outstanding volume of green bonds in the first half of 2019 had already come close to the level of 2018 as a whole.

Development banks leading the way, industry and financial sector catching up

Looking at issuance by sector, it can be seen that green bonds in Europe are being issued by non-financial corporations, financial corporations, government-backed entities and sovereigns (see the adjacent chart). At first, issuance was dominated by development banks and government-backed entities, such as the EIB and the Kreditanstalt für Wiederaufbau (KfW) in Germany. Development projects are evaluated and selected based not just on their economic benefit, but also taking into account environmental and social aspects. In subsequent years, industry and the financial sector also recognised the market potential and are increasingly assuming a more active role by launching their own green bond issuance programmes. Finally, at the end of 2016, the first green government bond was issued by the Republic of Poland, with an issue volume of €750 million. Shortly afterwards, in January 2017, France issued what was up until then the biggest green government bond, with an issue volume of €7 billion.[20] The preceding examples and the attendant political signals they sent induced other EU countries – such as Ireland, Belgium and the Netherlands – to issue green government bonds. Germany's Finance Agency, recognising the Federal Government's Sustainable Finance Strategy and a mandate granted by the State Secretaries' Committee for Sustainable Development, is also looking into the issuance of a green or sustainable Federal bond.

Outstanding volume of green bonds by sector

€ billion



Source: Climate Bonds Initiative, as at 30 June 2019.
Deutsche Bundesbank

KfW is Germany's largest issuer of green bonds

KfW is still currently the largest issuer of green bonds in Germany. In the first half of 2019, it issued €3.8 billion worth of green bonds, achieving a market share of almost 60%. Over the last few years, both private financial institutions and enterprises in the real economy have contributed to the development of the market in Germany. Mortgage banks, in particular, have established themselves as regular issuers. This is also evident from the ranking list of the largest issuers of green bonds in Germany (see the table on p. 22). Furthermore, the public sector is also contributing to an increasing green bond supply for investors. NRW Bank, a government-backed entity, has already issued seven green bonds, for instance. Besides this, the federal state of North Rhine-Westphalia has issued five sustainability bonds. The latter represent a further category of sustainable bonds that are simultaneously used to fund environmental and social projects. These include, for example, funding educational projects and investing in sustainability research.

New green financial products and thematic investing growing more important

The fact that investors are generally becoming more interested in topics relating to sustainability is also having a knock-on effect on innovation within the financial sector. In addition to funding climate projects through green bonds, thematic investing is rising in importance. This includes, inter alia, sustainability bonds, social

20 See Agence France Trésor (2019).

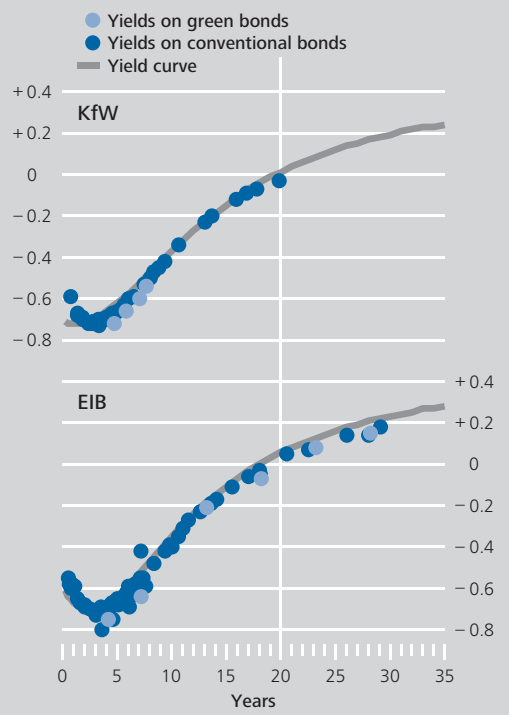
The five largest issuers of green bonds in Germany

