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The Evolution of the Green Finance Agenda – Institutional Anchoring and a Survey-based Assessment for Austria

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Abstract

A comprehensive restructuring of economies and a massive increase of investments in climate-friendly technologies, infrastructures, and R&D is needed for reaching the Paris targets. The EU has launched a process for greening the financial sector emphasising the need for new instruments and financial market regulation for aligning investments to sustainability. This chapter summarises research on two topics: firstly, what are the main political strategies, especially at EU level, to support green finance, and secondly, which are the key supporting factors, barriers and actors for an upscaling of green investments? To assess the relevance of green finance in the financial market and climate policy (with focus on Austria) an expert survey was conducted. It delivers insights on promising policies and strategies for fostering the growth of green finance. Conclusions can be drawn on instruments (like carbon pricing) that should be integrated in post-COVID-19 stimulus packages to ensure a Paris-aligned recovery.

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1. Introduction

The implementation of economic structures within ecological limits is the great challenge of the coming decades. This means that the existing fossil infrastructures must be replaced by more resource-efficient, carbon-free substitutes involving massive investments in technologies, infrastructures and R&D, and a correspondingly large financing requirement. Public budgets alone cannot meet the resulting needs for funding, so in recent years the political discussion as well as research have focused increasingly on what framework conditions would be necessary for a re-orientation of private capital flows towards sustainable development. The policy interest is illustrated by various initiatives that have been started on different levels to facilitate the mobilisation of private finance towards sustainability and environmental/climate investments (Migliorelli, 2021, Quatrini, 2021). These initiatives include, for instance, the Task Force on Climate-related Financial Disclosures (TFCD, established 2015) or the Network for Greening the Financial System (Network for Greening the Financial System, 2018), a coalition of central banks and supervisors that was established 2017. An active role is also played by the European Commission starting with the establishment of the High-Level Expert Group on Sustainable Finance (High-Level Expert Group on Sustainable Finance (HLEG), 2018).

The growing importance of green finance is also reflected in the academic literature, which addresses, among other things, the various institutional initiatives, a definition and standards of green finance or frameworks that support the green market development (Spencer et al., 2015; Clark et al., 2018; Cardona & Berenguer, 2020; Brühl, 2021; Marini, 2019). Topics such as the impact of climate risks on the financial market and barriers and enabling conditions for the development of green finance are also examined and a focus is given to the role of financial regulators and central banks (Volz, 2017; Dikau & Volz, 2021; Campiglio et al., 2018; Skovgaard, 2017; Halonen & Sjöblom, 2018; Evain & Cardona, 2021). For a more detailed discussion of the development of the green finance agenda, see chapter 2 below.

With the development of green finance, the need for empirical evidence on the importance of green finance in climate policy is increasing. Our research complements the extant literature as it adds empirical evidence on how stakeholders and experts active in the field perceive the development of green finance and how they rate the relevance of certain framework conditions, instruments and approaches for fostering its further growth. Our research was part of the

project "Scaling-up green finance to achieve the climate and energy targets: an assessment of macro-financial opportunities and challenges for Austria"[1]

The paper is focused on two research questions:

(I) Which institutional settings were developed in recent years to support the upscaling of green finance?

(II) How relevant is green finance in the financial market and as an element of climate policy in Austria?

The GreenFin project investigates supporting and inhibiting factors for a broader implementation of green finance mechanisms as well as appropriate framework conditions for greening the finance sector in Austria. Therefore, an online survey was carried out among national and international experts and stakeholders for identifying the main drivers and barriers for successful implementation. The results from this survey are described in detail below.

The working paper is structured as follows: Section 2 presents the development of the green finance agenda. Section 3 presents the survey results on the current relevance of green finance in the financial market and climate policy in Austria. Section 4 summarizes the findings from the previous chapters and offers conclusions.

2. The Green Finance Agenda

The urgency to act against increasing temperatures and to fight anthropogenic climate change is growing and unmistakable. This is impressively confirmed by the publication of the IPCC Special Report (IPCC, 2018) which states that the impacts on economies and societies differ drastically between a temperature increase of 1.5°C and 2°C.

The Paris Agreement on Climate Change gives important guidance for the transformation to sustainable development. The important role of finance for overcoming the inertia inherent in the economic and technological structures is also acknowledged in the Paris Agreement. On the need for redirecting finance flows the Paris Agreement states explicitly in Art. 2.1c: "Making finance flows consistent with a pathway towards low greenhouse gas emissions and climate resilient development" (United Nations (UN), 2015). This on the one hand signals to investors that the Paris Agreement will have a substantial impact on the finance sector and on the other hand underlines the role of private capital to close the decarbonisation investment gap.

Climate change and the already noticeable impacts and risks associated with it represent a substantial argument for profound changes in prevailing economic and social structures (see Friesenbichler et al., 2021; Köppl & Schleicher, 2018). The literature also speaks of a dual challenge, as on the one hand it is a matter of driving structural change in a direction that is consistent with a drastic reduction in greenhouse gas (GHG) emissions, but on the other hand does

[1] For further details on the project see https://greenfin.at/.

not jeopardise prosperity (Altenburg & Rodrik, 2017). In this setting, it is not only climate policy that is called for, but rather climate mainstreaming in all policy areas, as the goal of a decarbonised economy is a cross-cutting issue.

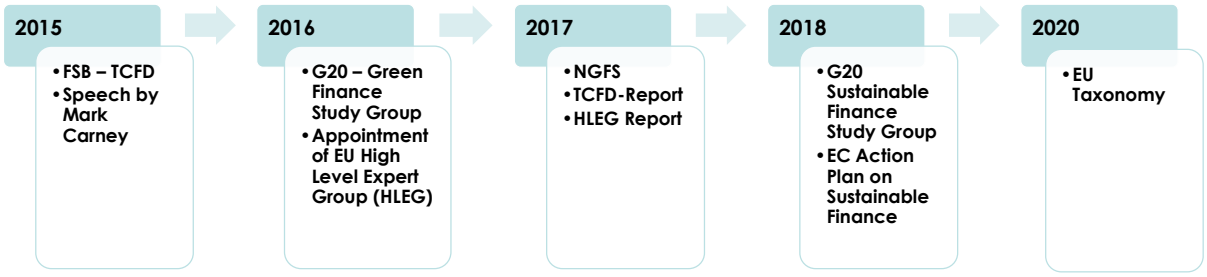
Green Finance as enabling factor for achieving deep structural change and climate goals increasingly receives attention. An important departure in the debate on the role of the financial sector in times of climate change can be seen in the speech by Mark Carney (2015) emphasising that "Climate Change is the Tragedy of the Horizon". With this statement he expresses the gap between the time horizons usually considered in current decision-making and those for which the effects of climate change are forecasted, which to a large extent only affect future generations. Put differently, risks for financial stability from climate change will materialize when it is already too late to take counteracting measures.

Köppl and Stagl (2018) state that business practices that focus on the short and the very short-term lead to economic decisions that ignore relevant scientific insight. The uncertainty concerning technological development in an era of disruptive change acts as an inhibiting factor for capital flows in low-carbon technologies and poses a risk for technological lock-in effects. Given the technological uncertainty as well as the limited disclosure of companies on their climate risks it is a challenge for investors to consider climate change in the context of an investment.

