

Policies for Sustainable Finance to Fund the Climate Transition

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The logo for VINNOVA, the Swedish Innovation Agency, is displayed in a bold, green, sans-serif font. The letters are spaced out, and the 'V' and 'A' have a unique, angular design.

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Executive Summary

The saying ‘money rules the world’ captures an important truth about how finance and investment flows determine the future of our society. In order to meet the challenges posed by climate change, there is a great need to redirect investments from economic activities that pollute the environment (such as fossil fuel extraction) into more sustainable activities and green projects (such as recycling and renewable energy). This report explores ways in which this can be successfully achieved. More specifically, the report seeks to answer two overarching questions: **1. What role does the financial sector play in achieving society’s climate goals and in financing the climate transition? 2. How can the government of Sweden influence the financial sector so that capital is increasingly directed towards more sustainable activities?**

The report is authored by the Sustainable Finance Lab, a multidisciplinary competence center established to enhance the ability of financial markets to contribute towards sustainable development. We have surveyed public policies for sustainable finance in both Sweden and the EU, and critically assess these policies based on a broad range of academic research. We have also surveyed private sector actions, and how the private and public sectors together develop sustainable finance practices. We draw on this critical analysis to put forward **recommendations concerning how the Swedish government should act to promote investment in the transition to a climate-friendly society.**

We have identified three overarching areas in which political action is most needed:

(1) Market Functioning: In order to harness the potential of financial markets to ‘on their own’ allocate resources efficiently, there is a need for policies that address central market failures and frictions that are barriers to more sustainable investments. The Swedish government should promote policies that enhance the functioning of financial markets in these regards, in particular their ability to recognize investors’ preferences for sustainable investments and to reliably allocate these investments towards sustainable companies and green projects that support climate policy objectives.

(2) Prudential Regulation: Delegated authorities such as Sweden’s national bank, the Riksbank, and the Swedish financial supervisory authority, Finansinspektionen, play an important role in overseeing financial markets, with regards to the ‘prudential’ goals of price and financial stability. But

this work now needs to be updated in order to give greater attention to climate-related risks and the role of financial markets for the climate transition. The Swedish government should review the mandates given to the relevant authorities and enact public policies that increase the alignment between prudential and sustainability goals.

(3) Directly Promotional Activities: The public sector can also play a more active and direct role in redirecting capital flows towards sustainable companies and projects, for example through public investments or credit guarantees. Such promotional activities are necessary to spur new markets and to support new solutions that private investors are unable or unwilling to finance. The Swedish government should continue to ramp up its activities that aim to, swiftly and directly, revert incentives away from high-carbon investments and towards more sustainable and long-term financing initiatives.

More generally, while there is a need for a multitude of policy interventions, there are gains from ensuring better alignment between public institutions such as the government, central banks, and supervisory agencies. Moreover, the degree of international integration of financial markets requires policy coherence at both national and international levels. The policy areas should however not be understood as being mutually exclusive or separate. Private sector initiatives can contribute much towards climate transition, but not without the support of public sector development of regulation and standards. Certain recommendations put forward will pertain to and concern more than one policy area.

Strengthening sustainable market functioning

Recent years have seen much activity pertaining to the “EU Action Plan on Sustainable Finance” including such elements as disclosure requirements, benchmarks and the “EU taxonomy of sustainable activities”. While it is easy to be overwhelmed by these initiatives, it is important to take a step back and put them into perspective. The bulk of the EU Action Plan consists of what we call market functioning policies, and these generally take less time to implement than regulations of market-based products and initiatives.

The objective of market functioning policies is to target the market failures and frictions that are barriers to more sustainable investments, such as information asymmetry, myopic investment horizons, and investment under uncertainty. It is vital to address these to harness the great potential of financial markets to allocate resources in efficient ways, although it is naive to think that market functioning policies on their own are enough to support a swift and strong transition towards a more sustainable society. Our more precise recommendations in this context are organized along two main themes, which are: harmonizing global standards and aligning regulatory frameworks.

Harmonizing global standards on sustainable finance

The Swedish government should continue its support of the development and implementation of global sustainability standards through international organizations, but can potentially play a more active role in areas in which Sweden has particular strengths. In recognition of Sweden’s limited size and independent influence, it is more efficient to engage with the establishment of sustainability standards through international organizations such as the EU, the UN, the IMF, etc. Sweden is already engaged in several such initiatives. In the future, the government may decide to play a more active role with regards to certain areas of particular national competence, such as hydropower, paper, the development of construction materials, and public digital sustainability data, for the sake of contributing towards developing meaningful standards.

The Swedish government should task the Swedish Competition Authority (Konkurrensverket) to focus on unfair sustainability practices, so that the government can act swiftly to prevent possible adverse effects of international sustainability standards on Swedish

industry. EU standard setting has a strong influence on the viability of products and business models of Swedish firms. To some degree, EU standard setting is a process where national interests are promoted by individual EU member states, and there is therefore a need for the Swedish government to promote Swedish interests in the EU standard setting process. To transition the financial markets towards sustainability, international sustainability standards should be promoted. Possible adverse effects of sustainability standards on Swedish businesses however can in turn be mitigated by the Swedish government intervening to remedy unfair sustainability practice internationally. The adverse effect of sustainability can also be mitigated by the Swedish government supporting competence development regarding how businesses can utilize sustainability to instead enhance their competitiveness.

The Swedish government should review its bilateral investment treaties (BITs) and renegotiate them where necessary to ensure they are aligned with climate policy objectives. BITs have become a concern as they can constrain host countries from implementing public policy. Under the Energy Charter Treaty, Vattenfall launched a EUR 1.4 billion claim against Germany over permit delays for a coal-fired power plant in Hamburg, which it won. It is unclear to what extent Sweden is using its BITs to constrain climate policy efforts overseas but, as Sweden is engaged in over 70 bilateral investment treaties and, through membership of the EU is a participant in various EU agreements, it should review them to ensure they are not to the detriment of climate policy objectives.

The Swedish government should promote investment inflows by developing policy that supports foreign sustainable business development in Sweden. The comparative advantage to foreigners of investing in Sweden for sustainable business development should be made clearer. Ambitious climate policy signals opportunities in carbon-friendly economic activities and may spur investment inflows and the establishment of enterprises that need reliable and clean energy sources. The Swedish government can therefore support economic growth and climate policy objectives by supporting clean investment inflows, rather than exporting clean energy.

Aligning regulatory frameworks with climate policy objectives

Uncertainty arising from policy, and especially climate policy, is a key barrier to increased investment in the climate transition. The Swedish government should explore opportunities to reduce this uncertainty with policy that offers greater certainty on investment returns. There is a well-established positive relationship between the level of policy certainty facing investors and the levels of investments made. Flexible, price-based policy may have efficiency advantages, but these advantages should be considered along with the potential impact of reducing the certainty of investment returns and corresponding effects on investment levels.

The Swedish government should further employ coordinating agencies to promote sustainable finance and business models. Different regulations across disparate public policy areas could potentially come to work at cross purposes with each other. Potential gains in climate protection could therefore be realized by aligning regulatory frameworks with climate policy objectives. As there is a need to develop sustainability-based business models, and great growth potential in the sustainability sector, government agencies such as Finansinspektionen, the Swedish Energy Agency (Energimyndigheten), the Swedish Agency for Economic and Regional Growth (Tillväxtverket), Sweden's innovation agency VINNOVA, the Swedish National Board of Housing, Building and Planning (Boverket), the Swedish Export Credit Corporation (SEK), and more, should be employed in coordinated efforts to achieve greater development of the sustainability business ecosystem.

The Swedish government should enhance its capacity to swiftly evaluate, adapt, and implement better sustainable finance regulation. Sustainable finance regulation, and environmental and social regulation more generally, is developing rapidly. At the same time retail and institutional demand for sustainable finance products is growing. In this dynamic environment, there is a danger of policy mistakes that lead to adverse effects that can undermine legitimate efforts to finance the transition. For example, policy to support increased investment in the cleanest 'green assets' may divert resources from 'brown assets' that require investment to upgrade and convert to green. The conversion of 'brown assets' to 'green assets' may benefit

sustainability objectives, but regulation may direct too little investment into this type of conversion. There is a need for a robust evidence base to evaluate the effectiveness of sustainable finance regulations to ensure a more efficient and cost effective transition towards sustainability. The government needs to develop a capacity to respond quickly to unsustainable finance practice because large amounts of financial resources may otherwise not most effectively contribute toward sustainability.

The Swedish government should actively promote regulation and standards that support the private sector's international sustainable finance initiatives. Furthermore, Sweden should seek to lead the way internationally by, for instance, requiring more detailed sustainability accounting data from companies.

Increasing efforts of private sector actors to transition financial markets towards greater sustainability need the support of matching international governing organizations, regulations, standards, etc. to be effective. Outstanding examples of such initiatives are the Glasgow Financial Alliance for Net Zero, and the International Sustainability Standards Board.

The Swedish government should deploy policy to ensure that smaller companies can access sustainable finance. This could be accomplished in part by supporting the development of simpler sustainability reporting standards for smaller companies. Current information frameworks utilized by financiers to guide their financing decisions towards more sustainable businesses are distorted by systemic biases. These biases can undermine efforts to support financing of climate-friendly projects. One source of bias is due to smaller companies often being unable to meet the informational demands being put to them by financiers. Increasingly elaborate sustainability reporting requirements impose costs that disproportionately affect small companies, as they lack the resources to meet these requirements. The effect being that smaller companies, which have been identified as an important driver of innovation, miss out on financing that would allow them to e.g. develop cleaner production.

Aligning prudence with sustainability

Prudential financial regulations aim to safeguard price and financial stability. As such they can be effective tools for the promotion of sustainable finance, since they have a direct steering effect which market

functioning policies lack. Due to the fact that current prudential policies may actually impose obstacles to sustainable finance, there is presently a need to review the prudential framework and to develop new policies that better align prudential and sustainability goals. However, exclusive reliance on prudential policies must be understood to be problematic as their primary function is to safeguard price and financial stability goals, rather than sustainability per se.

Whilst the current prudential framework shows some concern for climate-related risks, there is a need to reconsider its focus on informational policies in favor of moving toward more structural and/or coercive policies.

The Swedish focus has historically been on implementing informational rather than structural policies for the purpose of promoting sustainability, with some exceptions (mainly pertaining to how the Riksbank has chosen to exclude specific high-carbon investments from its own portfolio). The relevant authorities have mainly worked with improving the availability of information pertaining to the relationship between prudential and sustainability goals, and on giving non-coercive advice to market participants on how to e.g. reduce their exposure to climate risks. Seldom have more structural or coercive policies been employed, such as adjustments to capital or liquidity requirements or direct credit limits. This balance should be reconsidered in light of the seriousness and urgency of the threat posed by climate change to both price and financial stability.

There should be further dialogue to clarify the mandate of delegated authorities such as Finansinspektionen and the Riksbank as they relate to utilizing prudential policies to promote sustainable development. A reason why these authorities have not further employed structural or coercive policies relates to the interpretation of their mandates. Finansinspektionen has stated that it is not part of their mandate to raise or lower the capital requirements for certain types of exposures for the sole purpose of promoting sustainable development. Similarly, the Riksbank has stated that it accepts the 'principle of market neutrality' which entails that state interventions are not allowed to distort competition without objective grounds. There is however valid criticism of this principle of market neutrality, since it does not guarantee efficiency in the presence of market failures. Policies for sustainable finance can consequently be seen as corrections of the

market's tendency to underestimate the risks inherent in brown investments and over-emphasize the risks involved in green investments. Such policies do not entail that a broader sustainability mandate must be adopted, as a failure to promote sustainable finance may jeopardize already established prudential goals.

Appropriate authorities should conduct investigations into the benefits and drawbacks of various structural policies pertaining to the Swedish context, including, but not limited to, proposals of adjustments to capital and liquidity requirements. The Swedish authorities should rethink the balance of their prudential policies and move towards a greater usage of structural policies. At this point in time, it is difficult to determine the more specific policies of this kind which would be most suitable in the Swedish context.

The appropriate authorities should investigate the possibility of adjusting capital requirements through the introduction of a 'brown penalizing factor' to address concerns posed by climate-related risks to financial stability. Finansinspektionen was originally skeptical towards the government's proposal to reduce the capital requirements for occupational pension funds investing in green infrastructure projects, on the basis that reductions in capital requirements could increase the risk of financial instability. The Riksbank has expressed similar concerns and argued that incentives to increase sustainable investment should be created in other ways. These criticisms are however only directed at the idea of a 'green supporting factor' in capital requirements, i.e. a reduction in capital requirements for certain green projects. They do not pertain to the corresponding proposal for a 'brown penalizing factor', i.e. an increase in capital requirements for certain brown projects. Relevant authorities should investigate this avenue to address concerns posed by climate-related risks to financial stability.

Employing directly promotional policies to develop sustainable finance

Directly promotional policies aim to ensure specific non-prudential goals by more direct state interventions in the market's allocation of resources. These policies either shift resources directly to a specific use via public subsidies or investments, or they prohibit the use of resources for a specific use via quotas or other tools. Directly promotional investments can spur activity in

new markets or support new solutions that, for various reasons, private sector investors are unable or unwilling to finance. Through directly promotional policies, governments can act swiftly and directly to revert counterproductive high-carbon investments, and support more sustainable and longer-term financing initiatives. An important challenge in this context is how to best organize or administer state interventions to ensure that they spur private sector investment rather than displace it. Direct public investment can be delivered via several channels, including the legislative channel, the monetary/supervisory channel, and the direct involvement channel.