Issuer	Number of bonds	Issue volume (€ billion)
KfW	22	18.0
NRW.BANK	7	3.3
Berlin Hyp	6	3.0
LBBW	4	2.7
Deutsche Hypo	4	1.1

Source: Climate Bonds Initiative, as at 30 June 2019.
Deutsche Bundesbank

Yield spreads for conventional bonds versus green bonds

As a percentage



Sources: Bloomberg and Bundesbank calculations.
Deutsche Bundesbank

bonds (e.g. to finance social housing projects) and SDG bonds (funding that contributes to one or more of the UN's 17 sustainable development goals (SDGs)). To reach a broader group of institutional and private investors, large financial institutions and investment companies are increasingly launching investment funds and exchange-traded funds (ETFs) and investing in green and sustainable bonds.[21]

Unclear whether issuance of a green bond affects yield

At present, it is still unclear what impact the issuance of a green bond has on its yield. On the one hand, issuers incur internal and external inspection and documentation costs (e.g. certification, second party opinion, impact reporting), which can be passed on to investors. On the other hand, it is reasonable to assume that, if the credit risk is the same, investors will not be willing to forgo yields or pay a higher price to invest in green bonds compared to conventional bonds issued by the same issuer.

Uncertainty regarding yield discounts in the secondary market for green bonds issued by KfW and EIB

The following section examines green bonds and conventional bonds issued by KfW and the EIB to determine whether yield spreads exist in secondary market trading. When deciding which bonds to include in the analysis, denomination in euro and residual maturity were key factors. The chart below shows the yields to maturity depending on the individual residual maturity of the bond. Four out of five of KfW's green bonds trade at a slight yield discount on the secondary market compared to its conventional bonds. Only one green bond with a relatively short residual maturity trades at a yield mark-up and can be regarded as an outlier in this example. At least in the case of KfW, it appears that investors are currently willing to forgo yields and pay a higher price for green bonds. Another potential reason is that demand for green bonds outstrips supply, causing them to exhibit higher prices in the capital markets as a result of scarcity conditions. The same approach is used to analyse bonds issued by the EIB. The yields of all six green bonds seem to be almost exactly on a par with those of the conventional bonds issued by the EIB. In conclusion, comparing conventional and green

21 See Climate Bonds Initiative (2018b).

bonds of the two issuers does not reveal a clear pattern in terms of yield spreads.[22]

Yield discounts not clearly confirmed by academic research

The latest academic research likewise fails to provide any definitive evidence that sustainable bonds present an advantage in terms of funding costs. The following selection of research and studies reveals isolated yield discounts in the context of primary market issuance. Two things should be noted here: first, that the green bond market is still relatively small, and, second, that the historical data available cannot yet provide reliable information spanning a longer observation period.[23]

In their studies, VanEck (2017) and Östlund (2015) conclude that, in the context of primary market issuance, there is no cost advantage over a conventional bond in the form of lower interest costs for the issuer.[24] A study by the rating agency Standard & Poor's on the same subject comes to a similar conclusion, although its focus is on secondary market trading.[25]

The research paper by Zerbib (2017), on the other hand, finds that there is indeed evidence of a "green bond premium".[26] Based on a sample of 135 investment-grade green bonds, the analysis shows an average funding cost advantage of 8 basis points compared to conventional bonds from the whole range of investment-grade bonds analysed. On average, euro-denominated green bonds and US dollar-denominated green bonds traded at a yield discount of 2 basis points and 5 basis points, respectively. The author concludes that the yield discount observed is the result of high demand for green bonds.[27]

A study by Ehlers and Packer (2017) comes to a similar conclusion. Their analysis was based on a selection of 21 green bonds issued between 2014 and 2017, which they compared to conventional bonds issued by the same issuer. The authors ultimately noted that issuers' refinancing costs in the capital market were 18 basis points lower on average when issuing green bonds as opposed to conventional bonds.[28]