The development of the sustainable and green finance agenda is closely linked to the investment gap that prevails with respect to the transformation requirements in the context of the climate challenge (Cardona & Berenguer, 2020). Thus, the regulatory framework for the finance sector plays a crucial role in mobilising and redirecting private capital flows towards sustainable investment and climate finance. This also requires that financial institutions integrate climate-risk assessment into their business operations as currently the finance sector is not yet aligned with the Paris agreement. Cochran and Pauthier (2019) propose a framework for financial institutions that strives for Paris alignment. They recommend, among other aspects, that a Paris alignment strategy should be reflected in all strategic plans, as well as the implementation of methods that are applied in the assessment of the respective decisions in the decision-making process. A mix of pull factors (like climate policy regulation) and push factors (e.g. green bonds, disclosure rules) is proposed by Cochran and Pauthier (2019) as options to stimulate changes in the finance sector and contribute to increase the still small proportion of green finance in overall financial flows.

In recent years various policy initiatives have been started on different levels to facilitate the redirection of capital flows towards investments supporting sustainability or environmental/climate policy objectives (Migliorelli, 2021). The evolvement of the issue can be seen in several initiatives and documents over time as illustrated in Figure 1.

Figure 1: Important events in promoting green finance



Source: authors illustration based on Gonzales (2021).
Notes: FSB - Financial Stability Board, TCFD – Task Force on Climate Related Disclosure, NGFS - Network for Greening the Financial Sector.

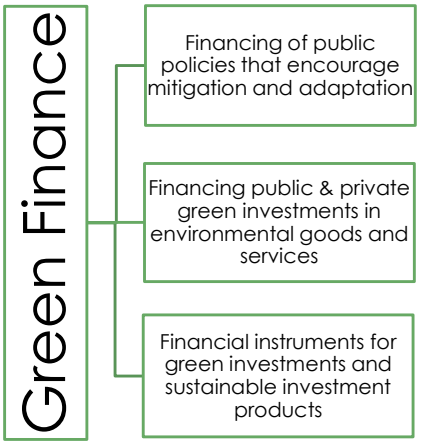
As Figure 1 shows, initiatives at different institutional levels are being pursued to develop effective political frameworks that redirect financial flows towards sustainable and climate finance. These various approaches, in general, reflect the main objectives of the respective institutions, but at the same time they hold the risk of inconsistent standards and thus inconsistent signals for the financial sector.

2.1 Scope and development of green finance

In recent years, interest in and attention to green and sustainable finance has grown strongly, even among the general public, although there is no universally agreed definition of what counts as sustainable and green finance. This is surprising against the background of a broad consensus on the need for a transition process, the necessary investment funds associated with it and the role the financial sector in this process.

Essentially, green finance is intended to contribute to the reduction of environmental externalities and to provide funding for adaptation measures. Climate finance specifically deals with mitigation of greenhouse gas emissions and climate change adaptation. The broader understanding of sustainable finance encompasses other sustainability criteria, such as social responsibility (compliance with labour law, exclusion of child labour), or environmental issues beyond climate change as well as governance aspects (transparency policies, codes of conduct etc.). The main purposes of green finance are illustrated in Figure 2.

Figure 2: Objectives of green finance



Source: authors illustration based on Lindenberg (2014).

The EU defines sustainable finance "as finance to support economic growth while reducing pressures on the environment and taking into account social and governance aspects. Sustainable finance also encompasses transparency when it comes to risks related to ESG factors that may have an impact on the financial system, and the mitigation of such risks through the appropriate governance of financial and corporate actors" [2].

Green bonds play an important role in the green finance sector. Just as a general definition of green finance is lacking, this also applies to green bonds. Several voluntary guidelines and standards exist, like the Green Bond Principles, the Climate Bonds Standard and Certification or the EU Green Bond Standard. These standards provide guidance both for green and sustainable bond issuers as well as for investors and should protect against greenwashing. It is mainly the green bond market that shows a very dynamic growth, however, further efforts are needed on both the supply and demand side to make this market segment on par with the overall bond market. The green bonds market for instance showed an annual growth of 20-30% over a period of several years (European Central Bank/European Systemic Risk Board, 2021) demonstrating the strong interest in such investment products.

In any case, a large demand for green investments from institutional investors but also private investors is observable, not only for green bonds. Coleton et al. (2020) point out that as a response to pressure from customers, investors and regulators, banks have started to incorporate sustainability risks into their risk management and strategies. This development confirms that banks increasingly view climate change as a financial risk. Focusing on green bonds and green loans Gilchrist et al. (2021) state that companies are driven by two motives when it comes to their environment and sustainability engagement: On the one hand they strive to avert

[2] https://ec.europa.eu/info/business-economy-euro/banking-and-finance/sustainable-finance/overview-sustainable-finance_en

damage from future climate change and environmental disasters, and on the other hand they see it as opportunity to build social trust with stakeholders (customers, suppliers, communities and governments). Both aspects contribute to a strengthening of green finance.

One significant starting point for the sustainable finance market was in 2005 when Wells Fargo dedicated funds for sustainable entrepreneurship, this step was followed by the Bank of America in 2007. Also, in 2007 the European Investment Bank (EIB) issued its first green bond (Climate Awareness Bond). Strong market growth has been evident since 2013 and the range of green finance instruments and products is constantly evolving. Still, there are no uniform delimitations and standards for green finance which hampers market integration, raises concerns about greenwashing and increases information costs for investors (Born et al., 2021). Also, the multitude of instruments available in the market complicates the comparison of different data sources. Depending on the delimitation used (e.g. ESG vs. green vs. climate finance) volumes will differ significantly. The most comprehensive overview of global climate finance is provided by the Climate Policy Initiative (2021). In accordance with other sources (Born et al., 2021; Climate Bonds Initiative, 2021; Aramonte & Zabai, 2021; United Nations Conference on Trade and Development (UNCTAD), 2021), Climate Policy Initiative (2021) attests high growth rates for sustainable and green finance in recent years, also for 2020 despite the global pandemic. According to Climate Policy Initiative (2021) global climate finance funds amounted to 632 bn $ (average 2019/2020) which corresponds to an increase of 10% compared to 2017/2018. 90% of the funds (571 bn $) are directed towards mitigation measures. Although funds for adaptation have increased substantially (+53%) reaching 46 bn $, they are still far from reaching the volumes needed for building resilience and adaptative capacity in developing countries. This is also illustrated by the fact that around 75% of climate funds are raised and invested in the same country and these funds are concentrated in a rather small number of countries (mainly Western Europe, North America, East Asia and Pacific). More than half of global climate funds are provided by public actors, mostly development financial institutions. Corporate entities and commercial financial institutions are the main actors in private finance. In terms of the sectors the funds directed to renewable energy still play the most important role with a share of 51%. Low-carbon transport reaches a share of 30% in mitigation related finance in 2019/2020 with an increase of 23%.

Similar developments are stated for other delimitations of green or sustainable finance markets. For instance, the Green Bond Initiative (2021) includes Green, Social and Sustainability bonds, Sustainability-linked bonds (SLB) and Transition bonds in their analysis and report a volume of 735 bn $ for 2020 and 779 bn $ for the first three quarters of 2021. Green bonds alone reached a total issuance of 290 bn $ in 2020.

The United Nations Conference on Trade and Development (UNCTAD) (2021) estimates that the value of sustainability-themed investment products in global capital markets amounted to 3.2 tn $ in 2020. Assets under management of sustainable funds have quadrupled in the last five years, and nearly doubled from 2019 to 2020 (from about 900 bn $ to over 1.7 tn $). Net investment inflows to sustainability themed funds are estimated to amount to approximately 300 bn $ in 2020. Also, for green bonds the United Nations Conference on Trade and Development (UNCTAD) (2021) estimates a volume of 300 bn $ in 2020.

Born et al. (2021) report that, although in the Euro area sustainable debt markets are developing rapidly, sustainable financial instruments (green, sustainable and sustainability-linked bonds, environmental, social and governance (ESG) funds) however still represent less than 10% of their respective markets. The assets under the management of investment funds and institutional investors with an explicit green or sustainable mandate have nearly tripled since 2015. The European Commission intends to issue up to 250 bn € of green bonds between mid-2021 and 2026 as part of the EU recovery fund, NextGeneration EU, which will further increase the share of green finance in the Euro area.