Directly promotional policies should be implemented as robustly as possible, which entails that they most often will take the form of public mandates, assigned to delegated authorities. The effectiveness of directly promotional policies hinges on minimizing policy uncertainty through: a) clear selection criteria and careful communication, and b) committing fully and without discontinuation to the transition pathway. This reduction of policy uncertainty creates trust and reduces uncertainty among market actors regarding the permanence of the policies, which is essential for market actors to make investments and organize their business. Directly promotional policies are therefore more likely to work if they are implemented as robustly as possible. They should not be perceived as ‘policies of the day’ that may change as the political winds do. This could be a reason to prefer administration by delegated authorities rather than by the Ministry of Finance itself. As the mandates given to delegated authorities and public companies are announced in advance and cannot be changed too often, they are likely to minimize both types of policy uncertainties mentioned above.

The government should build its capacity for risk balancing between the private and public sectors, for instance through procedures for swift development of enabling legislation and agency action. It is important to consider the distribution of risk-bearing inherent between the public and private sector in the different policies. The strongest argument in favor of directly promotional policies is that some of the risks involved in the climate transition can only be taken by the state. This is because some sustainability-related risks are too high for traditional market actors, which means that unless the state mitigates the risk, they will be reluctant to invest or develop their businesses in such a

way. An important counterargument against such policies is however that the state may create a ‘moral hazard’ scenario through shifting the risk to the public sector whilst guaranteeing repayments for investments made by private market participants. Moral hazard means that private actors intentionally engage in risky behavior because they know that any resulting losses will be incurred by someone else. To avoid such a scenario, directly promotional policies need to be implemented in a way that maintains a good balance of risk-bearing. Furthermore, there is a potential issue in giving a sustainability mandate to the public pension funds, as those who will bear the risk here are future pensioners instead of the public as a whole. The government should build their capacity to govern the balance of risk-bearing now, because this balancing will be of great importance in the future, not only because new investments and businesses entail complex risks, but also because of the changing nature of the risks pertaining to existing assets and businesses. The government could start by bringing together a commission consisting of private sector actors together with Fossil Free Sweden (Fossilfritt Sverige), the Swedish Environmental Protection Agency (Naturvårdsverket), Finansinspektionen, as well as the Ministries of Finance, Industry, Environment, and Infrastructure. We recommend that the government considers making a permanent organizational unit responsible for public-private risk balancing, for instance by creating a unit within a ministry, or within an agency.

The government should develop its capacity to take direct action on sustainable finance which is as complementary as possible to that of the private sector’s initiatives. A central challenge of state intervention is that it entails a need to build capacity for governments to identify which sustainable investments to make. A mixed public/private investment approach could be adopted as a hybrid strategy to harness the best of both public and private sector investment practices. Alternatively, the government should seek to direct its public investments to the areas that are as complementary as possible to private initiatives in the field. Two such areas are: (1) the most innovative new products, services, projects or new technologies that show considerable potential but which the market perceives as too risky to fund, and (2) the most long-term investments, in e.g. infrastructure, which are vital to the climate transition but go beyond

the investment horizon of many private market participants. Another important point here is to be mindful of the risk of creating a green financial bubble, as directly promotional policies could potentially increase the valuation of certain green (or merely greenwashed) assets beyond sound levels.

The Swedish government should launch an investigation into the feasibility of establishing a national green investment bank (GIB). This would be a publicly- capitalized bank created to provide financial services targeting green projects and to facilitate private sector investments to support the transition to a low-carbon economy. The rationale for a GIB rests on the ideas that: a) it would be able to provide financial resources where other financial market actors are unable or unwilling to, b) it could spur private sector investment via its banking activities, and c) a Swedish GIB could efficiently coordinate with GIBs of other EU member states and other international GIBs. To ensure that a GIB functions as intended, the role and scope of the GIB, which lies somewhere between direct public funding support and private sector investment, needs to be clearly delineated. A GIB that crowds out private investment, or undermines or duplicates direct public funding efforts, would be counterproductive and costly. A GIB should operate with a strong and transparent sustainability objective and could thereby help reduce policy uncertainties with regards to the government's endorsement of directly promotional policies. A GIB could be capitalized by the state but also take in private capital, and thus potentially contribute to a good balance of risk-bearing between different financial actors. Experiences gathered from observing other EU countries' publicly-backed investment banks provide valuable insights on how Sweden could consider approaching the issue of setting up its own.

Finally, **the Swedish government should investigate the possibility of channeling the money raised from sovereign green bonds into a separate budget for climate-related public investments, which is distinct from the broader state budget so that such investments do not have to compete against other public costs.** It is likely that many investment funds with a sustainability profile will buy the newly-issued sovereign green bonds as a counterweight to their riskier investments in corporate shares. However, a relevant criticism of these bonds is that they were not intended to facilitate additional expenses in the state budget. That is, the

relevant climate investments and railway maintenance costs were already included in the budget, and therefore the government failed to utilize the financial market's interest in sustainability to facilitate additional climate-related activities.

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Chapter 1.

Introduction

There is an old saying that ‘money rules the world’, and it captures an important truth about how finance and investment flows determine the future of our society. In order to meet the challenges posed by climate change and to sustainably transform our economy, there is a great need to redirect finance and investment flows from economic activities that pollute the environment (such as fossil fuel extraction) into more sustainable activities and green projects (such as the development and promotion of renewable energy). The challenge is in how to successfully accomplish this crucial transformation. In a modern economy, most finance and investment decisions are made by private sector actors, such as individuals, corporations, banks, funds, insurance companies, etc. It is therefore important to thoroughly examine the role of the financial sector in facilitating the transition toward a more sustainable economy. However, the financial sector can in turn be controlled or directed by public policies and regulations. The Swedish government may therefore have great opportunities to boost its climate actions through various interactions with the financial market.

This report seeks to answer two overarching questions:

1. What role does the financial sector play in relation to climate goals and for financing the climate transition?
2. How can the government of Sweden influence the actions of the financial sector so that capital is increasingly directed towards investments in more sustainable activities?

There is currently a strong development at the intersection of sustainability and finance. Most readers of this report have probably heard of the EU taxonomy for sustainable activities and various other initiatives by both private and public actors. The increased activity is likely due to the fact that most governments around the world – as well as most market participants – have come to realize the urgency of the challenge of climate change. The increased activity calls for a more thorough mapping of the various initiatives and a research-based analysis of their pros and cons. Analysis should also be made of what the government could do to develop the overall system for directing financial markets towards climate goals.

This report is divided into four main chapters. Chapter 2 provides an overview of certain basic issues concerning how financial markets influence the real economy and

how public regulations influence finance. It also introduces some of the main policies for sustainable finance that have been implemented in the European Union and Sweden, respectively. Chapter 3 thereafter discusses why financial markets currently pay so little attention to climate change, and some of the challenges involved in using financial markets to facilitate the climate transition. Most of the attention here is given to salient ‘market failures’ such as information asymmetry and herding effects. Chapter 4 returns to the role of public policies and gives a more thorough analysis of the full range of public policies that are available to promote sustainable finance, as well as a critical analysis of the strengths and weaknesses of three major groups of policies. Finally, Chapter 5 applies the preceding thoughts and analyses to the case of Sweden and gives a more detailed discussion of the various policies that are on the government’s table at the moment.

This report was commissioned by the Swedish Climate Policy Council (Klimatpolitiska Rådet), which is an independent expert body tasked with evaluating the Swedish government’s climate policies. It is authored by the Sustainable Finance Lab, which is a multidisciplinary competence center established to enhance the ability of financial markets to contribute to sustainable development. Sustainable Finance Lab is funded by Vinnova in collaboration with strategic partners from the financial sector and civil society. The authors are grateful for the feedback and advice we have received from several sources, including our corporate partners, the Swedish Climate Policy Council, and fellow academics.

A preliminary version of this report has been discussed with the following industry actors: Danske Bank, Nasdaq, Folksam, and AP7.

Chapter 2: Financial markets and regulation

2.1. The role of financial markets in the real economy

For those of us who live in developed countries, it should come as no surprise that finance and investment play a central role in the economy. For one thing, they are all-pervasive. According to the Global Wealth Report (2017), financial assets comprise around 50-70% of household wealth in most developed nations today. This means that the dominant form of wealth is no longer tangible things such as houses, cars, machinery or other material goods, but instead holdings of financial assets such as bank deposits, stocks and bonds. These assets can be held either by households directly or, as is more often the case, indirectly through financial institutions such as pension funds, insurance companies or other kinds of trusts. According to one estimate, global financial institutions hold assets of about USD 131 trillion – that is, 131,000,000,000,000 US dollars (Global Pension Assets Study, 2018).

Why are finance and investment so central to our economy? One explanation is that advanced economies tend to produce complex goods, where businesses need to engage in processes such as technological design, industrial production, and mass market retailing. These processes require large investments in human capital (such as education) and physical capital (such as materials and machinery). Both types of investments must in turn be financed or paid for by financial capital. To put it simply, we live in a world where almost all production and trade relies heavily on finance.

Historically, the financial sector’s share of GDP has increased with the development of the economy, and the financial sector is an essential infrastructure for economic growth. The financial sector is usually divided into markets for private individuals and small companies on the one hand, and the market for large companies and institutions on the other. Both of these are important for the economy, although in slightly different ways. For private individuals and small businesses, their many small financial transactions add up to having macroeconomic effects in terms of both economic growth and societal development. For large companies and institutions, there is an opportunity to make more conscious decisions on direct investments in large system solutions. For example, private and public pension funds have increased investments in infrastructure in the form of roads, electricity distribution, ports, and energy production in the form of wind power and solar energy.

2.2. How large an effect can financial markets have on the real economy in general, and climate change in particular?

Transitioning into a more sustainable economy requires significant financial resources, and most financial resources are made available and managed by private sector actors, such as banks, funds, and venture capital. At the Cop26 meeting in November 2021, a group of private sector financial companies created the Glasgow Financial Alliance for Net Zero (GFANZ) and presented a report that said that USD 125 trillion of investment is required to avoid “the worst physical impacts of climate change” (GFANZ, 2021). The group also stated that approximately 70% of this sum could be provided by private sector actors. A starting point for an analysis of the effect that financial markets can have on climate change is to get a bird’s-eye view perspective of the distribution of financial resources throughout the economy. The largest amounts of financial resources are allocated to debt markets and stock markets. Funds typically invest heavily in both debt and stock markets. However, as many compilations of global asset distribution (such as reports by the International Monetary Fund (IMF), the World Bank and various company reports) point out, it is difficult to map the global distribution of financial resources because of overlaps. Nonetheless, a rough estimate suggests that around one quarter of the world’s financial resources are invested in stock markets, as can be seen in Figure 1. The remaining three quarters are in debt markets. Consequently, if financial resources in debt markets could be directed towards climate change, then the effect could be large.

Figure 1. Schematic distribution of financial resources stock markets and credit markets globally.

World Stock Markets	World Government Debt	World Household Debt	Financial Corporation Debt	Non-financial Corporation Debt
~25 %	~24 %	~17 %	~17 %	~17 %

The household, financial and non-financial debt markets differ, and therefore provide differing opportunities to address climate change. Inspiring examples of successful initiatives include opportunities for households to receive a discount on their interest rate if their house is energy-efficient, and/or green-

labeled; the fact that the market for green bonds is growing rapidly for non-financial corporations; and the fact that financial corporations get better terms on their green-labeled debt. All these examples involve banks, because of their central role in lending to households, as well as financial and non-financial corporations.

2.3. How can financial markets support climate change objectives?

Sustainable Finance is achieved both by re-directing existing assets and by directing new debt and capital inflows toward sustainable assets. The *IMF Global Financial Stability Report for 2021* shows both a rise in global assets, and a rise in the share of assets that are designated as sustainable. There are two main mechanisms for change towards sustainable finance:

1. 'Greening finance', meaning to steer away from unsustainable investments, such as brown investments. This mechanism is used when financial market actors want to contribute towards sustainability on ethical grounds, as well as due to the fact that unsustainable and/or brown investments are becoming increasingly risky.
2. 'Financing green', meaning to direct investment and financial flows toward sustainable investments, such as green investments. This mechanism is used when financial market actors want to contribute towards sustainability on ethical grounds, as well as due to the fact that investments are rapidly growing, and/or profitable.

These mechanisms are most centrally at work in the rise of new sustainability funds, the increasing focus on sustainability in existing funds, the growth of sustainability-related businesses, and initiatives to green-label the credit portfolio of banks.

The effect of financial markets on the real economy is not easily quantifiable. Nonetheless, once the 'herd effect' towards sustainability gains momentum, a substantial change can reasonably be expected. An illustrative example is the recent rapid growth in green bonds, amounting to 95% a year. Although green bonds only comprise around 1% of global bond markets currently, there is reason to believe that green bonds will eventually become the market standard.