In their research paper, Kapraun and Scheins (2019) use both secondary market and primary market data to examine whether a yield discount exists. Particularly in the primary market, they identified yield discounts of 20 to 30 basis points depending on currency and type of issuer. Furthermore, they observed higher yield discounts for bonds issued by governments and supranational institutions, as well as in connection with placements of secured bonds and for bonds denominated in US dollars. Yield discounts on corporate bonds were found to be smaller, probably owing to lower demand from institutional investors and the difficulty involved in issuing this type of bond.[29]

The EU's Sustainable Finance Action Plan

Sustainability as a cornerstone of the capital markets union

In the context of its measures to complete the capital markets union, the European Commission is committed to ensuring that the European financial system and its participants support long-term, low-carbon economic growth and invest in the appropriate technology. This will help it deliver the contributions it has pledged to make towards global environmental and climate goals.[30] To this end, in March 2018, the European Commission presented an action plan on the financing of sustainable growth, which, if implemented as intended, will likely have a major bearing on the market for sustainable financial investments.[31] However, this action plan sees the Commission move away

22 The yield effect at the portfolio level remains unclear, as a BIS study shows (see Fender et al. (2019)). Analysis of the portfolios of green and conventional bonds shows them to be largely similar in terms of typical yield and risk figures.
23 See EU Technical Expert Group on Sustainable Finance (2019c).
24 See Asian Development Bank (2018).
25 See Standard & Poor's Ratings Services (2016).
26 Yield spread between a green bond and a traditional bond from the same issuer and with the same features in terms of maturity, coupon, rating and currency.
27 See Zerbib (2017).
28 See Ehlers and Packer (2017).
29 See Kapraun and Scheins (2019).
30 See Dombrovskis (2019); and European Commission (2018a).
31 See European Commission (2018a).

Analysis of the holder structure of green bonds held in the EU

The data from the Eurosystem's securities holding statistics (SHS)[1] enable an analysis of the holder structure of green bonds held in the EU.[2] There has been a marked increase in the stocks held in the EU over the past six years. While the market value of green bonds at the end of the third quarter of 2013 totalled €0.7 billion, a value of €72.9 billion was recorded at the end of 2018 (see the upper adjacent chart).

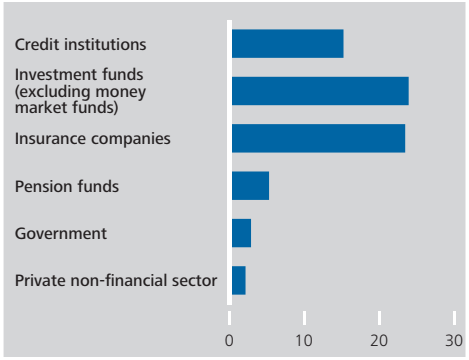
Stock of green bonds held in the EU*

€ billion, at market value

Source: ECB (SHS). * Excluding Croatia, Sweden and the United Kingdom.
Deutsche Bundesbank

Green bonds held in the EU* by holder sector

€ billion, at market value, end-2018



Source: ECB (SHS). * Excluding Croatia, Sweden and the United Kingdom.
Deutsche Bundesbank

The most significant holder group in the EU is investment funds, with stocks of €23.9 billion (see the lower adjacent chart). Insurance companies' holdings are only marginally smaller, amounting to €23.4 billion. Commercial banks follow in third place with stocks of €15.2 billion. Pension funds (€5.3 billion) and general government (€2.9 billion) hold significantly lower values than the three groups mentioned above.