While this fragmentation and lack of a commonly accepted definition result in diverging figures regarding the total volume of green or sustainable finance, a common conclusion can be drawn regarding the substantial growth rates of the sector. Despite the high dynamics characterized by the many initiatives and the growing quantitative relevance of green finance, the funds dedicated are still insufficient to reach a 1.5°C trajectory. A successful strategy towards a relevant sustainable finance sector requires a combination of top-down engagement by actors like the European Commission, central banks or other international organisations which needs to be complemented by bottom-up initiatives like investors' demand or the implementation of social responsibility strategies of financial institutions as argued by Delimatsis (2021). In this context, it should not be overlooked that there is also an indirect influence of various climate policy instruments on the development of green finance. A widely known example of this is the pricing of emissions, which affects the rentability of green and brown investment projects. This effect is an example of regulatory risk as described below.

2.2 Institutional anchoring

The debate on how climate change is impacting the finance sector has gained considerable momentum in different contexts and by different decision makers. The G20 e.g. initiated the Green Finance Study Group and published a Synthesis Report on green finance in 2016 (G20 Green Finance Study Group, 2016). This report lists several voluntary options how the public sector could encourage private finance for green investment. Among these recommendations are clear policy frameworks, capacity building networks, a promotion of the local green bond market, knowledge sharing on environmental risks, and international co-operation.

The political framework and the emerging accompanying relevant regulation of green finance follow different approaches to governance. They are to a large extent voluntary (e.g., the Task Force on Climate Related Disclosure -TCFD, the Network on Greening the financial sector initiated in 2017, the G20 Green Finance Study Group (2016) or the International Platform on Sustainable Finance (IPSF, 2019)). For the IPSF, Delimatsis (2021) summarises that the platform strives to join forces between policy makers for scaling up and mobilizing private capital, the promotion of best practices, the exchange of information and the identification of opportunities and barriers to sustainable finance. Objectives as described by Delimatsis (2021) for the IPSF can be found in other initiatives as well.

The Paris agreement Article 2.1c explicitly acknowledges the role of finance for mitigating climate change: "Making finance flows consistent with a pathway towards low greenhouse gas emissions and climate resilient development" (United Nations (UN), 2015). For investors this is a

signal that the Paris Agreement will also impact the finance sector (see also Cochran & Paulthier, 2019). It highlights the danger of stranded assets on the one hand and opportunities for early movers at a time of deep transformation on the other hand, even if the empirical evidence what the1.5°C target would mean for finance flows and investment flows is scarce (Chenet et al., 2019). In order to increase the chances of success of green finance, Cardona and Berenguer (2020) argue for an appropriate top-down regulation. They claim that a strict regulatory framework for the financial sector is a prerequisite for financing the transformation process and closing the investment gap. Evain and Cardona (2021) add to this analysis and advocate that regulatory measures should be examined to see whether they have an impact on financing the transformation, either positively or negatively. They conclude from their analysis that financial regulation can provide assistance in solving the challenges of climate change. In their view, three aspects of financial regulation are important:

- Fostering understanding of the challenges of the transformation among financial actors
- Overcoming financial actors' preference for the short term over the long term
- Incentivise financial actors to consider projects with low returns.

The voices for regulation and a guiding political framework are mirrored by an increasing awareness for climate change in central banks and the EU engagement in sustainable finance.

Central Banks, financial supervisors and the NGFS

Central banks increasingly acknowledge the transmission mechanism of climate risks on financial stability. In Dikau and Volz (2021) the rising awareness of central banks regarding climate risks is analysed in terms of the extent to which climate risks or mitigation and adaptation policies are included in central bank mandates. Dikau and Volz (2021) conclude that climate risks can have an impact on monetary and financial stability, which traditionally represents core responsibilities of central banks. In this sense, it can be considered as an explicit task of central banks to integrate sustainability or climate aspects into their core operations.

The Network for Greening the Financial Sector (NGFS) which was launched in 2017, then including 18 central banks and supervisors as well as five international organisations. The aim of this voluntary network is to advise and promote best practices on green finance and contribute to climate risk management in the finance sector. The work of the NGFS is embedded in other ongoing initiatives. Over time the number of members increased to 83 and the NGFS is active in publishing reports on relevant topics for sustainable finance, like on the topic of data gaps, climate scenarios for central banks and climate related litigation as potential risk. The NGFS thus addresses a broad range of issues in the field of green finance. In its first comprehensive report in 2019 six recommendations where compiled that are regarded as relevant for an active involvement of central banks and supervisors to mitigate the impact on climate change as a financial risk. Four of the recommendations directly address central banks and supervisors whereas the remaining two recommendations concern policy frameworks that would facilitate the work of central banks and supervisors, specifically carbon disclosure rules and a taxonomy of economic activities that allows to distinguish those activities that contribute to the transformation process (Network for Greening the Financial System, 2019). Although the NGFS operates

on a voluntary basis it provides an important platform for information and knowledge dissemination.

The European Central Bank (ECB) as one of the members of the NGFS integrated climate aspects into its strategy and in 2021 published "The ECB pledge on climate action" to contribute to the goals of the Paris Agreement (European Central Bank, 2021). The pledge comprises five objectives:

- Integrate climate-related risk into financial stability monitoring and prudential supervision of banks
- Integrate sustainability factors into ECB portfolio management
- Explore the effects of climate-related risks on the Eurosystem monetary policy framework within the ECB mandate
- Bridging data gaps on climate related data
- Working towards higher awareness and intellectual capacity through technical assistance and knowledge sharing.

The commitment was viewed critically in some comments[3], arguing that this is not in line with the ECB's mandate. This perspective is not reflected in the scientific literature if one follows the arguments of e.g. Dikau and Volz (2021) or Network for Greening the Financial System (2018).

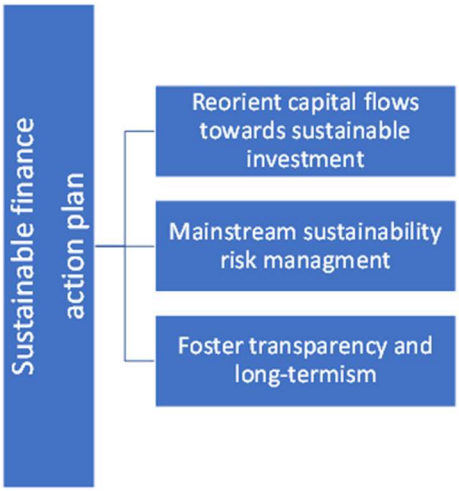
EU Sustainable finance action plan

In 2018 the European Commission released its action plan for financing sustainable growth (European Commission, 2018) following the recommendations from the High-Level Expert Group (HLEG)[4] on Sustainable Finance (High-Level Expert Group on Sustainable Finance (HLEG), 2018). Claringbould et al. (2019) interpret sustainable finance as having "strong green, environmental and social component, to support economic growth while reducing pressures on the environment…". In this sense, the action plan focuses on three areas (Figure 3) and establishes the main building blocks for sustainable finance at EU level.

[3] See e.g. Tesche (2020) or https://www.euractiv.com/section/climate-environment/news/german-central-banker-pushes-back-on-calls-for-ecb-to-fight-climate-change/.

[4] The HLEG comprised 20 senior experts from civil society, the finance sector, academia and observers from European and international institutions. The group's task was to provide advice to the Commission on how to steer the flow of public and private capital towards sustainable investments, identify the steps that financial institutions and supervisors should take to protect the stability of the financial system from risks related to the environment, and deploy these policies on a pan-European scale.