2.4. The role of regulation

Financial markets are sometimes referred to as 'the fifth branch of government', meaning that financial markets

are regulated to serve various social or political purposes. One of the most common reasons for regulation is to avoid financial crises. Yet another reason for regulating financial markets is to promote growth, for instance by letting banks provide credit in certain areas, or by regulating what kind of services financial firms can provide to the market. Regulation of financial markets has been quite effective in distributing financial resources for economic growth and societal development.

However, in order to ensure that the banking and finance sectors have a positive impact on the wider economy, regulation and financial sector actors must be aligned. Two examples of successful alignment are the Basel Accord's monitoring of financial stability and risks in the global banking system, and the Single European Payment Area (SEPA).

The global financial risk monitoring system relies on banks reporting to central banks and accountants and financial supervisory authorities, who in turn monitor whether the reports are fully compliant with regulation. The system is called the Basel Accord, because it is governed by the Bank for International Settlements in Basel. The Basel Accord was designed and implemented by central banks and governments internationally. It was initiated in 1988, and over the years most countries and central banks have joined the system, rendering it the de facto global system for financial risk monitoring. Accountants have developed a corresponding global system for risk assessment in bank assets (www.ifrs.org). The global financial risk monitoring system works fairly well due to its capacity to provide global standards for assessing risk in financial assets held by banks and other financial market actors. This standard ensures not only global assessment of bank risk, but also efficient global credit markets. When global credit markets run efficiently, they contribute towards economic growth by channeling capital accurately.

The Single European Payment Area (SEPA) is a European Union (EU) example of how the financial services sector has improved business by lowering cross-border payment fees. The SEPA started in 1999, and by 2014, most EU countries were in compliance with the SEPA regulation. EU member governments implemented the regulation for their banks and other financial services actors involved in handling payments. The SEPA resulted in lower fees for cross-border payment in the

EU, benefiting both households and business across Europe. The SEPA also created EU-wide standards for payments, which facilitated a common market for credit card debt, factoring, clearing, and payment infrastructure. The SEPA is an example of how one large financial market can be restructured by the public sector. The SEPA is also an example of how standardization across several markets can create a new market that is much larger. Markets that are large and standardized will most likely change to capitalize on economies of scale. Changes in market size and standards can thus pave the way for market forces to restructure the market in a way that the public sector intended.

The two examples of the Basel Accord's global risk monitoring and the SEPA demonstrate how financial markets can improve business by regulation, standardization, and economies of scale in transactions. Throughout history, new, non-standardized financial services have proven to be expensive. As a result, these financial services are not widely used at first. However, once financial services are standardized, the cost of usage is radically reduced. Once this is achieved, financial services become more widely used and ultimately facilitate economic growth and societal development. Economies of scale drive the cost of the standardized services down, which increases market efficiency. These mechanisms illustrate the 'herd effect' in financial markets: once momentum builds, financial markets grow rapidly. The 'herd effect' can be positive, if financial service growth promotes sustainable growth, but it can also be negative, and result in financial crises.

The timeline of change within the financial sector is especially important in light of the urgency of climate change. The SEPA reform took place from 1999 to 2014, a period of 15 years. The Basel Accord started in 1988 and is still evolving, and there are amendments made to it continuously. However, the Basel Accord did develop quickly after the financial crisis of 2007-2009, when new capital adequacy requirements were introduced, which are scheduled to be implemented in 2023. It thus seems that a major update to the Basel Accord took 14 years to implement. If the SEPA took 15 years, and a Basel change took 14 years, then we can expect sustainable finance regulation to take a similar amount of time. Still, there is hope that SEPA, Basel, and other international regulations have developed working

relationships that will enable sustainable finance regulation to take place faster.

Nowadays, governments and central banks at the international and national levels recognize the need to regulate financial markets to reduce their negative, and promote their positive, effect on growth. In general, regulatory efforts have enabled great progress, but the current situation, in which regulation and market actors engage in efforts to address climate change, is a completely new challenge for financial markets and governments. Regulations are emerging, and a great deal of trial and error is necessarily currently taking place in the market. However, it remains to be seen whether the right steps are being taken to ensure that society takes the best pathway towards a more sustainable future.

2.5. The regulatory environment

The Swedish financial market is regulated by law. Additional regulation and oversight are executed via Finansinspektionen, and the Riksbank. Financial markets are international, and the Swedish financial market is no exception with regard to its integration in the international market. The regulatory trajectory over the last decades has primarily aimed at harmonizing financial regulations within the EU.

Finansinspektionen is tasked with overseeing the Swedish financial market, in particular regarding matters of risk and consumer protection. However, it is also part of the European System of Financial Supervision. The financial reporting made by banks follow international accounting standards, such as IFRS 9, which specify and measure how an entity should classify financial assets and liabilities. The financial reporting made by banks also follows the Basel Accord's reporting standards, which specify the reporting of operational, liquidity, and market risks. The reporting of banks is validated by accountants, while rating agencies assess the risk of financial market corporations.

The Riksbank is an independent agency that oversees the stability of financial markets and the monetary system in Sweden. The Riksbank is also a member of various international networks of central banks, such as the European Central Bank, and the Bank for International Settlements.

Given this regulatory environment, it seems clear that policy initiatives for sustainable finance need to come in at many different levels and they need to align with each other. In order to achieve change in the real economy, there needs to be an alignment between the government, central banks, supervisory agencies, and other public institutions on the one hand, and banks, funds, and other actors in the financial sector on the other. Because financial markets are international, there also needs to be alignment between the national and the international levels. We will engage in more thorough discussions on this in the coming chapters.

However, we should say that all actors mentioned have taken steps towards sustainable finance.

Finansinspektionen focuses on sustainability from a financial stability and consumer protection perspective. The Riksbank focuses on sustainability primarily from the perspective of the stability of financial markets. The Riksbank and Finansinspektionen work to coordinate with each other, and with other central banks and financial supervisory authorities internationally. Meanwhile, the accountants have taken action at an international level, where they have formed the International Sustainability Standards Board (ISSB), which will provide global sustainability accounting standards.

2.6 Recent policies for sustainable finance in the EU

As noted above, the bulk of financial regulation that is relevant for Swedish actors today is determined by the European Union. In order to understand the Swedish context, we must first understand the regulatory status quo in the EU. Unfortunately, this proves to be a somewhat difficult task since there has been an enormous amount of work going on in the EU with regards to sustainable finance over the last half decade or so. However, we will here try to give a brief summary of some of the most important events and regulations.

The EU Action Plan

In 2018, the European Commission launched its ambitious 'Action Plan for Financing Sustainable Growth'. Informed of the possibly catastrophic and unpredictable consequences of climate change and resource depletion facing the planet, the Commission recognized the need to urgently adapt public policies to this new reality. The Action Plan detailed how the financial system can be a major part of the solution,

by creating a greener and more sustainable economy. The plan is informed by and built upon a report written by the High-Level Expert Group on sustainable finance that was appointed by the Commission at the end of 2016. The Action Plan specifically presents ten actions divided under three main objectives: (1) reorienting capital flows towards a more sustainable economy, (2) mainstreaming sustainability into risk management, and (3) fostering transparency and long-termism. The report's recommendations touch upon several key areas of finance and entail both cross-cutting actions, as well as actions targeted at specific sectors of the financial system (European Commission, 2018a).

In May 2018, the Commission adopted a first package of measures implementing several key actions announced in its Action Plan. The package included:

1. A proposal for a regulation on the establishment of a framework to facilitate sustainable investment. The proposed regulation establishes the conditions and the framework to create a unified classification system (i.e. an **EU taxonomy**) on what can be considered environmentally-sustainable economic activities.
2. A proposal for a regulation on **disclosures and duties** relating to sustainable investment and sustainability risks. This regulation introduced obligations on institutional investors and asset managers to disclose how they integrate ESG (Environmental, Social and Governance) factors in their risk management processes. Delegated acts were to further specify the requirements to integrate ESG factors in investment decision-making processes, as part of institutional investors' and asset managers' duties towards investors and beneficiaries.
3. A proposal for a regulation amending the benchmark regulation. The proposed amendment was to create a **new category of benchmarks** comprising low-carbon and positive carbon impact benchmarks, to aid investors in gaining a better understanding of the relative carbon impact of their investments.
4. Furthermore, the Commission also solicited feedback on amendments to delegated acts under the Markets in Financial Instruments Directive (MiFID II) and the Insurance Distribution Directive to **include ESG considerations into the advice** that investment firms and insurance distributors offer to individual client (European Commission, 2018b; PRI, 2018).

This was just the first step and since the launch of the Action Plan, the Commission has moved further with each of the points above in various stages. The following provides a brief outline of this development.

Reporting requirements

In January 2019, the Commission published new climate-reporting guidelines for companies, consistent with the 2014 Non-Financial Reporting Directive (NFRD). These new guidelines were to provide guidance for companies on how to report on the impacts of their business on the climate and on the impacts of climate change on their business (i.e. the 'double materiality' of climate change) (European Commission, 2019a).

Disclosure Regulation

In the spring of 2019, the EU Regulation on "sustainability-related disclosure in the financial services sector" (SFDR) was adopted by co-legislators to apply from March 10, 2021. The regulation detailed sustainability disclosure obligations for issuers of financial products and financial advisors toward end-investors. It does so in relation to the integration of sustainability risks and the consideration of adverse sustainability impacts by financial market participants (i.e. asset managers, institutional investors, etc.) and financial advisors in all investment processes and for financial products that pursue the objective of sustainable investment (European Commission, 2019b).

Benchmarks and labels

In June 2019, the Technical Expert Group on sustainable finance (TEG) published a first report on climate benchmarks and ESG disclosures. The report put forward and advocated for a list of minimum standards for the methodologies of EU Climate Transition and Paris-aligned benchmarks, which addressed the risk of greenwashing and the disclosure requirements necessary to improve transparency and comparability of information across benchmarks. These were additionally not limited to only climate-related information but extended across a variety of ESG indicators (European Commission, 2021b; EU Technical Expert Group on Sustainable Finance, 2019).

In July 2021, the Commission proposed a regulation on a voluntary European Green Bond Standard (EUGBS). The standard was based on the recommendations of the Technical Expert Group on Sustainable Finance and, in their own words: "...aimed to set a gold standard for how

companies and public authorities can use green bonds to raise funds on capital markets to finance such ambitious large-scale investments, while meeting tough sustainability requirements and protecting investors." This new bond standard was furthermore to be open to any issuer of green bonds: companies, public authorities, etc. (including issuers located outside of the EU) (European Commission, 2021b; EU Technical Expert Group on Sustainable Finance, 2019).

Financial supervision

The EU Commission has also worked closely with European financial supervisory authorities to promote the inclusion of climate risks in existing prudential frameworks. For instance, it commissioned a report from the European Securities and Markets Authority (ESMA) in 2019, for the purpose of examining whether financial markets put pressure on businesses to act in a short-sighted manner. In April 2020, three European Supervisory Authorities (EBA, EIOPA and ESMA) issued a consultation paper seeking input on proposed environmental, social and governance (ESG) disclosure standards (the SFDR) for financial market participants, advisors and products (EIOPA, 2020). In February 2021, they submitted a final report to the European Commission with draft technical standards for content, methods and presentation for accounting, in accordance with the SFDR.

The European Banking Authority (EBA) published their action plan on sustainable finance in December 2019. The first step focused on strategies, risk management, key performance indicators and information. The second focused on the development of climate-related stress tests and the third on analyzing eventual indicators that might justify lowering the capital requirement for so-called 'green' exposures. Their action plan also sets out the agency's timetable, which included the production of reports, recommendations, guidelines and technical standards related to sustainability (EBA, 2019).

Taxonomy

In July 2020, the EU Taxonomy for sustainable activities entered into force, developed with the intent to play a key role in scaling up sustainable investment and achieving the objectives set out in the 'European green deal'. The EU taxonomy seeks to do so by providing companies, investors and policymakers with appropriate definitions for which economic activities

can be considered environmentally sustainable. The ambition being that, as it provides a common starting point for what is to be considered environmentally-sustainable activity, it would thereby lend security to investors, protect investors from greenwashing, mitigate market fragmentation, shift investments towards sustainability and help companies become more climate-friendly. Overall, contributing towards aligning the European financial market with sustainability goals and climate targets (European Commission, 2020).

The Taxonomy Regulation established six environmental objectives: (1) climate change mitigation, (2) climate change adaptation, (3) the sustainable use and protection of water and marine resources, (4) the transition to a circular economy, (5) pollution prevention and control, and (6) the protection and restoration of biodiversity and ecosystems. For an economic activity to be recognized as being aligned with the taxonomy, it had to meet four conditions: make a substantial contribution towards at least one of the environmental objectives, not do significant harm to any other environmental objective, comply with minimum social safeguards and comply with the technical screening criteria. The technical screening criteria are in turn developed in delegated acts (European Commission, 2020).

Updates of the Action Plan

In April 2021, the Commission adopted another comprehensive package of measures to help improve the allocation of money towards sustainable activities across the European Union. The package included a Delegated Act for the EU taxonomy, a proposal for a directive on corporate sustainability accounting (the CSRD) as well as six delegated acts for investment and insurance advice, management assignments and product supervision and control (European Commission, 2021d).