An analysis by country shows that investors in France (€21.6 billion) and Germany (€19.5 billion) hold the largest stocks of green bonds.[3] A major driver here is the size of the economies and the associated importance of their financial sectors. With regard to France, the key role played by the insurance sector is striking – it accounts for 67% of the green bonds held by French investors. The Netherlands claims third place with relatively high stocks of green bonds (€10.0 billion). Banks, in particular, play a very important role in the Netherlands, holding 86% of green bonds. Luxembourg follows in fourth place with a volume of €6.7 billion. Here, the investment fund sector is particularly important, accounting for 84% of the green bonds held in the country. This

1 The SHS data are granular securities holdings data from the Eurosystem and other European countries. The statistics therefore cover securities held in the EU (excluding Croatia, Sweden and the United Kingdom). Data are collected by the national central banks of participating countries. The stocks held are broken down into holding countries and holding sectors for each type of security. In this context, the securities holdings statistics provide the underlying data for the stocks held in Germany.
2 The selection of green bonds is in line with Bloomberg's classification based on the Green Bond Principles.
3 Account should be taken of the fact that investment funds and other investment vehicles can cause the SHS data to give a distorted picture of the ultimate holders and thus also their countries of residence.

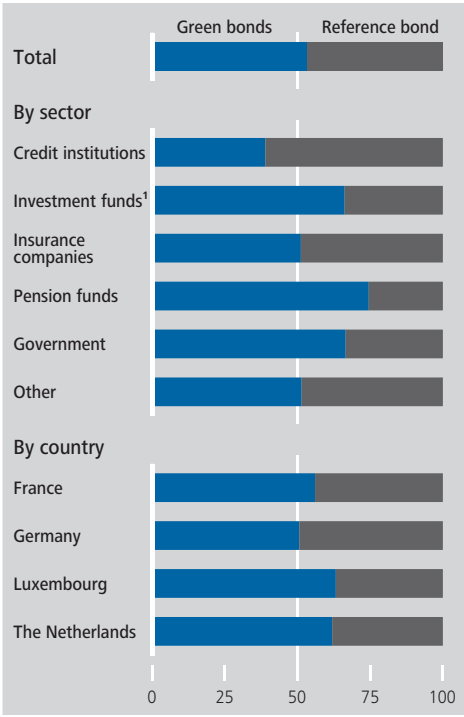
reflects Luxembourg's prominent role in the European investment fund sector.

The following section examines whether individual holder groups show a particular preference for green bonds. For this purpose, the existing green bond dataset is expanded to include conventional bonds. All normal bonds issued by issuers of green bonds are now added to the dataset, too.[4] A cross-section of all holder groups shows that the share of the total volume of green bonds is 53% (see the chart above). Therefore, the issuers included in the dataset finance a larger amount in the EU through green bonds than through conventional bonds. A look at the individual holder groups can give an indication of whether certain groups show a particular preference for green bonds. This is the case if the share of 53% across all holder groups is exceeded by an individual holder group. In particular, pension funds which choose to hold green bonds – with a share of 74% – show a strong preference for green bonds over normal bonds. The shares are also above average for general government and investment funds, equalling 67% and 66% respectively. By contrast, the share of 39% recorded by commercial banks is below average.

A breakdown of investors by country shows that the share of direct investments in green bonds is 63% for institutions in Luxembourg.[5] Holders in the Netherlands (62%) and France (56%) follow – also both above the overall average of 53%. Holders in countries with absolute high investment volumes evidently also tend to hold a disproportionately large number of green bonds compared with normal bonds. Among these countries, Germany falls just short of the average of all of the countries with a share of 51% in direct investments in green bonds.