Figure 3: Aims of the EU Sustainable finance action plan



Source: EC action plan (European Commission, 2018), authors illustration.

Most notably the legislative package included the following aspects (see also Siri & Zhu, 2019):

- Taxonomy[5]: a regulation to establish a unified classification system on what can be considered environmentally sustainable economic activities.
- Disclosure and duties: disclosure requirements on how institutional investors integrate environmental, social and governance (ESG) factors in their risk processes.
- Benchmarks: a new category of benchmarks to help investors compare the carbon footprint of their investments.

The probably most prominent part of the sustainable finance framework, the EU taxonomy regulation entered into force in 2020 (European Commission, 2020). The taxonomy recognizes as 'environmentally sustainable' economic activities that make a substantial contribution to at least one of the EU's climate and environmental objectives, while at the same time not significantly harming any of these objectives and meeting minimum social safeguards. The first delegated act on sustainable activities for climate change adaptation and mitigation objectives that defines consistent and objective criteria for classifying economic activities that contribute to achieving climate neutrality and support adaptation was adopted in June 2021. The delegated acts for the other environmental objectives are due to follow in 2022.

Other disclosure tools that are part of this framework are the Non-Financial Reporting Directive (NFRD) that aims at delivering a comprehensive corporate reporting framework with qualitative and quantitative information to facilitate the assessment of companies' sustainability impacts and risks; as well as the Sustainable Finance Disclosure Regulation (SFDR) that creates a comprehensive reporting framework for financial products and financial entities.

[5] The Taxonomy Regulation establishes six environmental objectives: Climate change mitigation, climate change adaptation, sustainable use and protection of water and marine resources, transition to a circular economy, pollution prevention and control, protection and restoration of biodiversity and ecosystems.

Building on the action plan for financing sustainable growth and the progress made since 2018 the European Commission adopted the new strategy for financing the transition to a sustainable economy in July 2021. At the same time the proposal for the voluntary European green bond standard was published, which is supposed to set criteria for bonds raising funds for projects aligned with the EU taxonomy and provide robust information for investors. The new strategy takes into account the increased ambition of the EU's climate policy and the objectives defined in the European Green Deal. It includes a package of measures in four areas that require further action: financing the transition of the real economy towards sustainability, improving the inclusiveness of small and medium-sized enterprises and consumers, improving the financial sector's resilience and contribution to sustainability (double materiality perspective) and increasing global ambition by developing international sustainable finance initiatives and standards, and supporting EU partner countries.

With this process the EU has developed and continues to expand a comprehensive set of regulations and instruments to increase transparency on firms' activities and the "greenness" of investment products, thus providing consistent information for financial market actors and investors and reducing the risk of greenwashing. While this has already contributed to raising awareness especially in financial market institutions and to implementing specific information systems still extensions will have to be made to the existing regulations. One main issue is that currently the disclosure tools and requirements mainly apply to activities, firms or products that are understood as sustainable or delivering a substantial contribution to reaching environmental objectives. Thus, an extension of the taxonomy that would consider also non-green activities or such that support the transitioning towards (more) sustainable business models would enhance the clarity of (environmental) information available in financial markets.

2.3 Risks and challenges

The realization that climate change and related climate risks affect the financial sector has led to a systematization of climate risks. The TCFD has contributed significantly to this systematization with its final report (Task Force on Climate-related Financial Disclosures, 2017). Besides the TCFD other initiatives to manage climate financial risks have been launched in recent years. Pointner and Ritzberger-Grünwald (2019) summarise the emergence of the most important ones among which the TCFD was one of the first. Based on this work a broad consensus on the main risks of climate change for the financial sector emerged and are typically clustered into the following two categories (Task Force on Climate-related Financial Disclosures, 2017; see also Köppl & Stagl, 2018; European Commission, 2019a):

Economic and financial risks from environmental imbalances:

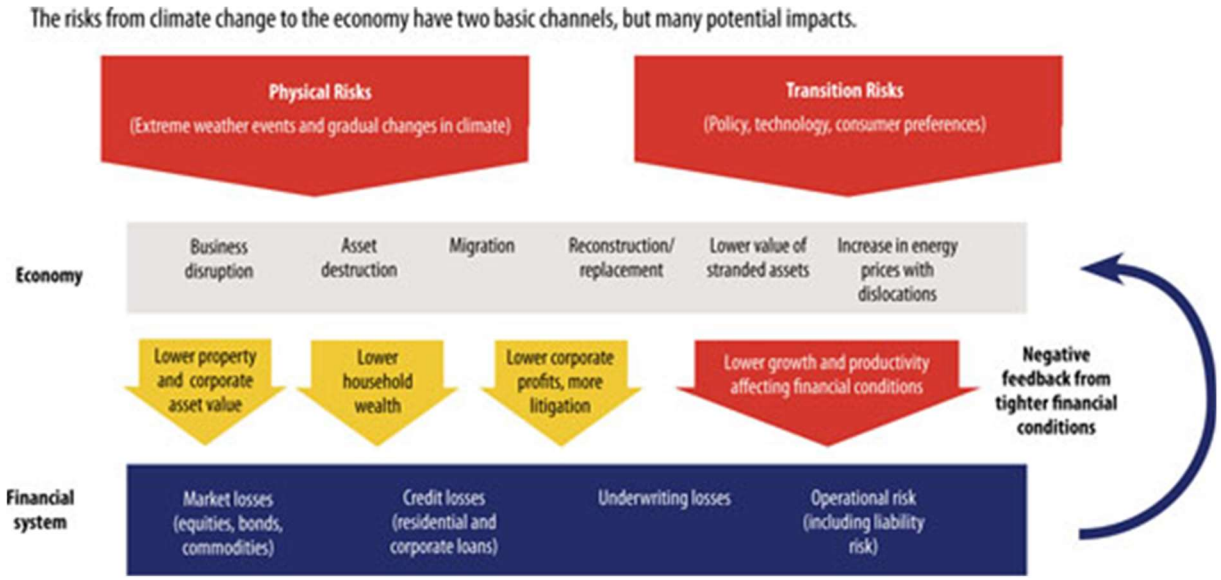
- abrupt damages by an increase in the frequency and intensity of extreme weather events
- interruption of infrastructure
- interruption of resource availability
- non-linearity of climate change (tipping points).

Risks from (policy) regime changes towards low-carbon structures:

- (sudden) policy changes that translate in nearly all sectors in the national and international level, which can lead to stranded assets through regulatory stranding due to a change in policy legislation (carbon taxes, eliminating fossil subsidies)
- economic transformation due to changing relative prices and technological stranding leading to novel technological pathways (e.g. electricity from photovoltaic compared to fossil energy sources)
- market risks due to changes in preferences of customers towards less climate damaging products and services
- risk of litigation for failing to avoid climate risk and reputational risk like losing trust from customers or business partners
- short-termism in asset allocation decisions that underestimate long term risk.

Figure 4 summarises the main channels how climate risk can affect the broader economic system. It shows the impacts on the real economy which then affect the financial sector. Ultimately feedback effects from the financial sector on the real sector take place.

Figure 4: Climate risks in the economic system



Source: https://www.elibrary.imf.org/view/journals/022/0056/004/article-A009-en.xml

Environmental imbalances pose a risk as they contribute to a destruction of physical assets or impair economic structures and value chains. The damage from physical risks is not directly dependent on whether or not an affected company negatively impacts the environment (European Commission, 2018). The risk from short-termism in asset allocation decisions, initially addressed by Carney (2015), requires new risk management models and a stronger orientation towards scenario analysis by financial institutions (see e.g. Network for Greening the Financial System, 2020). The problem of short-termism and the challenge to overcome it is also raised by

Esposito et al. (2019), who stress the strong role of regulation as a prerequisite for a positive role of the finance sector in transformation. Silver (2017) emphasises that the prevailing basis for decision making are past developments which are extrapolated to future development without reflecting potential structural shift.