Further reporting requirements

The Corporate Sustainability Reporting Directive (CSRD) was to amend the previous directive on non-financial reporting (the NFRD) entailing, amongst other things, an extension of the scope, an audit requirement on reported information and a requirement to report according to mandatory EU sustainability reporting standards. These EU sustainability reporting standards were to first be drafted by the European Financial

Reporting Advisory Group (EFRAG), to then result in a first set of standards to be adopted in October 2022 (European Commission, 2021a).

The Commission also adopted six amending Delegated Acts on fiduciary duties, investment and insurance advice that seek to ensure that financial firms, e.g. advisors, asset managers or insurers, include sustainability in their procedures and their investments to clients.

EU strategy for financing the transition

In July 2021, the Commission also adopted a new sustainable finance strategy aiming to support the financing of the transition to a sustainable economy by proposing action in four areas: transition finance, inclusiveness, resilience and contribution of the financial system, and global ambition. To summarize, the strategy entailed six sets of actions: (1) extending the existing sustainable finance toolbox to facilitate access to transition finance; (2) improving the inclusiveness of small and medium-sized enterprises (SMEs), and consumers, by giving them the right tools and incentives to access transition finance. (3) enhancing the resilience of the economic and financial system to sustainability risks; (4) increasing the contribution of the financial sector to sustainability; (5) ensuring the integrity of the EU financial system and monitoring its orderly transition to sustainability; and (6) developing international sustainable finance initiatives and standards, and supporting EU partner countries (European Commission, 2021c).

2.7 Recent policies for sustainable finance in Sweden

Since Sweden is a member of the European Union, all of the developments and regulations above are of course relevant in Sweden as well. However, the Swedish authorities have also taken steps on their own with regards to public policies for sustainable finance. Interestingly, these policies have sometimes differed from the EU directives. Most importantly, there have been at least some attempts to go beyond the EU framework in various ways. We will here try to give a brief overview of some of the most important events and policies in the Swedish context.

Disclosure requirements

The Swedish government has issued a series of disclosure requirements for financial firms that are

slightly different from the EU directives. For instance, a bill proposed by the Government as early as 2017 made certain amendments to the Mutual Funds Act and the Alternative Investment Fund Manager Act, entailing fund companies, management companies and AIF managers having to provide the information needed to understand the fund's management as it relates to sustainability. This included issues regarding the environment, social conditions, employees, respect for human rights and the combating of corruption. Furthermore, if a fund manager does not consider sustainability aspects at all, the manager was to disclose that to be the case (Government Offices of Sweden (Regeringskansliet), 2017).

Financial supervision

As early as 2015, the government commissioned Finansinspektionen to keep tabs on the sustainability work of Swedish banks and investment funds. Their first report surveyed the nine largest Swedish banks on the topic of "Environmental and sustainability perspectives in credit granting to companies" (2015). Subsequent reports have dealt with issues such as "Climate changes and financial stability" (2016), "Sustainability work of financial firms" (2016), "How can the financial sector contribute to sustainable development?" (2016), "Sustainability information in funds" (2018), and "Integration of sustainability into corporate governance" (2018).

From 2017 onwards, Finansinspektionen worked on aspects related to the international effort of creating uniform definitions and measurement methods, conducted discussions with parts of the financial industry about scenario analyses as a tool for identifying risks, and worked on various consumer-related issues with a focus on sustainability information as it relates to fund saving. In 2020, Finansinspektionen announced that it was going to investigate the possibilities of ensuring that businesses to an increasing extent report an internal price on carbon dioxide emissions. In 2020, Finansinspektionen's mission was extended to include sustainability, entailing the objective to act in such a way so as to ensure that the financial sector contributes towards sustainable development. This encompassed actively engaging in international collaborations for the purpose of developing better measurements and increased reporting of climate change risks and effects (Government Offices of Sweden (Regeringskansliet), 2020).

Finansinspektionen has consequently, through participation in IOSCO's Sustainable Task Force, acted to establish global sustainability reporting standards. This involved collaboration with the IFRS Foundation, which at COP26 announced the creation of its new International Sustainability Standards Board (ISSB) and the ambition to develop comprehensive high-quality sustainability disclosure standards (further detailed in Chapter 3). Furthermore, Finansinspektionen, like the Riksbank, is a member of the Network for Greening the Financial System (NGFS). An organization made up of 101 central banks and financial supervisors, which acts to accelerate the scaling up of green finance and to develop recommendations concerning the role of central banks and supervisory agencies in dealing with climate change and related risks. In their first report, NGFS acknowledged that climate-related risks were a source of financial risks, and clarified that it is therefore within the mandates of central banks and supervisors to ensure that the financial system is resilient to climate-related risks.

In March 2021, Finansinspektionen published its "Sustainability Report 2021 – the climate in focus". The report described its work with the new EU regulation to achieve a global standard for sustainability reporting, and further highlighting its engagement on sustainability reporting through heading IOSCO's working group on the matter. Finansinspektionen's investigation on the extent to which financial firms are measuring and reporting climate-related risks and climate effects was also a subject of the report, as well as its assessment of how assets in Swedish insurance undertakings align with the climate goals of the Paris Agreement. Finansinspektionen also detailed its plan to include a sustainability perspective when reviewing the business models and credit risks of banks.

Platform for sustainable business

Since 2017, the government has endorsed a policy for sustainable business. The policy is intended to signal the government's belief in the importance of integrating sustainability issues into all business decisions taken by Swedish companies. The policy was updated into the "platform for international sustainable business" in 2019. The updated platform includes an emphasis on the promotion of international trade that is economically, socially and environmentally sustainable. In line with the platform, the government expects several of its delegated authorities and public

companies to provide financial support for sustainable business activities both at home and abroad. We can only give a few examples of such support here.

Almi is a public venture capital company that, among other things, issues green loans to facilitate the transformation of small and medium-sized enterprises (SMEs). The loans can be used to finance green efforts which contribute towards the achievement of important environmental goals. For the investment to be classified as sustainable it needs to substantially contribute towards one of the defined ambitions of the EU taxonomy. Almi also runs the Almi Invest GreenTech Fund which has EUR 65 million under management and seeks to back early-stage startups that significantly reduce greenhouse gas emissions.

Since 2017, Business Sweden (Sverige's export- och investeringsråd) is expected to use its export-promoting initiatives to contribute toward the achievement of the 2030 Agenda goals and to facilitate increased exports of innovative and sustainable products and solutions. There have also been projects co-financed by the Ministry of Foreign Affairs where Business Sweden and companies work together to identify and clarify the positive impact of these export efforts.

Similar financing activities are undertaken by both EKN, the Swedish Export Credit Agency and SEK, the Swedish Export Credit Corporation. Both agencies aid companies that intend to re-orient themselves in line with a more environmentally-sustainable framework by offering guarantees that cover part of the risk of their corporate loans, making it easier for the bank to grant the loan. EKN's newly-launched 'green credit guarantees' (September 2021) were to be offered to companies that conduct direct or indirect export in some way that contribute toward climate change adaptation and mitigation. Similarly, SEK's sustainability efforts focus on conducting responsible lending to mobilize capital for green projects and sustainable development. SEK more specifically finances re-orientation of the energy, transport and shipping industries as well as the development of smart cities.

Pension funds

In 2018, the government proposed new regulations concerning the investment practices of the public pension funds, AP1 to AP4, including a requirement to

manage the funds sustainably. More specifically, it was proposed that the funds' assets should be managed in an exemplary manner through responsible investments and responsible ownership, which entailed that the funds should integrate ESG aspects in their investment decisions. Moreover, special emphasis was to be placed on how sustainable development can be promoted without sacrificing the overall goal of high financial returns.

Later in 2018, it was also decided that the premium pension system should be reformed. A central aspect of these reforms included the introduction of new sustainability requirements for funds, pertaining especially to the role of the fund marketplace. The decision to reform led to an inquiry into the development of these reforms, and it was decided that the reforms would be put in place in 2020. It was agreed that among 'the general principles for the procurement of funds for the fund marketplace' should be a principle of sustainability. More specifically as regards this principle, the inquiry suggested that, "A fund agreement should, according to the Inquiry's proposal, contain conditions requiring the fund manager to take account of environment, social responsibility and governance, 'ESG factors', in their management." (Westberg et al., 2019, pp. 74-75).

In January 2021, the government proposed changes to the regulations concerning occupational pension funds. One of the changes was a reduction in capital requirements regarding investments in infrastructure classified as environmentally sustainable. That is, occupational pension funds would be incentivized to increase their investments in green infrastructure projects rather than brown ones. The proposed changes came into effect later that year.

In October 2021, the government put forward the recommendation that the AP6 fund should also manage its investments in an exemplary manner through responsible investing and responsible managing of its assets. The purpose of the recommendation was to clarify and strengthen the regulation concerning AP6's work with sustainability. The added objective corresponded to the already introduced objective of exemplary management in place for the management of the AP1-AP4 funds. The recommendation also further proposed that the AP funds should cooperate with regards to reporting on how well the objective of

exemplary management practices has been achieved.

Inquiry into tax relief for green savings

In 2018, the government appointed a special investigator to examine a proposal for tax relief for green savings by individuals. This was in recognition of the fact that an important part of the allocation of capital to environmental projects comes from private investment. The investigator was therefore asked to examine the conditions for such investments and whether the tax rules should be changed to increase the incentives for savings where the capital is to be used to finance green projects. The report was published on March 31, 2020.

Interestingly, the inquiry found that it could not guarantee that a tax relief for green savings would have demonstrable and positive effects on Sweden's climate goals. While it seems probable that the climate transition requires considerable amounts of green investments, it notes, the central problem does not seem to be a lack of investment resources per se. Instead, there is probably a broader palette of market failures involved that is keeping banks and investment firms from investing in what they perceive to be risky new technologies. And a tax exemption for green savings would not alleviate those broader market failures (Government Offices of Sweden (Regeringskansliet), 2020, pp. 177-178).

Sovereign green bonds

In July 2019, the government tasked the Swedish National Debt Office (Riksgälden) with implementing an issue of Swedish sovereign bonds that would give investors an opportunity to contribute to the state's activities related to the transition to an environmentally sustainable society. In June 2020, the government further determined the framework for these 'sovereign green bonds' and as to which budget expenditures the bond would be linked, including the protection of valuable natural environments, climate investments and railway maintenance. The Debt Office thereafter moved forward and raised SEK 20 billion through its first-ever sale of a sovereign green bond on September 1, 2020 (Government Offices of Sweden, 2020; Swedish National Debt Office, 2020).

Comments on the EU taxonomy

In December 2020, the Swedish government published its response to the European Commission's consultation

request on the EU taxonomy. The response stated that the government supports the overall purposes of the taxonomy, namely, to create common definitions and references as to what should be regarded as environmentally sustainable in the financial market and to create a common EU market for green financial products. However, the response also detailed what the government viewed as significant shortcomings of the proposed delegated act. To cite the government's highlighted observations and comments:

- The requirements set for an activity to not directly harm an environmental objective should not be stricter than the sustainability requirements set in existing legislation. The delegated act must therefore be based on existing sectoral legislation.
- In some cases, the proposed criteria do not comply with the requirements set out in the Taxonomy regulation. There are important activities that are not included, e.g. food production and carbon capture and storage. There are also deviations from the principle of technology neutrality, e.g. in terms of renewable energy, forestry and buildings.
- Finally, in some cases the criteria of the taxonomy risk becoming stricter for companies within the EU than for companies outside the EU as they rely on national regulations with varying quality and consistency in supervision." (Government Offices of Sweden, 2020)

Further, in March 2021, the Swedish government released a statement detailing how it had signaled to the European Commission that it does not support the proposal to introduce additional requirements on bioenergy in the EU taxonomy. Sweden and nine other member states presented their position on this matter together in a joint letter to the European Commission (Government Offices of Sweden).

Green credit guarantees

In June 2021, the government resolved to give the Debt Office a mandate to issue so-called green credit guarantees for certain projects. These would be state credit guarantees for new loans raised by companies from credit institutions, for financing large industrial investments in Sweden that contribute to reaching the national environmental or climate goals. The state would guarantee up to 80% of the loans. To qualify for the guarantee scheme, investments would have to meet certain environmental requirements based on the EU taxonomy as well as input from the Swedish

Environmental Protection Agency. Furthermore, only very large loans would be eligible, meaning those whose amounts exceeded SEK 500 million.

According to the Debt Office at the end of July 2021, some candidates submitted their interest. These had together entailed a total loan amount of more than SEK 80 billion, which could correspond to a guarantee amounting up towards SEK 64 billion. As the green credit guarantees scheme involves large and complex projects, the Debt Office clarified that it will take time for the companies and credit institutions interested to complete the applications, and estimated that the first applications could come to be submitted first at the end of 2021 (Swedish National Debt Office, 2021).

Chapter 3:

The challenges of sustainable finance

(covering selected distortions
in the financial market)

3.1 Introduction

We have so far established that the financial sector could potentially play an important role in facilitating the transition to a more sustainable economy. Yet, there is a worry that the financial sector should be more responsive to climate policy, and should already be directing resources toward more sustainable projects and away from less sustainable projects. Enormous investments in fossil fuel-based companies and other brown industries continue, while nascent green technologies are financially constrained. In this chapter, we discuss the theory and the evidence relating to the barriers to sustainable finance for climate change transition investments, and also the policies that are used to overcome these barriers.