Holder structure of green bonds versus normal bonds

As a percentage, at market value, end-2018

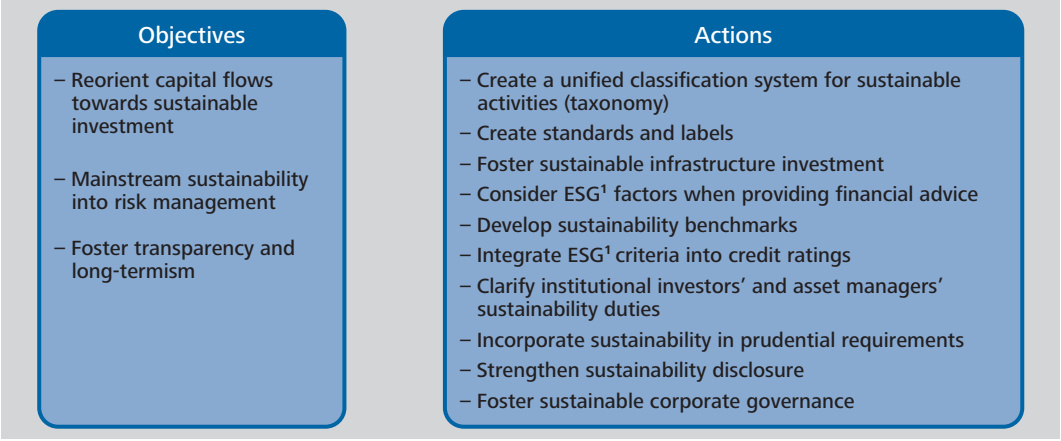


Source: ECB (SHS). **1** Excluding money market funds.
Deutsche Bundesbank

4 Therefore, the expanded dataset comprises only bonds from issuers who have issued at least one green bond and one conventional bond with virtually the same features. The sample covers the period from 2013 to 2018. Stocks held in the EU countries of Croatia, Sweden and the United Kingdom are not included. Issuers who only issue conventional bonds are not taken into account. Thus, the figures presented in the analysis do not reflect the ratio of all green bonds issued in the EU to all conventional bonds issued in the EU.

5 The data do not allow any reliable conclusions to be drawn with regard to the relative preference for green bonds in the various countries, but can only provide indications since it is not always possible to capture the countries of residence of bond holders precisely (see footnote 3).

The EU action plan on financing sustainable growth



Sources: European Commission and Deutsche Bundesbank. **1** Environmental, social and governance.
Deutsche Bundesbank

from the overall concept of sustainability and focus on green finance and, in particular, climate change. The action plan builds on the work of a high-level expert group (HLEG), mandated by the European Commission, which presented strategic recommendations and numerous sector-specific proposals in January 2018.[32] It consists of three overarching objectives and outlines ten actions needed to achieve them (see the chart above). The action plan will provide a uniform taxonomy, i.e. a classification system of sustainable economic activities, which, according to the Commission, will form the core of the action plan and create the basis for further actions. The Commission has already proposed draft legislation relating to the establishment of this taxonomy, sustainability benchmarks and disclosure of the methods used to integrate and evaluate ESG factors.[33]

Group of experts develop proposals for regulation

The European Commission tasked a technical expert group (TEG) with the specific design of the three legislative proposals. The TEG also received a mandate to develop an EU Green Bond Standard. As things stand, work on the EU standard and the three regulatory proposals should be completed by the end of 2019.

Taxonomy is key component: some flaws, but flexible

The European Commission intends the taxonomy to form the basis for the EU's sustainability strategy for the financial system. The aim is to define a set of criteria (see the chart on p. 27) for determining whether or not an economic activity is to be regarded as sustainable.[34] However, there are concerns that the binary nature of the taxonomy could prevent gradations in financing conditions, since the taxonomy itself does not reflect that economic activities can achieve various degrees of sustainability. Another criticism is that the European Commission is focussing almost exclusively on the ecological dimension of sustainability.[35] European primary law does not provide for such a hierarchy of the various dimensions of sustainability, but refers to them on equal terms.[36] However, the European Commission argues that the proposed legal framework could be broadened going forward to include aspects beyond climate change and incorporate additional sustainability goals. The taxonomy could be applied, in particular, to the planned introduction of sustainability labels for financial products and for the EU standard for green bonds.

32 See EU High-Level Expert Group on Sustainable Finance (2018).
33 See European Commission (2018b, 2018c and 2018d).
34 See EU Technical Expert Group on Sustainable Finance (2019b).
35 See Möslein and Mittwoch (2019); and Stumpp (2019).
36 See European Union (2016), Article 3(3); and Möslein and Mittwoch (2019).