Risks from regime changes apply to different financial institutions, e.g. if financial institutions (e.g. pension funds, insurance companies) are strongly exposed to fossil assets that are in danger of losing value, or when lost loans are increasing in banks' balance sheets. The impact of climate change on the finance sector and financial instability however is not distributed evenly: they differ both across regions and across sectors (European Central Bank/European Systemic Risk Board, 2021).

Köppl and Stagl (2018) argue that accounting for uncertainties related to technological development and disruptive technologies in financial decision-making is difficult but essential. Acknowledging structural shifts, the potential of disruptive technologies and uncertainties would, however, not only reflect the costs and strategies for avoiding them, but also show related opportunities for investments. As Coleton et al. (2020) conclude risk management is the main driver for taking climate change into account. Ultimately, given the scientific evidence on climate change, risk management represents the underlying condition for a sustainable business model. The Network on Greening the Financial System (Network for Greening the Financial System, 2018) emphasises from an aggregate perspective that climate related risks as source of financial risk endanger financial stability and thus are of concern for central banks and supervisors. The aim is to strengthen resilience of the economy and society, and at the same time provide financial means for low carbon investments.

A successful risk management, however, requires transparent, reliable, and comparable carbon disclosure. The Task Force on Climate-related Financial Disclosures (2017) provides a framework on how carbon disclosure could be implemented. The relevance of disclosure for the development of green finance is also underlined by the European Commission (2018, 2019a) and the Network for Greening the Financial System (Network for Greening the Financial System, 2019).

A survey on investors' views and preferences on climate disclosure was carried out by Ilhan et al. (2019). The respondents value climate disclosure as important information, and the majority considers climate risk reporting equally important as financial reporting. However, the current reporting on climate risk is assessed as lacking information and as imprecise. Also, Siri and Zhu (2019) stress the importance of disclosure as one success factor for green finance and the EU sustainable finance strategy. They propose to focus on a limited number of common and comparable indicators that could act as prerequisite against green washing.

Knowledge is key for managing climate related risks and identifying potential opportunities. In this context the Task Force on Climate-related Financial Disclosures (2017) identified four core elements for the assessment of climate related disclosure:

- Governance: The organization's governance around climate-related risks and opportunities.

- Strategy: The actual and potential impacts of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning.
- Risk Management: The processes used by the organization to identify, assess, and manage climate-related risks.
- Metrics and Targets: The metrics and targets used to assess and manage relevant climate-related risks and opportunities.

Mainstreaming these four thematic areas into annual financial reporting is seen to accelerate changes in business practices which also would promote a reorientation of capital flows towards climate friendly businesses. A crucial aspect in this context is the neglect of negative externalities which sends wrong signals to companies and investors. Carbon pricing is therefore one of the important steps to set the right signals. Internalizing negative externalities would also lead to a reduction of potential under-investment in green activities and potential over-investment in brown activities (G20 Green Finance Study Group, 2016). A clear understanding of what counts as "green" and what as "brown investment" reduces search and transaction costs. The EU taxonomy can provide clarification and a useful guidance for investors and potentially direct the focus on the opportunities that are associated with green investments.

A consideration of structural change and a stronger focus on opportunities for the financial sector include e.g. a potential first mover advantage in low-carbon technologies. These include topics such as energy efficiency technologies, renewable energy technologies and energy storage. How quickly uncertainties about technological change can turn into opportunities is shown by the declines in prices for energy storage in a very short time horizon. For the finance sector this requires a concise regulatory framework on the definition of green or sustainable finance to prevent greenwashing or re-branding of finance flows (Migliorelli, 2021).

3. Results from the survey on green finance's contribution to climate policy, supporting factors and barriers

As described above in recent years the interest in green finance has increased substantially. Not only have various policy initiatives been started, most notably on EU level, but also the quantitative relevance of capital flows towards sustainable or green investments has developed dynamically.

To assess the current relevance of green finance in the financial market and climate policy (with focus on Austria) we carried out an online survey among experts and stakeholders. For the design of the questionnaire and to ensure that all relevant aspects related to the topic are included we led a series of guided interviews with experts from the Austrian central bank, a rating agency and research institution. With the online questionnaire we addressed national and international experts and stakeholders from administration/regulatory bodies, the financial market, (institutional) investors, NGOs and interest representations as well as research and consulting.

The list of addressees for the questionnaire was compiled using snowball sampling. This non-probabilistic method involves primary data sources nominating other potential data sources to be used in the research. Thus, it is based on referrals from initial subjects to generate additional

subjects and is often used when characteristics to be possessed by samples are rare or difficult to find (in this case expertise in green finance). The primary sources in our sample were the members of the project team and their personal contacts from various areas of their work who in turn provided further contacts. Obviously, this approach is subject to sample selection bias. But for the research question in general and most of the questions included in the survey this bias is not unhelpful as specific aspects as well as estimates and expectations stemming from the respondents' experience were asked. Thus, in this case the views of an informed group are preferable over those of an overall population. One remarkable feature of the survey responses was the relative uniformity of opinion on most topics, irrespective of the respondents' professional background, geographic region, or the frequency of dealing with the topic in their daily work[6].

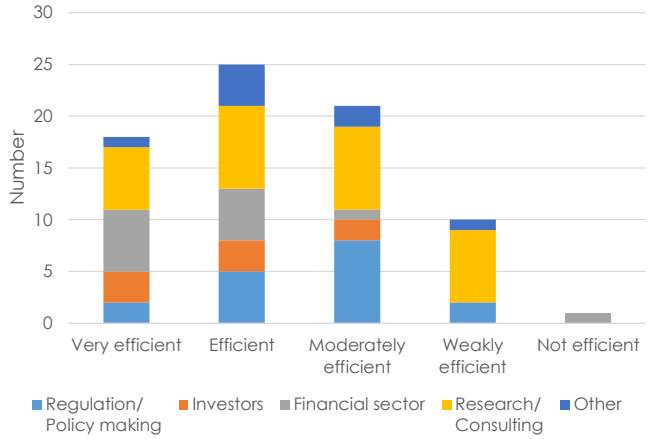
The results can be regarded as robust representation of respondents' opinions and market evaluations and the identified areas of agreement deliver an insight on key strategies, policies and actors that can support the growth of green finance. In particular, the results also provide conclusions regarding key policies that should be integrated in post-Covid stimulus packages to ensure that the recovery is Paris-aligned. The online survey was sent to a total of 185 experts and stakeholders. With 84 questionnaires completed we achieved a response rate of 46%. The largest group among respondents are researchers (30%) followed by people active in policy making or regulating authorities (22%). The financial sector (banks, investment companies, etc.) supplied the third largest group (17%), institutional and private investors account for 12%. Another 11% of respondents are consultants, 8% pertain to other institutions like interest representations or NGOs.

The major part (85%) of the respondents is actively working in green finance and also perceived a strong increase of the topic's relevance in the financial market over the past three years. However, the quantitative share in financial assets is still regarded as minimal, nearly two thirds of the respondents' estimates range from 1- 5%. In contrast, 9% of respondents estimate the share to be above 10%. This could, however, be caused by using a broader definition of the topic, including not only green finance but sustainable finance, which in addition to environmental aspects also take into account social and governance aspects.

The perception of the increasing relevance of green finance also applies to climate policy. In terms of its current contribution to reaching climate policy targets more than half of the respondents rate green finance as an efficient or very efficient instrument (Figure 5).

[6] A similar conclusion was drawn by Stroebel and Wurgler (2021) who conducted a survey among 861 academics, professionals, and public sector regulators about climate finance.