In theory, financial markets should be quick to adjust. For one, in line with the demand among investors for more sustainable products and green projects, investments should flow towards greener economic activities and over time support more and more such products and projects. This could be driven by pro-environmental attitudes of investors and should translate into an increasing inflow of investment into more climate-friendly economic activity. Another driver is public policies (or indications of future policies), which make brown industries less profitable (such as taxes on carbon emissions), and thereby shift investment away from such industries. If financial markets operated efficiently and without distortion or friction, the scope for financial reform to support the climate transition would be far more limited than in the status quo.

In this chapter, we explore why financial markets sometimes deviate from the efficient characterization. We outline and discuss a number of prominent ‘market failures’, i.e. factors that result in too little investment into activities that mitigate and support our adaptation to climate change. We have identified six mechanisms that play a key role in this regard. We assess the evidence of the magnitude and importance of these mechanisms as a barrier to the economic transition for climate protection.

3.2 Information asymmetry – where to invest for the climate

One of the most important barriers to increased investment in the climate is simply a lack of information available to investors. Investors cannot choose ‘green’ companies unless they have access to reliable and comparable metrics that capture climate-related aspects of company activities. Even with high quality metrics, the complexity of some technologies and solutions requires metrics that are simple and clear enough to be understandable and usable for a broad range of investors with differing investment mandates.

To see some of the challenges involved, consider the three scopes of carbon emission effects by the Greenhouse Gas Protocol as an example.¹ The protocol identifies three levels of scope of climate emissions: Scope 1 covers direct emissions from owned or controlled sources. Scope 2 covers indirect emissions from the generation of purchased electricity, steam, heating and cooling consumed by the reporting company. Scope 3 includes all other indirect emissions that occur in a company’s value chain. We can then consider each of these scopes at one point in time, or consider the respective scope over the lifecycle of the asset, as depicted in Figure 2.

Figure 2. Analytical dimensions for CO2 emissions of a real asset.

Scope 1 and 2 are often much easier to measure and verify than Scope 3 emissions. A challenge with upstream Scope 3 is that emissions are embedded in components used in each step of the value chain of a good. Accurately tracking Scope 3 emissions requires

Scope of CO2 emissions analysis	Length of time	
	Momentarily	Life-Cycle
Scope 1 covers direct emissions		
Scope 2 covers indirect emissions from the generation of purchased electricity, steam, heating and cooling		
Scope 3 includes both upstream and downstream emissions, i.e. emissions embedded in the inputs to production as well as the emissions resulting from the use or consumption of the final product.		

¹ For details see ghgprotocol.org

coordination not only across the boundaries of companies, but also between reporting jurisdictions. Products that involve multiple components sourced from countries with divergent reporting standards make it all but impossible to accurately quantify the emissions embodied in the final product. For some sectors with simpler or shorter value chains, the challenge with Scope 3 emissions is manageable. For example, emissions from base materials such as metals and mining, pulp and paper and some agricultural products are much less difficult to assess. For other sectors, such as retail electronics, tracking Scope 3 emissions is a daunting task. The challenge is equally difficult with respect to downstream Scope 3 emissions, which include emissions arising from the use, disposal and/or consumption of a good.

Complexity is increased when we consider technological progress which can make estimates for CO₂ emissions change rapidly. Even within narrowly defined sectors, there is wide variation in technologies employed by companies (not to mention the wide variation in products and services). Technology is available to make 'green steel', real estate is increasingly recycled, and transportations to and from buildings are increasingly done by electric vehicles. Information based on sectoral averages miss this variation but are often the best available source of information, despite the fact that investors often need company-specific information when making their investment decisions.

The promise and the peril of ESG metrics and ratings

An important source of information that is currently widely used by investors are so-called ESG metrics and ratings, which capture a variety of sustainability-related aspects of company performance. ESG stands for 'Environmental, Social and Governance' factors. In 2020, upwards of USD 35 trillion of assets under management were 'ESG assets', meaning ESG factors played a non-negligible role in the investment decision, according to Bloomberg.² This figure is expected to grow to around USD 50 trillion by 2025. The business of selling ESG data to investors is growing rapidly. There are hundreds of companies across the globe selling ESG data with global revenues exceeding USD 1 billion in 2021, growing at around 20% annually.³ The sector is of course dominated by a few leading business data

providers such as Bloomberg, MSCI, to name a few.

ESG data are obtained from a mix of sources, including self-reported metrics in corporate sustainability reports, or from third parties that follow corporate activities, such as NGOs and other industry watchdogs. The more comprehensive ESG data products often include hundreds of metrics that describe various environmental, social and governance characteristics of a single company. Refinitiv's ESG data product includes around 450 ESG metrics for over 10,000 listed companies, with dozens of metrics related to climate change alone including: current Scope 1, 2 and 3 emissions, target for future emissions, policies related to emissions and emissions reduction, carbon offsets, and so forth. These metrics are the basis for calculating ESG ratings and indices.

There are several serious problems with ESG metrics. These include: data inconsistencies and errors; lack of comparability of ESG criteria and rating methodologies, and the promulgation of different approaches. Some errors are idiosyncratic, arising from the way ESG data is reported and collected.⁴ A larger problem is the systematic errors and biases in ESG metrics. Some companies simply do not, or cannot, report their ESG performance. Companies are keen to avoid reporting poor ESG performance, which means that ESG data tends to include only the 'better' performers. Reporting on hundreds of metrics every year is a costly undertaking, which means that smaller companies cannot afford to report to the same degree as larger companies. The EU's reforms targeting sustainable finance will require smaller companies (excluding SMEs for the moment) to report on their ESG performance. We discuss the EU CSRD reform in Box 1 below. This reform could help support smaller companies gain access to investment, but could also impose increased reporting costs. The implications of the CSRD for smaller companies remains to be seen.

Another related challenge is jurisdiction. Companies headquartered in countries with weaker corporate governance laws have more discretion to be overoptimistic in their reporting. This means larger companies headquartered in countries with weak corporate oversight tend to have ESG ratings, albeit likely less reliable ones. Moreover, ESG data providers

² See <https://www.bloomberg.com/professional/blog/esg-assets-may-hit-53-trillion-by-2025-a-third-of-global-aum/>

³ See <https://www.marketsmedia.com/esg-data-spending-to-reach-1bn/>

⁴ For example, somewhere along the way, someone involved in producing the final metric for a particular company might have made an error, e.g. reporting carbon emissions in tonnes rather than kilograms. These idiosyncratic errors increase the cost for investors looking to use the data and blunt the informative value.

themselves are competing fiercely with each other. An outcome of this competition is that each ESG data provider develops its own distinct ESG products and pushes its own product as being the “best”, which can create confusion and conflicting signals that investors need to filter.

Efforts are underway to improve the state of the information on sustainability performance that investors use in their investment decisions. A key effort relates to the development and harmonization of standards.

Reporting standards are evolving to help investors distinguish between good and bad companies and deliver comparable and consistent metrics that can guide investment decisions. International coordination on reporting standards is crucial to ensure that investment flows are determined by their contribution to climate change mitigation, rather than differences in reporting methodologies. In Box 1, we briefly discuss some of the leading efforts underway to improve reporting standards in terms of accuracy as well as international coordination and harmonization.

Better and fewer reporting standards can help correct some of the challenges related to information asymmetry. For example, fewer standards would reduce reporting costs and confusion among reporting companies as well as among investors. This, in turn, could reduce errors and simplify verification efforts, thereby mitigating some of the systematic biases noted above.

Box 1 – Climate-related sustainability reporting standards

International Sustainability Standards Board (ISSB)

At COP26, it was announced that the IFRS will establish a new International Sustainability Standards Board (ISSB). It aims to develop, in the public interest, a comprehensive global baseline of sustainability disclosures for the financial markets, IFRS Sustainability Disclosure Standards.

The IFRS will also consolidate two investor-focused international sustainability standard-setters into the ISSB. The Value Reporting Foundation (VRF), which is home to SASB Standards and Integrated Reporting, and the Climate Disclosure Standards

Board (CDSB) will become part of the IFRS family. The ISSB will sit alongside and work in close cooperation with the IASB, ensuring connectivity and compatibility between IFRS Accounting Standards and the ISSB’s standards – IFRS Sustainability Disclosure Standards. The ISSB and the IASB will be independent, and their standards will complement each other to provide comprehensive information to investors and other providers of capital.¹

Global Reporting Initiative (GRI)

Global Reporting Initiative (GRI) is an independent, international organization that helps businesses and other organizations take responsibility for their impacts, by providing them with the global common language to communicate those impacts. The GRI is aligned with the UN Global Compact Framework.²

According to a study by KPMG (The KPMG Survey of Corporate Responsibility Reporting 2015 – Currents of Change), 74 % of the world’s 250 largest companies apply GRI guidelines. In Sweden, the share of companies applying GRI is 66 % of the 100 largest companies.³

Task Force on climate-related financial disclosures (TCFD)

The Financial Stability Board established the TCFD to develop recommendations for more effective climate-related disclosures that could promote better informed investment, credit, and insurance underwriting decisions and, in turn, enable stakeholders to understand the concentrations of carbon-related assets in the financial sector and the financial system’s exposures to climate-related risks better.

The Task force consist of 32 members from across G20 countries and is chaired by Michael Bloomberg.⁴

1 <https://www.ifrs.org/news-and-events/news/2021/11/global-sustainability-disclosure-standards-for-the-financial-markets/>

2 <https://www.globalreporting.org>

3 <https://home.kpmg/se/sv/home/tjanster/hallbart-foretagande/rapportera/gri.html>

4 <https://www.fsb-tcfd.org>

Corporate Sustainability Reporting Directive (CSRD)

In April 2021, the EU Commission adopted a proposal for a Corporate Sustainability Reporting Directive (CSRD) which would amend previous reporting requirements. This standard is planned to be adopted by October 2022. The draft standards are developed by the European Financial Reporting Advisory Group (EFRAG).

In comparison to previous requirements, CSRD extends the scope to all large companies and all companies listed on regulated markets (except listed micro-enterprises), requires the audit of reported information, introduces more detailed reporting requirements, and a requirement to report according to mandatory EU sustainability reporting standards, and requires companies to digitally 'tag' the reported information, so it is machine readable and feeds into the European single access point envisaged in the capital markets union action plan.⁵

⁵ https://ec.europa.eu/info/business-economy-euro/company-reporting-and-auditing/company-reporting/corporate-sustainability-reporting_en

Box 2 - Nordic Sustainability Reporting Standards for SMEs

Sustainability reporting is currently required of the larger companies according to the Swedish Annual Accounts Act. It is only a matter of time before small and medium-sized companies also need to start reporting sustainability. Therefore, the Association of Swedish Accounting and Payroll Consultants has developed a common Nordic sustainability reporting standard for small and medium-sized companies, the Nordic Sustainability Reporting Standard (NSRS). NSRS is based on GRI. NSRS provides a framework to investigate the risks and opportunities related to climate change that the company sees in its business. The framework focuses on areas where the sustainability impact is the largest, such that companies can assess which areas to focus on first.

The reason for developing the NSRS is that sustainability reporting standards are too complex and costly for smaller businesses to comply with. Accounting professionals are trusted advisors on

economic sustainability, which is one of the reasons they decided to take the lead in developing this standard. The expectation is that sustainability reporting is soon going to be necessary for all companies, including SMEs, due to demands from the market, if not from legislators.¹

¹ Learn more about the NSRS at <https://www.srfkonsult.se/om-srf/about-srf/>

3.3 Learning by doing – demonstrating complex projects

The complexity and novelty of some climate-related projects are a barrier to attracting investment in such projects. Technological complexity is one obvious aspect of this challenge, where investors are perhaps unfamiliar with new technology. Another dimension of complexity is that some projects may involve the participation of actors that are not used to collaborating. Developing trust can take time, as does negotiating new ways of contracting and establishing new ways of collaboration. Technology-intensive projects involving carbon capture and storage present an archetypal example of this type of challenge (Coninck et al., 2009).

The potential failure associated with complex projects is that the costs of coordinating unfamiliar actors, contracting under unfamiliar conditions, and/or learning the risks associated with new technologies are sufficiently high to undermine investment in these projects.

One way of overcoming this challenge is to provide public funding for demonstration projects. The basic idea here is to fund some form of public-private partnership to manage the risks associated with new technologies and provide solutions to help overcome the “valley of death” that is a challenge facing a number

of nascent technologies.⁵ This pattern of challenges can be identified in many technologies, but it is particularly pronounced in large-scale, capital-intensive technologies that may involve multiple parties that need to be coordinated.

Box 3 – Case example: Low-temperature district heating

(by Kristina Lygnerud, Swedish Environmental Research Institute, IVL)

In the EU, the heating sector accounts for 40% of the energy consumed. A restructuring of the sector is crucial to reach the climate target of 1.5 degrees Celsius. Sweden has a well-established district heating infrastructure and currently, the sector accounts for half of the heat demand in the country. In contrast, the EU market share is 9%. Larger, international investors are interested in the sector in light of the long-term investment horizon (the infrastructure has a lifespan of 40 years or more) and sustainability advantages.