EU standard for green bonds as hallmark of quality

The TEG's proposal for the creation of an EU green bond standard is closely linked to existing, established market standards, particularly the requirements listed earlier for the Climate Bonds Initiative and the Green Bond Principles published by the ICMA. In its final report on the EU green bond standard, the TEG makes recommendations to both the European Commission and market participants and highlights four key requirements a bond should meet in order to be certified as a green bond according to the EU standard. First, the EU taxonomy should be used to assess the project to be financed. Second, a green bond framework should be established, comprising information about the scope of the investment, the environmental goals associated with it, and reporting while the project is in progress. Third, the TEG proposes requirements for reporting on the use of proceeds and the environmental impact of the project being funded. The fourth recommendation is the mandatory verification of the project by an external evaluation body. Issuers would be free to implement the EU standard on a voluntary basis, and its application would not be limited to Europe. Instead, the hope is for it to have global reach and establish itself as a hallmark of quality for green bonds, thus reducing any doubts potential investors might have about the positive environmental impact of such bonds.

Benchmarks and disclosure to create confidence

To boost confidence in sustainable investment – not only in the form of bonds, but also in other asset classes – the European Commission intends, moreover, to introduce benchmarks to prevent "greenwashing".[37] These benchmarks will serve as guidance for investors aiming for a green portfolio but lacking the resources to perform in-depth sustainability analyses. To ensure the credibility and comparability of the sustainability benchmarks, the TEG is proposing transparency requirements for index providers, which will oblige them to disclose the criteria they apply to determine which securities or issuers are included in a benchmark. The European Commission's decision in June 2019 to update the voluntary guidelines on non-financial reporting to include the disclosure of climate-related aspects, in particular, can probably also be seen as part of its efforts to improve transparency in the market.

Criteria for environmentally sustainable economic activities according to the TEG's proposed taxonomy*

Compliance with minimum social standards

Substantial contribution to at least one of the following environmental objectives:

– Climate change mitigation
– Climate change adaptation
– Sustainable use and protection of water and marine resources
– Transition to a circular economy, waste prevention and recycling
– Pollution prevention and control
– Protection of healthy ecosystems

No significant harm to any of the other environmental objectives

Sources: European Commission and Deutsche Bundesbank. * Proposal by the Technical Expert Group (TEG) for the development of a classification system.
Deutsche Bundesbank

Outlook for sustainability and climate protection on the financial market

One of the financial market's functions is to allocate capital, …

Given that the most fundamental function of the financial market is to allocate capital to real economic activities, the Paris Climate Agreement has highlighted the importance of financial flows in the fight against climate change and the implementation of sustainable development goals. The financial market unites lenders with borrowers and, in the interests of both sides, allocates resources to the best possible use – in economic jargon, this is known as "utility maximisation". While some investors simply consider the "best" investment projects to be those that are most lucrative on a risk-adjusted basis, others also take into account additional aspects such as their underlying moral values. From an economic perspective, market efficiency and sustainability coincide when market prices – including in the financial