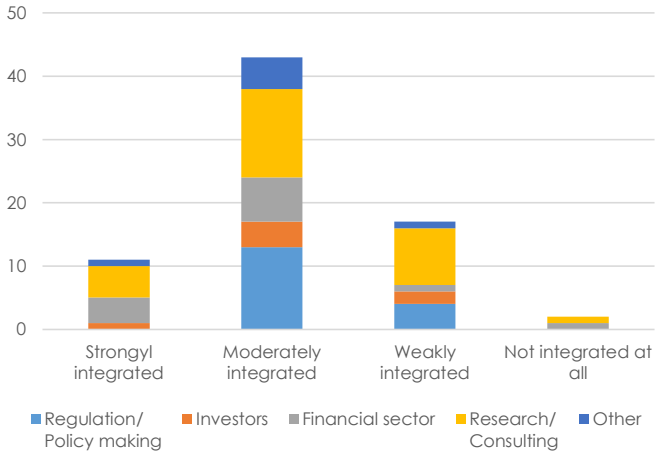
Figure 5: How efficient is Green Finance in contributing to the long-term climate policy goals?



Source: own calculations. The total number of responses is 73.

However, the majority also states that the integration of green finance in climate policy is not yet sufficient - 15% regard it as strongly integrated, 59% as moderately integrated and 26% as weakly or not at all integrated (Figure 6).

Figure 6: To what extent is Green Finance integrated in climate policy?



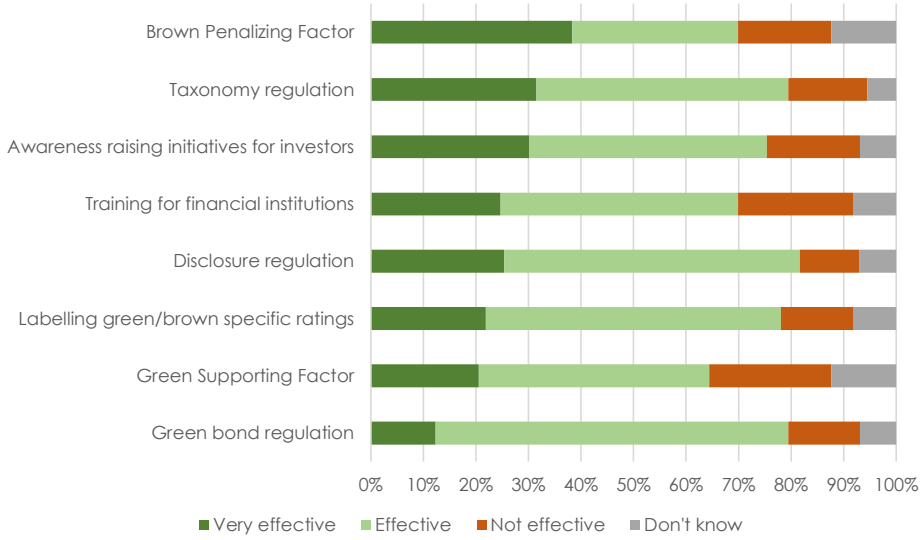
Source: own calculations. The total number of responses is 75.

The main drivers behind the increase in importance are new regulation and guidelines, increased public perception of the climate crisis, the increased consideration of climate risks in the financial market as well as rising investor demand for green investment products. Especially regulatory measures like the EU taxonomy or the Non-financial reporting requirements are perceived as (very) efficient approaches to shift investments towards climate protection. This corresponds to findings in other surveys. For instance, a survey on investors' views and preferences (Ilhan et al., 2019) found that the majority regards reporting on climate risks as equally important

as financial reporting. Also, Siri and Zhu (2019) emphasize the importance of disclosure as one success factor for green finance and the EU sustainable finance strategy. In addition, the participants in our survey are to a large extent of the opinion that specific labels or ratings for brown and green activities and the definition of green bond standards or regulations are efficient instruments for redirecting investments. This highlights the importance of approaches to provide comprehensive and credible information about a firm's or an activity's impact on the environment to potential investors. As a review by Quatrini (2021) highlights, current sustainability assessment is often criticized for having important weaknesses, particularly regarding credibility, scope, and the time-horizon considered.

The results regarding the perceived or expected effectiveness of various instruments and measures for shifting investments are depicted in Figure 7. Interestingly, the expectations concerning a green supporting factor are significantly lower than those about the introduction of a brown penalizing factor. Also, the provision of specific ratings or labels for green and brown activities – another measure to increase transparency – is regarded as effective approach. In this case one significant difference in the answers by sub-group was discernible. Investors and members of the financial sector attribute higher effectiveness to this category than the other sub-groups.

Figure 7: How effective do you rate the following instruments and measures regarding their ability to shift investments towards climate protection?

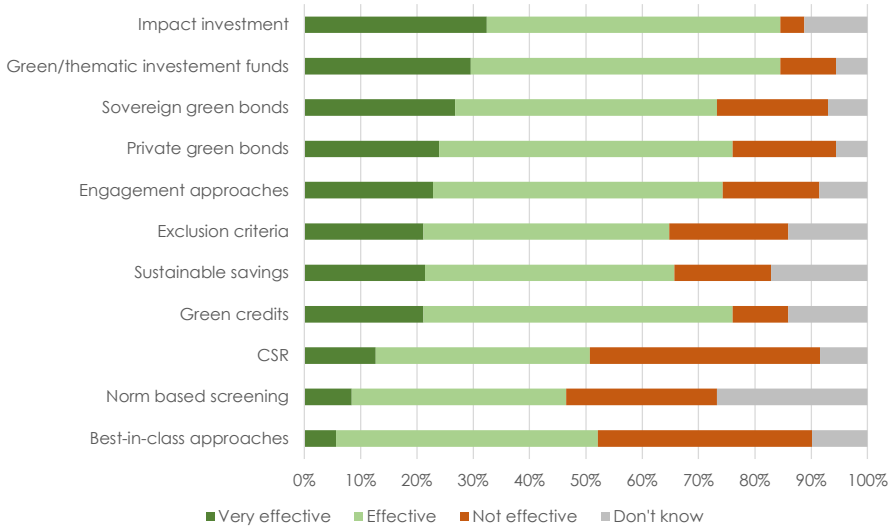


Source: own calculations. The total number of responses is 73.

The next question regarded the effectiveness of various investment products and strategies regarding the shifting of investments toward climate protection (Figure 8). In this context a majority of 85% of respondents rates the approaches as (very) effective, that are related to specific projects or technologies, i.e. impact investment and green investment funds. Thus, the quantifiability of environmental impact is a key criterion. Also, green bonds, green credits and

engagement approaches are perceived as effective. In contrast, investment approaches that are based on a kind of "minimum requirement" for sustainability (corporate social responsibility, norm-based screening and best- in-class approaches).

Figure 8. How effective do you rate the following products and approaches in their ability to shift investments towards climate protection?