There are, however, important threshold-effects to investment in the sector despite its great potential. A key barrier is that the many investors are unfamiliar with this sector. For one, there are uncertainties about what kind of heat source is required for an investment to be in line with EU taxonomy requirements. Many projects typically involve a mix of heat sources, which makes it difficult to get an overview of the investment's carbon footprint in the long term. A regulatory aspect that complicates the investment in district heating/cooling is that there is no uniform regulation with regards to how residual heat is to be regarded: as a renewable fuel or otherwise.

Box 4 – Case example: Bio Energy Carbon Capture and Storage (BECCS)

(by Kenneth Mollersten, the Swedish Environmental Research Institute, IVL)

Although individual technologies along the value chain are mature, integrating the entire value chain

at large scale is in great need of demonstration. Developing BECCS at scale would require careful planning of transport and storage infrastructure to evolve over time in sync with the ramping up of the capture of biogenic and fossil CO₂. The risk involved in large investments in CCS and BECCS infrastructure, the need to coordinate investments along the different components of the value chain to benefit from economies of scale, a rational system design and avoiding possible 'hold-up' problems, and secure free access to transportation and storage services, provide reasons why the government should take a role in coordinating planning, design and investments across the value chain. At regional scale, coordination between neighboring countries can bring significant benefits.

Another investment barrier is the lack of accounting rules for BECCS that strengthen the link between policy objectives and the financial incentives for removing CO₂.

Recent supportive policy measures include the EU Innovation Fund, which makes available up to EUR 10 billion over 2020–2030 to support the demonstration of innovative first-of-its-kind, low-carbon technologies. The Innovation Fund will support up to 60 percent of the additional capital and operational costs of large-scale projects. However, current policies do not provide project developers with sufficient return on investment for capturing and storing biogenic CO₂. Moreover, support is needed beyond first-of-its-kind projects. Notably, the Swedish government is preparing to introduce a guaranteed compensation for BECCS developers through reverse auctions. The CO₂ transport and storage infrastructure required for BECCS (which is the same as for CCS applied to fossil emissions) represents up-front costs too large to be borne by a handful of BECCS projects, which might prove particularly daunting for initial CO₂ capture projects.

In Norway, significant governmental support goes towards the realization of full-scale capture of CO₂, including biogenic CO₂, as well as infrastructure for CO₂ transport and storage. The different

⁵ See Murphy and Edwards (2003) for a discussion of the types of arrangements that are deployed to support demonstrations.

components of a BECCS value chain need to be developed (and incentivized through policy) jointly. If one of either capture, transport, or storage is not moving ahead, it risks the success of the entire value chain, as operators will be reluctant to commit and invest if others do not do the same.

3.4 Investor herding – bubbles and stranded assets

Information about an investment is often costly, difficult or impossible to obtain. In this world, investors look to the decisions made by other investors as a source of information. Some investors may be better informed than others or simply have a reputation for being well-informed. Herding arises when investors systematically follow a lead investor. Market failure arises when investors follow each other to the point where they put too little weight on fundamental information about the investment itself. This is a fairly intuitive social mechanism that can easily be illustrated even with mundane decisions such as restaurant choice: We were going to eat at restaurant A, which had been given great reviews but, when we arrived, we saw that restaurant B across the street was almost full and restaurant A was empty, so we switched to restaurant A. An example of a study of the financial sector analogy can be found in Di Maggio & Pagano (2018). On climate policy, stranded assets are a case in point. Climate policy discussions in Sweden, in the EU and internationally have evolved publicly over decades, as did clear signals from the scientific community that global emissions need to be cut drastically. Despite this, some investors were caught off guard, holding carbon intensive assets that they had valued without properly assessing the impact of climate policy, the pace of technological change and shifting consumer demands. Similar factors are in play in discussions about green bubbles, except rather than a reluctance to offload 'dirty' assets, investors are instead overvaluing some "green" assets.

GIBs or other private/public investment policies, involving direct public funding, are also employed as a way of overcoming the financial market distortions related to investor herding. Public actors have an 'entrepreneurial' or 'lead-investor' role. In that, they can (and should) take on risks that private sector investors

cannot. The intention is to signal to investors that a certain project is financially viable by e.g. assuming the role of the lead investor (Mazzucato et al., 2017).

3.5 Climate policy uncertainty

Another source of uncertainty relates to climate policy itself. One aspect of this uncertainty is that future policy, and the impact this future policy will have on the economy, is not known. The European Union has set the ambitious goal of being carbon neutral by 2050 and to reduce its emissions by 55% between 2005 and 2030. However, there are still great uncertainties with regards to how we are going to achieve those objectives and how the policies will affect various sectors in the real economy. Climate policy itself introduces a source of uncertainty that can dampen the effectiveness of climate policy in affecting investment decisions and lead to a level of investment that is too low. Another source of uncertainty relates to policy that is already in place. Some policies are more likely to be implemented than others. For example, a variable electricity price for solar power is less likely to be implemented than a feed-in tariff. But how important is policy uncertainty as a barrier to investments in the climate transition? In this section, we provide a review of the empirical estimates of the importance of climate policy uncertainty on climate change investments.

One way of understanding the mechanism at play here is to apply 'real options' theory to help us understand investment choices when the investor faces uncertainty about future returns (Lucas and Prescott, 1971). The real option's value to the investor is determined by the delay in investment until new information is revealed. The option's value is increasing in the level of uncertainty facing the investor. This drives a wedge between the investment's current worth (Net Present Value, NPV) and the value of the project to the investor: the NPV of the project must be large enough to overcome the option value of delaying the investment. Uncertainty means projects need to demonstrate higher returns before the investment is made. This analysis framework puts the reversibility of the investment and the timing of the investment in focus. A reversible investment is one where, for example, the investor can sell used machinery for a decent price to recoup some of the investment.

Real option theory explains a key barrier to clean energy investments (IEA, 2017). Climate policy uncertainty will lead to investment levels in renewable energy that will be too low. Current levels of uncertainty around climate policy development are playing an important role in slowing the flow of investments to cleaner energy alternatives. It is hardly surprising that the uncertainty facing investors is an important barrier. Attempts to estimate the magnitude of this real options wedge for renewable energy investments for Norwegian wind power found that revenues needed to be 61% higher under variable price renewable certificates than for feed-in-tariff policy, for a given electricity price (Boomsma et al., 2012).

The upshot is that the estimated effects of policy uncertainty on investment are a significant barrier. Designing policy with this market friction in mind can help draw more investment to support climate objectives (Fuss et al., 2008). It is worth noting that policies that are based on a flexible carbon pricing (such as tradable emissions credits) are motivated based on their efficiency, but they do introduce additional risk and uncertainty to investors. Stability is in fact one of the key reasons for why economists advocate carbon taxation or targeted subsidies over more flexible policies (Goulder and Schein, 2013).

3.6 Myopic investors and short-term investment horizons

There has been considerable debate about the failure of financial actors and corporations to take a longer-term perspective with investments. The problem is often framed as one where companies inflate short-term results to the detriment of long-term performance to attract investment. The assumption is that investor analysts fail to capture the effect of short-term gains on the subsequently lower performance of the company (Haldane, 2011). In the context of climate change, short-term investment would work to dampen investment in climate change mitigation and adaptation if these investments have systematically longer payback periods. To what extent has empirical research been able to show that investors are myopic, i.e. that they miss the longer-run effects of inflated short-run claims made by companies?

Davies et al. (2004) set out an analytical framework and empirical estimates of the costs associated with short-termism. They estimate economically and statistically

significant effects of short-termism using a panel of 624 companies in the UK FTSE and US S&P indices over the period of 1980-2009. They find systematic evidence of myopic investor discounting, to the degree that it reduces the output of companies examined by around 20% over the period examined. Companies respond to myopic investors by distributing too much in dividends rather than re-investing to support future growth. This example does not focus specifically on climate change investment but serves to indicate the magnitude of the market failure. McKinsey (2017) also examines the impact of short-termism on investment and comes to similar conclusions, although with a more descriptive methodology.

Myopic investors distort investment levels from the level needed to transition the economy. A strategy that has been deployed to overcome this distortion is to blend private and public investment objectives. In fact, several countries have or are considering setting up so-called 'green investment banks' (GIBs), which would effectively mix public and private sources of funding in order to spur investment in projects that private sector investors alone deem unattractive. GIBs are one way to overcome the myopic investor barrier. Broadly speaking, direct subsidies or direct public financing for some climate-friendly projects are also motivated along these lines. We discuss these issues more in Chapter 5.

3.7 Investment leakage

More stringent climate policy in Sweden and the EU bears the risk of not only helping direct investment towards cleaner projects, but also leading to a net outflow of investment to foreign destinations in search of better returns (so-called 'investment leakage'). For example, energy intensive sectors, such as steel production, face rising costs associated with increasingly stringent climate policy. Rather than investing in new capacity in Sweden, these sectors may instead choose to invest in production abroad in countries with less stringent climate policy, and then sell steel back to Sweden.

Investment leakage represents a double loss for Sweden. First, the loss associated with reduced investment and industrial capacity located in Sweden. Second, the reduced effectiveness of Sweden's climate policy efforts, as production is moved to jurisdictions with weaker climate policy will continue to emit GHGs and damage the climate system.

The risk of investment leakage is important because the loss of production capacity entails long-term economic losses and long-term carbon leakage. The investment leakage is also particularly important because it is based on companies' expectations of the future, rather than on the effects on current domestic production activity.

There are relatively few studies on investment leakage. Verde (2020) reports evidence of investment leakage in Sweden. Studies by Borghesi et al. (2020) and Koch and Mama (2019) find evidence of investment leakage in more trade-intensive sectors in Italy, (more exposed to international competition) and less capital-intensive sectors in Germany (more mobile or footloose). For some regulated companies, Aus dem Moore et al. (2019) find declining investments in fixed capital, in response to the EU ETS, which is in line with the investment leakage hypothesis. Overall, empirical studies based on historical data find quite weak effects of investment leakage. A potential explanation is that climate policy has only recently begun to send a clearer price signal, which is a methodological challenge for detecting leakage effects in the data. The point is that a lack of evidence for historical leakage effects does not necessarily mean that leakage effects could become more pronounced in the near future. The EU has implemented a number of measures to counteract leakage, albeit not necessarily targeting investment leakage specifically.

As much as climate policy can drive investment in 'dirty' activities outside Sweden, it could also draw investment in cleaner activities into Sweden. Activity that relies on clean electricity as an input for example, should choose to invest and locate in Sweden. Electricity is often viewed as a homogeneous good; a KW of electricity is hard to differentiate from another KW of electricity. However, companies are profiling themselves in terms of the type of electricity/energy that they use. Clean server halls, clean steel producers or companies engaged in clean battery production (Northvolt) claim that part of their reason to locate in Northern Sweden is to access to clean electricity. The mechanisms that could help explain how stringent climate policy can attract investment in projects that need access to clean energy have, to our knowledge, not been examined.

In terms of policy, Sweden is already actively trying to encourage companies to locate in Sweden for access to clean energy. One area that is currently being discussed is how to streamline permitting approvals so that it is easier for new factories, or similar, to establish themselves in Sweden. Limited access to clean power and slow, burdensome permitting processes are issues that are raised by Swedish industry as barriers to investment in the transition. ⁶

3.8 Concluding remarks on a hierarchy of market failures

We have reviewed six market failures that can help explain why investment levels in climate change-related projects may, from society's perspective, be too low. We have also touched on some of the types of actions deployed to correct these market failures. We provide Sweden-specific recommendations in Chapter 5, where we discuss the policy options in more detail. However, the policy recommendations provided in this report link to the market failure mechanisms discussed in this chapter. The main point is that policy interventions should be motivated in terms of the market failures that they seek to correct. These market failures are hardly mutually exclusive. They interact in ways that can strengthen or weaken the effects on investment. For example, learning by doing (which is about generating information in part for the investor), investor herding (which is about the costs of obtaining this information) and myopia are closely related. In the same way, policy interventions target several market failures at once. The UK's GIB (which we discuss in more detail in section 5.4) sought to target these three types of failure.

Ideally, the most acute market failures in terms of their impact on investment levels would be the highest priority for policy makers to tackle. However, a straight up ranking is quite impossible. One reason for this is the fact that these market failures are not mutually exclusive, as already mentioned above. Another reason is that estimating the society-wide/macro-economic costs associated with an individual market failure is fraught with methodological challenges. For example, a ranking would require an estimate of the social costs associated with policy uncertainty versus information asymmetry and so forth across all investments across all sectors in the economy. This is hardly feasible.

⁶ https://www.svensktnaringsliv.se/sakomraden/hallbarhet-miljo-och-energi/svenska-foretag-driver-klimatostallningen-framat_1173124.html

With this in mind however, there are some qualitative points that can be made about the way these failures relate to each other. We propose a hierarchy of the failures to help guide the discussion - see Figure 3. The intention here is to provide some logical, albeit imperfect structure about how various barriers to investing in the transition relate to and complement each other.

Although policy recommendations are often motivated by the failure or friction in the market that they seek to correct, there are of course other ways of slicing these issues. In the next chapter, policy is discussed in terms of the channels through which it is implemented.

Figure 3. A simple hierarchy of climate-related financial market reforms

Third tier: Reducing the cost of obtaining information and experience, and reducing investment risks
Second tier: Better climate change investment metrics
First tier: Climate policy for the real economy

The first tier relates to the role of climate policy for the real economy. Strong signals regarding policy today and in the future are the bedrock for driving investment towards projects needed for the transition and away from carbon-intensive projects. Reforming the financial sector to compensate for a lack of or weak climate policy for the real economy would probably be an ineffective, if not counterproductive, effort.