37 See EU Technical Expert Group on Sustainable Finance (2019a).

Sustainable finance initiatives in Germany

The German Federal Government is currently developing its own sustainable finance strategy, and, similarly to the EU, is working in close cooperation with the various stakeholders involved. In February 2019, the State Secretaries' Committee for Sustainable Development, which is the Federal Government's central body for the implementation, review and refinement of Germany's sustainability strategy, initiated the founding of a Sustainable Finance Advisory Council. At present, this council is supporting the Federal Ministry of Finance, the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety and the Federal Ministry for Economic Affairs and Energy in their efforts to develop a sustainable finance strategy for Germany. The Advisory Council includes representatives from the financial market, the real economy, academia and civil society to ensure that a balance is struck between the different interests and priorities of these groups. The Bundesbank and the Federal Financial Supervisory Authority are also involved in this dialogue, contributing their financial market expertise and insights gained from working closely with other central banks and supervisory authorities around the globe. Meanwhile, the Federal Government and the Advisory Council are able to build on years of extensive preliminary work carried out by the German Council for Sustainable Development, another advisory body of the Federal Government, as well as private sector initiatives. Particularly notable in this area are the Hub for Sustainable Finance (H4SF)[1] and the Green and Sustainable Finance Cluster Germany (GSFCG),[2] which for years have sought to ensure that Germany as a financial centre contributes to sustainable development and the mitigation of climate change. For this to happen, the institutions involved in the existing initiatives – among them the Bundesbank – argue the need for a uniform set of practicable indicators and transparent reporting of a comparable standard in order to facilitate adequate assessment of the risks and opportunities associated with sustainability. Such indicators would also be useful to support the Federal Government's planned communication strategy for sustainable finance by making the topic more tangible and easily understandable for consumers.

1 Founded in 2017 by Deutsche Börse and the German Council for Sustainable Development, the H4SF is an open network of financial market participants that has identified ten key fields of action for developing a sustainable financial sector in Germany. The network fosters discourse on these recommendations by organising an annual Sustainable Finance Summit, the most recent of which was held in Frankfurt on 16 October 2019.

2 The GSFCG was formed in 2018 by the merging of two initiatives run by Hesse's Ministry of Finance and Deutsche Börse. In its role as an observer on the Standing Committee of the GSFCG, the Bundesbank contributes to the network's aims of pooling the sustainability expertise of financial market participants in Germany and serving as a central point of contact for related matters.

market – adequately capture external costs and income. Transparency on social external factors such as the impact of climate change is a key prerequisite for the efficient allocation of resources and capital.

… but it needs sufficient information to do so

Ultimately, the financial market can only perform its allocation function if there is sufficient information about the risk/return profiles of the investment opportunities and if the skills and capacity to process the available information and data exist. In order to reflect investment risks in asset prices, market participants have to be able to identify and dissect them accurately. Medium and long-term risks, above all, have traditionally been disregarded as they were seen to be fraught with uncertainty. These also include climate risks, in particular. Today, although the exact realisation of these risks remains uncertain, there is now broad academic consensus that negative economic effects of climate change will materialise, particularly if adaptation and mitigation measures are not taken promptly.[38] The debate in the financial sector, as elsewhere, is therefore not about whether to take these risks into account, but how.

Long-term risks increasingly important to investors

More and more investors – especially institutional investors, which often need to hedge long-term payment obligations – are therefore also making efforts to minimise long-term risks in their portfolios and, at the same time, take advantage of the opportunities the transition towards a low-carbon economy offers. This value-based approach is often complemented by a values-based perspective and takes into account social and corporate governance factors as well.

Financial market can only provide support; policymakers must set the course

While it is in financial market participants' own interests to analyse the scope and relevance of climate and sustainability risks and to adjust their portfolio or risk management where necessary, responsibility for sustainability and climate policy lies in the hands of elected politicians. This also applies to the internalisation of external costs. The financial market can only help to achieve sustainability goals and allocate resources accordingly if efficient market price formation and solid key data are in place as a basis for valuations and decisions. With almost €100 trillion of assets under management, only a fraction of which are currently invested sustainably, the financial market industry can play a key role in the reallocation of assets along these lines going forward.

EU and German government seeking basis for further market growth

Through its action plan for financing sustainable growth, the European Commission is hoping to help facilitate this reallocation of assets into sustainable activities, notably by using the taxonomy to boost the confidence of potential investors in the impact of various forms of sustainable investment. The German government has likewise made a clear commitment to promoting sustainable finance. New transparency requirements, information campaigns and the uniform classification system are likely to make the opportunities and risks involved clearer, thus opening up sustainable investment to private investors, too. If public interest in climate change is any indication of demand for financial investments that align with this issue, then the market for sustainable financial investment is likely to continue expanding in the future.

38 See, for example, Intergovernmental Panel on Climate Change (2018).

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