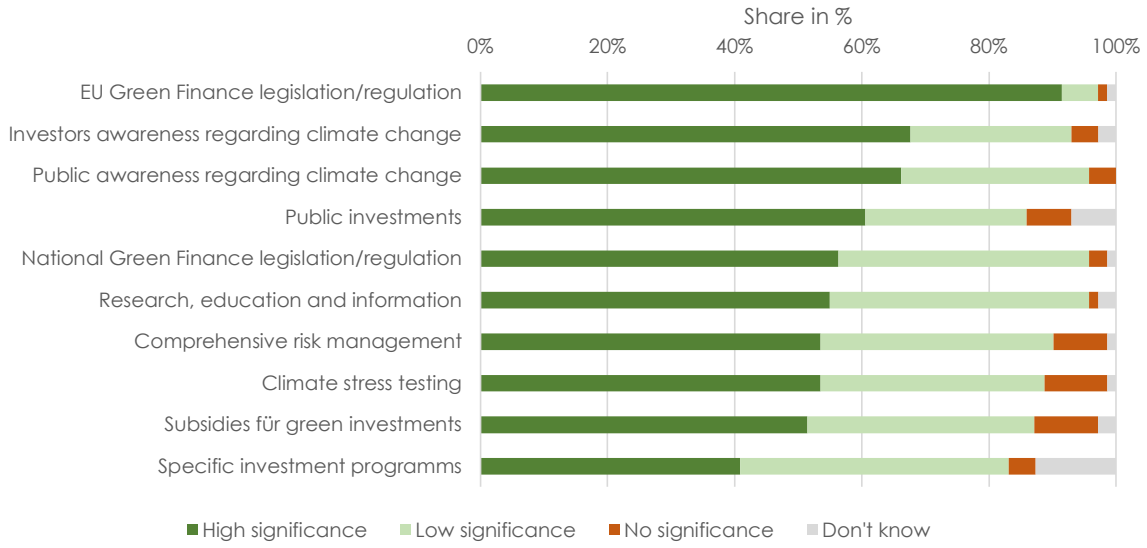


Source: own calculations. The total number of responses is 73.

The importance of specific regulation is also reflected in the perceptions regarding supporting factors for a further growth of green finance (Figure 9). The main impacts are expected from respective legislation and regulation at EU level to which 90% of respondents attribute a high significance, followed by growing awareness for climate change of investors and the public. Also, public investments (as are for instance intended in the context of the NextGenerationEU package) are regarded as important drivers. Kemfert and Schmalz (2019) emphasize the role of public investments and green public procurement which represent not only a direct channel for influencing investment decisions and greening the financial system but are also of quantitative importance. The OECD (2017) estimates public procurement to amount to 12% of GDP in the OECD.

National regulation, in contrast, is regarded as being of lesser significance for supporting green finance as are e.g. comprehensive risk management approaches or climate stress testing, which constitutes a fairly novel instrument. Also, subsidies and specific investment programs are not seen as very significant supporting factors. An assessment of Austrian financial market actors' awareness regarding climate related risks (Glas et al., 2020) also concluded that carbon risk management has to be extended and therefore a reliable policy framework (including carbon pricing), the development of harmonized definitions and indicators, as well as tools for dealing with climate related risks are required.

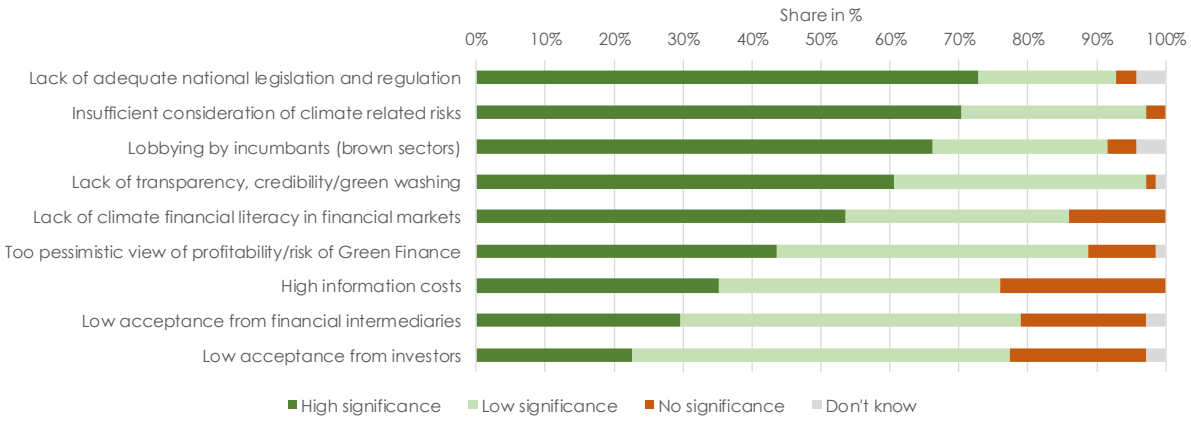
Figure 9. Supporting factors for scaling up Green Finance



Source: own calculations. The total number of responses is 71.

The results regarding the main barriers for green finance (Figure 2) represent the other side of the coin. Here, the inadequate regulation at the national level, insufficient consideration of climate related risks as well as lobbying by incumbents ("brown" sectors) are stated as the main issues that are perceived as obstructing for the growth of green finance. Also, the lack of transparency or the risk of greenwashing are regarded as significant barriers.

Figure 10. How significant do you rate the following barriers for Green Finance?

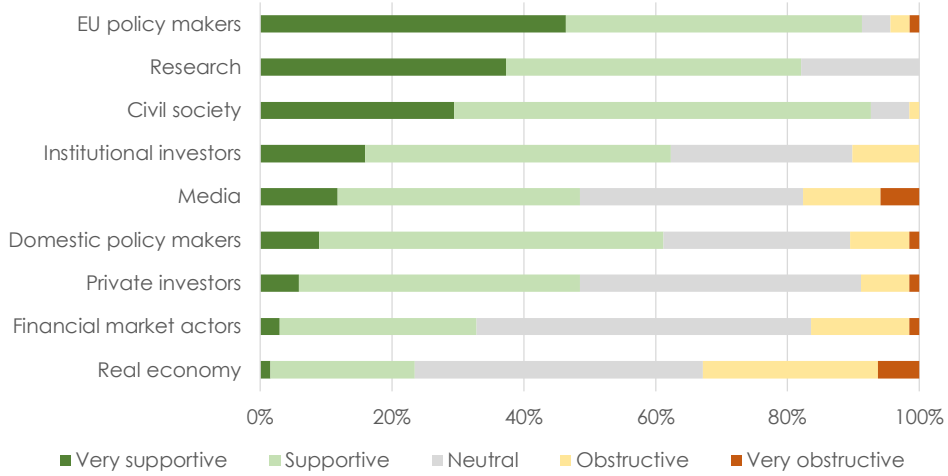


Source: own calculations. The total number of responses is 71.

However, aspects that are often put forward as being problematic with regard to green or sustainable investments like low acceptance from investors or financial intermediaries, high information costs or a wrong, i.e. too pessimistic, view of the investments' profitability are not perceived as being overly obstructive by our respondents. An analysis based on a comprehensive literature review and interviews regarding barriers to closing the green investment gap with a focus on renewable energy investments by Hafner et al. (2020) concludes that the lack of a long-term climate change policy framework and of stable policies is one main obstacle. In addition, apart from issues specific to renewable energy project (related to technological risks or long and complex administrative processes) aspects relating to the short-termism in the financial system, lack of knowledge and climate disclosure are also regarded as highly relevant.

Another aspect included in the questionnaire was which actors are perceived as being supportive or interfering with green finance. The results (Figure 3) largely correspond to the ones presented above.

Figure 11. How supportive or obstructive do you rate the following actors in their role of promoting of Green Finance?