The second tier relates to the need for accurate, comparable, comprehensive information that can support good investment decisions, be it to minimize risks associated with the price of carbon, or to reduce emissions, or some other related investment objective. As important as this is, putting accurate information about company performance in the hands of investors may not on its own redirect the flow of financial resources to support the transition of the economy. However, once clear climate policies (under tier 1), or strong pro-climate investor preferences are established, better climate change investment metrics are essential to support the transition.

The third tier relates to investor risk preferences and the cost of obtaining information. These types of challenges tend to blunt the effect of good climate-related metrics and clear policy signals. Overcoming these challenges, as we have seen, requires some nuanced approach, such as blending public and private objectives, subsidizing access to information, or various public/private risk sharing schemes.

Chapter 4.
Public policies
for sustainable
finance

The matter now turns to how governments and public policies can play a role in addressing the challenges of sustainable finance discussed above. More specifically, how can public policies be used to increase the speed or depth of financial markets' contribution toward the sustainable transition of society? This chapter sets out to do two things. First, to give a more analytical overview of the landscape of public policies for sustainable finance, including both actual policies (that have been implemented in various parts of the world) and potential ones (that merely have been suggested by policymakers or academics). Second, to combine this overview with a normative evaluation of the various policies at hand, based on a number of critical themes from the academic literature. The aim of this normative evaluation is to identify some important lessons from the literature that can be used to give recommendations for the future.

The chapter proceeds as follows. We first give a brief introduction to the landscape of public policies for sustainable finance (in 4.1.). We thereafter zoom in on and critically discuss three major groups of such policies (in 4.2-4.4).

4.1. The landscape of public policies for sustainable finance

Governments and public authorities around the world are slowly waking up to the fact that they have a central role to play in promoting sustainable finance. There are consequently a lot of things going on in this area, and it is not easy to keep track of it all. In the present chapter, we attempt to go beyond the details of what specific countries or regions are doing in the here and now, to instead present an analytical overview of the landscape of public policies for sustainable finance. The purpose of this overview or landscape is to paint a broad-strokes picture of the most central or salient types of public policies that are available to policymakers.

We have chosen to further subdivide this chapter into two parts, namely: the different potential channels of public policy (the 'how') and the different potential policies themselves (the 'what').

4.1.1. The channels of public policy

'Public policy' is a broad concept that includes several types of actions taken by states or public authorities to influence the direction of society. When considering the full range of potential public policies regarding finance,

it is important to note that there are several 'contact areas' between the public sphere and private financial markets. The government, through its Ministry of Finance, is of course responsible for legislation concerning financial markets. However, most of the day-to-day regulation and supervision of the markets tends to be administered by delegated authorities such as the central bank or the financial supervisory authority. Moreover, the public sector is in many ways a direct participant in financial markets, e.g. as a major investee through the National Debt Office and as a major asset owner through the public pension funds. All of these 'contact areas' can also become channels for public policies for sustainable finance.

We say here a bit more about the main channels through which the state can promote sustainable finance: the legislative channel, the monetary/supervisory channel, and the direct involvement channel.

Legislative channel

Legislative political authorities – such as parliaments and governments – are the only bodies within a state capable of amending old and passing new laws. As representatives of their respective populations, they balance competing interests within their population. Legislative authorities thus affect the shape of economic development in their respective countries or regions. Whereas the power to make laws formally rests with the parliament, it seems safe to say that the primary agent in the legislative area is the government.

An obvious example of legislation in line with sustainability goals are the various legislative acts that align countries' GHG emissions with the Paris Agreement goals to become emission free by 2050, such as the UK's Climate Change Act, Germany's Klimaschutzplan and the EU's European Green Deal. But similarly, more fine-grained pieces of legislation, such as anti-pollution legislation such as Clean Air and Clean Water acts, dictate which economic resources can legally be used for which purposes. Legislation pertaining to sustainable finance is no different here. Legislative authorities can pass legislation that directly prohibits or incentivizes the allocation of capital from and to specific economic sectors and regions. In the next section, we present a few central examples of such legislation.

Monetary/supervisory channel

Delegated authorities are parts of the public apparatus that operate with varying degrees of independence from the political authorities outlined above, although their central task is to fulfil the mandates provided to them by political (including legislative) authorities. Contrary to other political authorities, delegated authorities are typically not elected. Hence, their legitimacy is determined by the limits of their mandate and their ability to fulfil their mandate. We shall come back to the issue of legitimacy in a later section.

With regards to financial market policies, two mandates have traditionally played a central role: protecting price and financial stability. We refer to delegated authorities in charge of protecting price stability as monetary authorities, and to delegated authorities in charge of protecting financial stability as supervisory authorities. In some states or regions, these mandates lie with the same delegated authority (e.g. as in the case of the European Central Bank), whereas in others they are separated. In Sweden, the monetary authority is the Riksbank, whereas the supervisory authority is Finansinspektionen. Both of these authorities have immense influence over the day-to-day regulation and supervision of financial markets.

These authorities also have a potentially large role to play with regards to public policies for sustainable finance, since both price and financial stability require the mitigation of climate-related risks. An obvious case in point for the threat that physical climate risks pose to price stability are food and energy shortages. Monetary authorities need to ensure that climate-related risks do not lead to prolonged inflationary or deflationary episodes. Financial stability is similarly at threat due to climate-related risks. In particular, a focal worry for supervisory authorities is that assets related to the high-carbon sector will become 'stranded', i.e. prematurely lose a substantial amount of their value due to the transition to a green economy. Given the global interconnectedness of our financial system, unanticipated heavy losses can wreak havoc upon financial stability and potentially become a trigger event for a financial crisis. Supervisory authorities must ensure that financial firms are resilient to climate-related threats.

Direct involvement channel

Finally, the public sector is in many ways a direct

participant in financial markets. This is through the operations of various other public authorities or publicly-owned companies that are active on the financial markets. One can view these as similar to the delegated authorities above in the sense that they get their mandate from political authorities, but operate with varying degrees of independence. However, in contrast to the monetary and supervisory authorities, the authorities that we are talking about here have a more limited mandate and role with regards to the financial markets.

Some of the most important ways in which the public sector can be a direct participant in financial markets include:

- As a major investee, through e.g. the National Debt Office or various local or regional debt organizations (a Swedish example: Kommuninvest). These authorities raise capital from private financial markets to fund public investments.
- As a major asset owner, through e.g. public pension funds (in Sweden: AP-fonderna) or sovereign wealth funds (such as the Norwegian Oil Fund). These authorities or companies are typically run in a way that is similar to private investment firms, but the proceeds are dedicated to common concerns such as public pensions.
- As a public bank, that often is run in a way that is similar to private banks but is owned by the public sector. E.g. many countries have a postal bank that provides depositors who do not have access to private banks a safe method to save money. Alternatively, the bank can have a more specific policy mandate, such as the 'national development banks' of most developing countries.
- As a provider of venture capital, through e.g. publicly-owned business development funds (a Swedish example: Almi). These organizations are tasked with using public money to finance future-oriented research and innovation projects, which often end up being sold to private investors at a later stage.

Basically, all of the public authorities or companies outlined above can be used as channels for public policy concerning sustainable finance. For example, the government can instruct its national debt office to issue green bonds (which the Swedish National Debt Office did for the first time in 2020). Alternatively, the public pension funds can be tasked with taking a strong stance against investment in fossil fuel companies, or

something similar. Perhaps the most ambitious example in this regard is the establishment of public banks with explicit sustainability targets – such as the UK’s Green Investment Bank (2012-2017). We will return to some of these examples below.

4.1.2. Three types of public policy measures

We now turn to the substantial policies for sustainable finance as such, which will be further elaborated on in the following subsections. The various political and delegated authorities sketched out above have a wide range of policy measures available to them with which sustainable finance could be promoted. Previous studies have attempted to categorize the policies along several analytically interesting dimensions, such as their underlying motivations (prudential or promotional); the primary policy instrument that is used (informational, incentive-based or coercive); and the main implementing authorities (political or delegated) (Baer et al., 2021). One can also analyze the policies on the basis of their relationship to the traditional objectives of financial regulation (Cardona & Berenguer, 2020).

In order to simplify and facilitate our discussion, we have chosen to divide the landscape of policy measures into three rough and broad categories: (1) Market Functioning Policies, (2) Prudential Policies, and (3) Directly Promotional Policies. The central basis for our division is that the three categories of policies can be said to appeal to three different ‘mechanisms of change’: the market itself, the existing prudential framework, and a more active and interventionist state.

To put it briefly, market functioning policies aim at ensuring that financial markets properly perform their function of allocating resources to their most highly valued use. Such policies do not aim to divert resources from their market allocation, but rather aim to ensure that markets are not plagued by the types of market failures discussed in the previous section, such as myopia and information asymmetry.

Prudential policies work through the existing framework of delegated authorities and aim to ensure price and financial stability. These policies take on either an informative or structural character. Informative prudential policies aim to improve the availability of information crucial to promoting price or financial stability. Structural prudential policies go

beyond mere information gathering and aim to directly achieve the respective prudential goal.

Lastly, directly promotional policies aim to ensure specific non-prudential goals by more direct state interventions in the market’s allocation of resources. These policies either shift resources directly to a specific use via various types of subsidies, or they prohibit the use of resources for a specific use via various types of quotas. Contrary to market functioning and prudential policies, directly promotional policies are intended to have a distributive impact.

In the sections that follow, we provide a more in-depth overview and critical analysis of each of these categories of policies.

4.2 Market functioning policies

Market functioning policies aim at ensuring that financial markets properly perform their function of allocating resources to their most highly valued use. Crucially, such policies do not aim to divert resources from their market allocation, but rather aim to ensure that markets are not plagued by specific market failures such as myopia or information asymmetry.

One could say that the historical trend in developed nations over the past decades indicates that state interventions have been more politically palatable when such interventions have addressed specific ‘market failures’, instead of promoting a more overtly distributive or ‘market-shaping’ agenda (Mazzucato, 2016, p. 141). Because of their supposed non-distributive and market-friendly nature, then, market functioning policies have been implemented in almost all jurisdictions (Baer et al., 2021, p. 13). For the same reason, it should come as no surprise that these policies make up the bulk of the EU Action Plan of Sustainable Finance. Since they do not intervene with the market’s allocation of resources, they are perhaps a palatable compromise that can be agreed upon by different political factions as well as the participants of financial markets themselves.

We will in what follows comment on some of the most prominent examples of market functioning policies that can be used to promote sustainable finance.

4.2.1 Prominent examples

Disclosure requirements

In order to drive capital towards sustainable investments, investors need to understand which investments qualify as sustainable and which do not. Furthermore, they need to be aware of climate-related risks that might affect the value of their investments and their own impact on climate risks. More specifically, such information is considered 'material' to the degree that its omission or misstatement could impact other market participants' economic decision-making. Disclosure policies aim "to reduce information asymmetries in principal-agent relationships" (EU Regulation 2019/2088) and thereby make information on sustainable investments known among market participants.

We have already noted several initiatives with regards to disclosure in this report. The G20 Financial Stability Board established the Task Force on Climate Related Financial Disclosures (TCFD) specifically to provide recommendations on best practices in sustainability-related disclosure. The TCFD's main recommendations focus on Governance, Strategy, Risk Management and Metrics and Targets (TCFD, 2017). There are two kinds of disclosure policies in the EU: Disclosure policies in the non-financial sector ('corporate disclosure') and disclosure in the financial sector ('disclosure in financial services sector'). While corporate sustainability disclosure remains non-binding, as of March 2021, the "Regulation on sustainability-related disclosures in the financial services sector" (SFDR) harmonizes and renders sustainability disclosure in the financial sector mandatory. The regulation includes, among other elements, reporting requirements on "sustainability risk policies, adverse sustainability impacts at entity and financial product level, remuneration policies in relation to the integration of sustainability risks and sustainable investments in pre-contractual disclosures." (EU Regulation 2019/2088)

Benchmarks/standards/labels

Benchmarks, standards and labels are an additional way to disseminate information on sustainability in financial markets. While sustainability disclosure is important, not all disclosed information is of immediate importance to investment decisions or the measurement of the performance of a particular portfolio. Moreover, it is not certain that investors and their clients will be able to understand all of the

information that is being disclosed by companies. Green benchmarks, standards and labels can help with simplifying information on investment decisions.

As already noted in this report, there are currently excessively many green benchmarks, standards and labels under way. Some of these are private or civil society initiatives, whereas others are connected to the public sector. Crucially, the introduction of green benchmarks, standards and labels must be consistent in order to simplify rather than obscure information relevant to sustainability. A particular worry is that "it is not clear to users of benchmarks whether a particular low-carbon index is a benchmark aligned to the objectives of the Paris Agreement or merely a benchmark that aims to lower the carbon footprint of a standard investment portfolio" (EU Regulation 2019/2089). With this in mind, regulators need to establish minimal requirements for green benchmarks, standards and labels. Under EU regulation 2019/2089, the European Parliament and Council have established such minimum requirements for 'EU Climate Transition Benchmarks' and 'EU Paris-aligned Benchmarks'.