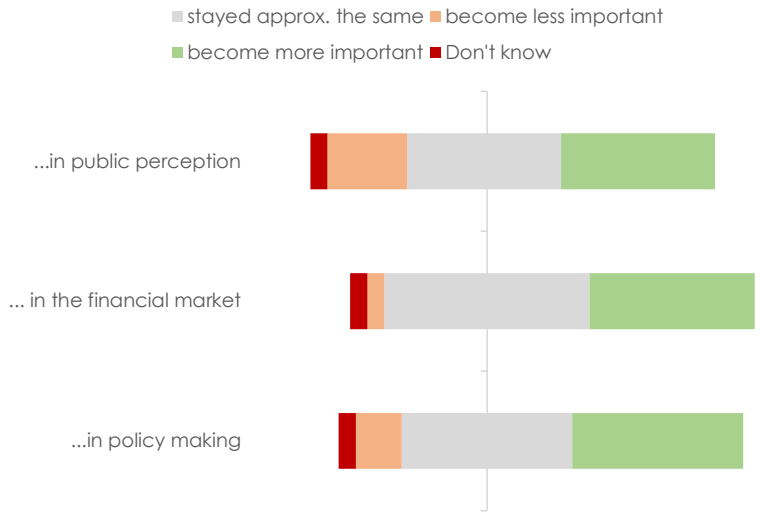


Source: own calculations. The total number of responses is 70.

Our survey finds that it is mainly EU policy makers, research and civil society that are perceived as promoting green finance (80% to 90% of respondents ranking these actors as supportive or very supportive). Also, institutional investors (e.g. pension funds, churches etc.) are largely perceived as supportive. At the other end of the spectrum we find real economy actors (21% perceiving them as obstructive or very obstructive), financial market actors (11%) and the media (12%). A similar rating can be found in Corporate Responsibility Interface Center (CRIC) (2021), an annual survey of stakeholders' opinions on the development and quality of sustainable investments in Germany and Austria. The recent survey sees civil society and EU policymakers as the main drivers for sustainable investment. Corresponding to our results national politics, the real economy and the financial sector are regarded as very to moderately obstructive.

Regarding the impacts of the COVID-19 crisis on green finance the results can be regarded as cautiously positive. Around 40% of responses state an increase in the relevance of green finance in policy making, the financial market and the public perception. Between 40% and 50% state an unchanged relevance. A decrease in relevance is seen by 20% of responses regarding the public perception, while for policy making and the financial markets the shares are 11% and 4% respectively. Thus, at least our respondents have not perceived a major negative impact of the COVID-19 crisis on the relevance of green finance.

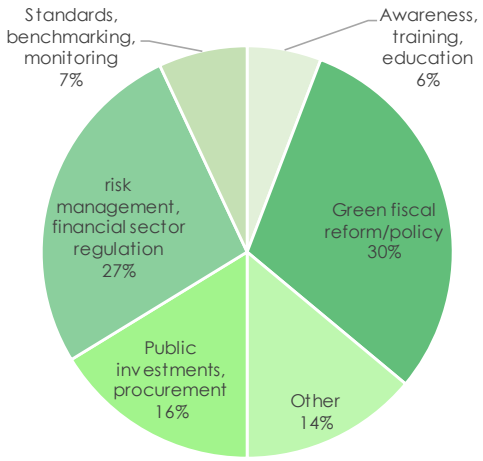
Figure 12. How did the COVID-19-crisis impact the relevance of Green Finance in the following areas?



Source: own calculations. The total number of respondents is 71.

As a final question, respondents were asked to state their opinion on which instruments should be integrated in recovery packages in order to further promote green finance and improve its integration in financial and climate policies. They could state a maximum of three responses. A large share of inputs is related to green fiscal measures (carbon pricing, removal of environmentally counterproductive subsidies, introduction of specific green subsidies). Specifically, 30% of responses relate to the introduction or increase of carbon pricing and/or the removal of environmentally counterproductive subsidies (Figure 13A). 27% of responses concern measures and instruments for risk management and financial sector regulation like stress testing, introduction of a green supporting factor, enhancing the EU taxonomy or greening (development) banks. Another 16% of responses pertain to the category public investments and public procurement which included the consideration of exclusion criteria for public investments (fossil fuels, high-carbon sectors), the focus on green infrastructure in the context of economic recovery and generally strict restrictions for investments not aligned with climate targets. Other suggestions mentioned concern the introduction of technology standards, monitoring requirements as well as education and training approaches (green jobs or retraining of employees in sectors subject to profound transformation).

Figure 13A. Which instruments and/or measures should be integrated in Covid-related recovery packages in order to adequately promote green finance?



Source: own calculations. The total number of responses is 86.

Figure 13B displays the distribution of answers by sub-groups. The three categories with most answers per sub-group are marked in different shades of green. Here, as in the other parts of the survey opinions are largely uniform. In the survey conducted by Stroebel and Wurgler (2021) also carbon taxes are regarded as main driver for change over all sub-groups included. In contrast, financial regulation was regarded as having significantly less influence.

Figure 13B. Which instruments and/or measures should be integrated in Covid-related recovery packages in order to adequately promote green finance?

	Regulation/ policy making	Investors	Financial sector	Research & Consulting	Other
Green fiscal reform/policy	9	6	3	7	1
risk management, financial sector regulation	8	0	2	11	2
Public investments, procurement	4	0	4	4	2
Other	4	2	2	4	0
Standards, benchmarking, monitoring	1	2	0	3	0
Awareness, training, education	0	3	2	0	0

Source: own calculations. The total number of responses is 86.

4. Summary and conclusions

Achieving the emission reductions to meet the long-term climate policy objectives requires a comprehensive restructuring of our economies. Decarbonization implies a massive scaling-up of investments in climate-friendly technologies and infrastructure for mobility, housing and energy as well as R&D aiming at providing solutions for the industrial transition or solutions for net zero mobility. Awareness has been growing in recent years that a broad portfolio of instruments and mesasures has to be applied to meet the challenges at hand. In addition, it has become clear that public finance alone will not be sufficient to fill this investment gap. Therefore, the

mobilization of new capital flows or a redirection towards sustainability and climate protection are an integral part of the climate policy portfolio. In recent years the topic of green finance has gained much relevance, be it at the political level or regulatory level as illustrated by the EU's sustainable finance strategy, be it in terms of capital flowing into sustainable or green investments (green bonds, thematic funds etc.). However, much work still needs to be done to foster the growth of green finance and ensure that it effectively takes the role as enabler of transformation. This regards mainly the continuous improvement of transparency and disclosure guidelines as well as their international harmonization and the closing of data gaps. The fragmentation in the market concerning definitions, delimitations and ratings so far hampers international comparison and an effective market integration. Harmonized definitions and data sources are a prerequisite for a comprehensive evaluation of environmental additionality and credibility beyond the European market. The EU has taken a leading role in this context since the establishment of the High-Level Expert Group Sustainable Finance in 2018 to the adoption of the taxonomy and non-financial disclosure regulations. While some regulations are legally binding other building blocks of the Sustainable Finance strategy are still being developed or in the form of voluntary measures (green bond standard, Corporate Sustainability Reporting Directive). Further advancements are scheduled to ensure the contribution to reaching the 2030 investment targets. The existing and scheduled regulations and guidelines are key prerequisites for providing sufficient transparency and coherent information for financial market actors to base their decision making on. The comprehensive understanding of climate related risks as well as opportunities has to become an integral part of corporate risk management and planning and of investors' asset management.

The results of our expert and stakeholder survey with focus on Austria concerning the relevance of green finance and important framework conditions for its further growth and re-orientation of finance flows correspond with other results found in the literature. The main conclusions that can be drawn from the survey results concern recommendations for policy makers. These regard primarily the further development of financial market regulation to improve investment security in terms of environmental impacts and prevention of greenwashing as well as the thorough consideration of climate related risks in firms', banks' and investors' decision making. In this context, potential is seen for national policy making to increase efforts for establishing supporting framework conditions and removing barriers. The review of policy documents, academic literature as well as our survey results underline to the need for ambitious climate target-setting, specifying a clear path to reach those targets. Most importantly, however, there is broad consensus that a more comprehensive application of carbon pricing and the removal of counterproductive subsidies as instruments for pricing negative externalities also contribute to achieving a level playing field for climate friendly technologies, infrastructures, and activities.

Acknowledgements

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