Taxonomies of sustainable activities

A common taxonomy on sustainable activities is the backbone of any sustainability disclosure regime. Without clear definitions of which activities qualify as sustainable, market participants will not be capable of disclosing their activities in a reliable manner and are likely to face significant barriers in allocating financial resources to sustainable assets (Cardona et al., 2020, p. 22). In acknowledgment of this, many jurisdictions have established their own taxonomies.

The EU's 'taxonomy for sustainable activities' entered into force in July 2020. The taxonomy establishes six environmental objectives that sustainable activities must promote: climate change mitigation and adaptation, the sustainable use and protection of water and marine resources, the transition to a circular economy, pollution prevention and control, and the protection and restoration of biodiversity and ecosystems (EU Regulation 2020/852). Activities do not qualify as sustainable if they significantly impede the achievement of any rival environmental objectives (EU Regulation 2020/852). The taxonomy puts forward a number of activities that are conducive to the environmental objectives, including activities that "strengthen climate-neutral mobility", "strengthen land

carbon-sinks” and “protect the environment from the adverse effects of urban and industrial waste water discharges”.

Research on climate risks

The aim of a disclosure regime is to increase the amount of available information that market participants can use to make informed decisions. However, it is not clear that the market will become efficient simply because companies and financial institutions become more transparent. Especially with regards to climate risks, there may also be a need for further information of a more structural or scientific kind.

Political and delegated authorities can here play a large role in gathering, analyzing and disseminating information of fundamental importance for the transition of society. However, the promotion of independent research on sustainable finance is equally important. Diverse information input is often out of reach or out of sight for regulators with fixed mandates. Thus, critical research on policy initiatives, market acceptance and life experiences shaped by sustainable finance constitutes an essential checks-and-balances system against which the success of a green transition should be measured.

Mandate and competence requirements of fiduciaries

For the increased information above to have an influence on financial decision-making, it must also be perceived as relevant and salient by financial decision-makers such as fund managers. Unfortunately, as we noted in a previous section, many fund managers have a narrow focus on short-term profits and do not see it as their role to engage with broader issues about the sustainable development of society. At least a part of the problem here is the traditional perception of the fiduciary duties of financiers – that is, the legal obligations that trustees (such as fund managers) owe to their clients or beneficiaries (such as future pensioners) (Hawley et al., 2014). According to the traditional perception, the role and mandate of trustees is simply to maximize the risk-adjusted returns of their clients’ portfolios.

Several things can be done in order to challenge the traditional perception of fiduciary duty. As part of the EU Action Plan, the European Commission has taken steps to clarify or update the relevant fiduciary duties in a way that includes a stronger focus on sustainability

risks over the longer term. This is not thought to be a policy that intervenes with the market, instead it is justified on the grounds that it “better reflects members and beneficiaries’ sustainability preferences” (EC Communication 2021/390, p.15). Sweden has gone further and given its public pension funds a direct, although secondary, mandate to “consider ethics and the environment in investment activities without compromising the overall goal of a high return” (Sandberg et al., 2014). Insofar as this secondary mandate is not connected to the interests of clients or beneficiaries, it may be thought to go beyond the confines of market functioning policies.

There have also been calls for updating the competence requirements for individuals that take up leading positions in financial institutions – including fund managers, asset owners, and the directors of financial institutions. The idea here is that financial decision-makers need to be better able to understand the interests of modern clients and beneficiaries, in particular their preferences for sustainable finance.

Initiatives for financial literacy

There is currently an increasing number of retail investors and clients of investment funds that are interested in sustainable finance, but these investors also face significant challenges. An important factor for the integration of retail investors into sustainable finance is financial literacy. A recent study by the OECD International Network on Financial Education demonstrated that the financial literacy rate among citizens of G20 countries is shockingly low. Fewer than half of the participants in the study were able to achieve even the minimum target score measuring financial knowledge (OECD/INFE, 2017, p. 7). Furthermore, citizens of countries with increasingly ageing populations cannot exclusively rely on social security in retirement. More and more, citizens are strongly incentivized to become retail investors. The problem of financial illiteracy is likely to become even more pronounced when retail investors are forced to additionally consider sustainability factors in their investment decisions.

Increasing financial literacy rates via appropriate education programs could be supplemented with learning objectives that promote sustainable investment and shift retail consumers’ investment decisions away from high-carbon sectors. In addition,

such programs can directly impact the achievement of sustainability goals by bridging inclusion gaps in the financial integration of economically vulnerable citizens (OECD/GFLEC, 2018).

International collaboration

Finally, international collaboration between regulators and political authorities could further promote sustainable finance. Sharing information on best practices, comparing different regulatory initiatives and highlighting differences and similarities in regulations can ultimately help to create a more unified, global regulatory environment for sustainable finance. International collaboration is crucial to facilitate the international flow of capital towards green investments.

In light of this, the EU created the 'International Platform on Sustainable Finance' in October 2019 together with authorities from six other nations. In 2019, six additional nations became members of the platform. One of the spearhead projects of the platform is to establish a 'Common Ground Taxonomy', which unifies the taxonomies from all member states of the platform in order to enhance transparency and enable coordination on green investments across platform member states (IPSF, 2020, p. 6).

4.2.2 Critical analysis

Based on the academic literature in the field, it seems clear that market functioning policies have a lot of advantages to appreciate. First and foremost, market functioning policies are politically palatable, since they aim to bring about the transition to sustainable finance with minimal interference in the current market allocation. They do not involve large-scale redistributive endeavors via the state and are hence comparatively easy to justify from the viewpoint of the political status quo. Ideally, market functioning policies take advantage of efficient market pricing and enable socially optimal economic growth (Baer et al., 2021). In short, market functioning policies aim at 'repairing' the market only where market failures erupt.

But it is also clear that market functioning policies on their own are insufficient to achieve sustainable finance. We have identified two kinds of problems with market functioning policies that are discussed in the literature. First, market functioning policies aim at remedying some specific market failures, but are unlikely to do so

successfully. Second, market functioning policies fail to address some other important market failures at all.

Let us begin with the first problem. One kind of market failure that market functioning policies aim at remedying are information asymmetries, i.e. situations in which one party to a transaction has more or better information about the goods that stand to be exchanged than others. Policies such as benchmarks, labels and taxonomies aim specifically at providing information on the climate impact of particular financial products, thereby eliminating the information differential between investors and issuers. In some cases, however, the attempt to eliminate information asymmetries is likely to be incomplete. An obvious point in case is that most taxonomies specify sustainable activities but refrain from defining carbon-intensive activities (Gabor, 2021a, p. 183). This invites a significant risk of greenwashing. The elimination of information asymmetries requires not only disseminating information on which activities financial resources ought to be allocated to, but also information on which activities will confidently undermine the achievement of sustainability.

A related problem is that many initiatives for disclosure are voluntary and non-binding. For example, the TCFD's recommendations on sustainability reporting are non-binding, and, as a result, "significant progress is still needed as an average of only one in three companies reviewed disclosed climate-related information aligned with the TCFD recommendations" (TCFD, 2021). Some developing economies (India, Indonesia, Nigeria, Pakistan and Vietnam) have made specific climate disclosures mandatory but, with the notable exception of France, climate disclosures remain mostly non-binding in developed economies (Cardona et al., 2020, p. 22).

A more principled problem is that the elimination of information asymmetries in general is hindered by radical uncertainty. Unfortunately, contrary to typical financial risks like credit, liquidity and market risk, climate risks as well as the trajectory of the transition pathway are subject to radical uncertainty. This ultimately means that the extent (and materialization) of unprecedented physical and transition risks is simply not reliably computable in the medium to long-run (Chenet et al., 2021). There is hence a principled reason to believe that market participants on their own will

ultimately fail to efficiently reflect the uncertain impact of physical climate threats and policy developments in asset prices.

Yet another market failure that is insufficiently addressed by market functioning policies is myopia, i.e. investors' excessive focus on short-term outcomes. Policies aimed at overcoming myopia, such as changes in the mandate and competence requirements of fiduciaries and financial literacy initiatives, address the problem only superficially. For example, insofar as fiduciaries are only required to inquire about investors' sustainability preferences (e.g. as required in the EU Markets in Financial Instruments Directive and the Insurance Distribution Directive), it is entirely unclear how precisely these initiatives address short-term focused investors that have no positive preference for sustainability. As de Bruin describes the problem: "Given the wealth of opportunities for sustainable investing that such an investor presently has, it is, however, unlikely that there are many investors who, despite their having preferences for sustainable investing, have so far decided to postpone reorienting their investments, and wait until they receive information about what projects should count as 'sustainable' (de Bruin, 2021, p.15). Financial literacy initiatives might not only be negatively impacted by a lack of preference for sustainable investments, but in addition a lack of expertise to assess sustainability-related information. Given the wealth of non-regulated sustainability benchmarks and labels, unsophisticated investors might not be capable to reliably assess whether they invest in sustainable projects (Ward, 2017). Even if retail investors have an interest in avoiding long-term climate risks, financial education programs must be complemented with comprehensive consumer protection policies in order to be effective.

The second problem is that market-functioning policies do not address other market failures at all. Most evidently, financial markets are already subject to severe environmental externalities (see for example Cruz and Krausmann, 2013). A result of these externalities is that high-carbon assets are severely underpriced, since the costs associated with climate change are shifted to others than high-carbon asset holders. As we noted in Chapter 3, climate policies for the real economy (such as a strong CO₂ tax) are vital in this regard. Unfortunately, as is widely acknowledged, market participants' awareness of this misallocation of

capital does not reliably translate into prices (Look, 2020). Part of this, as we have already stated, is due to the principled problem of radical uncertainty with regard to transition and physical risks. Yet, another important explanation for this mispricing is that due to the presence of externalities, climate risks inherent to high-carbon assets are not internalized: Why invest in the nascent, yet highly risky green industry when high-carbon companies form part of a mature industry with purportedly well-known risks? Whether high-carbon assets are eventually accurately priced is 'scenario-dependent': Only once we are reliably well on the way to transitioning into sustainable finance, the transition risks inherent in high-carbon assets will be evident (Baer et al., 2021, p. 8).

Indeed, even if high-carbon asset prices fall for a short period, there remains a risk of feedback effects. Some investors might simply choose to buy high-carbon assets at a discount, insofar as it remains unclear whether the asset is 'stranded'. There is thus an in-built dampening effect in highly liquid financial markets which tends to counteract the activities of sustainable investors: the non-green assets will simply be bought by other investors with less moral scruples (Sandberg, 2015; Olovsson, 2020). In short, market functioning policies on their own do not correct the short-term incentives created by climate externalities.

A closely-related problem is the integration of retail investors. According to the report of the EU High Level Expert Group, it is estimated that household savings make up 40 percent of financial assets in the EU (HLEG, 2018, p. 27). A portion of these assets must eventually be accessed in order to secure the transition towards sustainable finance. However, market functioning policies on their own generate little incentive to stimulate retail investors to purchase sustainable assets. Hence, even if retail investors have positive sustainable preferences, they might choose to express these preferences qua voters, but not qua investors. Additionally, even if retail investors do invest in sustainable projects, they might avoid high-risk projects and prefer to invest in comparatively safe and established sustainable assets. Such a trend would ultimately not help close the investment gap for high-risk, innovative, new sustainable projects.

In conclusion, the academic literature suggests that there are severe limitations to how effective market

functioning policies, on their own, can be to enable the transition to sustainable finance. From the fact that many investors do not yet shy away from these assets (even when their adverse climate impact is obvious), it is evident that the transition to sustainable finance has not yet taken part exclusively because investors lacked access to reliable information on sustainable projects (Jolly, 2021). Market functioning policies, however, address only the obstacles that a lack of information poses. Neither do changes in the mandate and competence requirements of fiduciaries and financial literacy initiatives address the problem of short-termism adequately, since both take investors' potentially biased preferences as given, instead of aiming to increase awareness of long-term climate risks. Furthermore, even with access to reliable information on the sustainability of specific assets, incentives created by climate risk externalities will continue to bias market participants' investment decisions (including those of retail investors) towards high-carbon assets unless addressed directly. While market functioning policies are a core element of a successful policy mix enabling the transition to sustainable finance, it also seems clear that they are insufficient on their own to achieve this goal.

4.3. Prudential policies

To the extent that there is a need to go beyond market functioning policies, the next step is likely to be prudential policies. As we noted above, prudential policies aim to ensure price and financial stability. While some such policies have had a long standing in many jurisdictions, prudential policies really came to the fore after the Global Financial Crisis of 2007-2008. The crisis demonstrated, with excruciating clarity, how 'free' or unfettered financial markets can create enormous risks to both financial institutions themselves as well as the surrounding society. Hence, in the aftermath of the crisis, most nations gave further powers to their monetary and supervisory authorities to keep the financial markets in check. We have probably all become aware of the great powers that are vested in delegated authorities such as central banks and financial supervisory authorities.

Currently, an interesting trend is to expand the prudential framework even further in order to address concerns about climate-related risks. We have already noted the central role that the ECB and other delegated authorities have played in this realm, sometimes

coordinating their activities through the Network for Greening the Financial System (NGFS).

Prudential policies can have slightly different aims and take on different forms. It is common to distinguish between so-called micro-prudential policies, which aim to safeguard individual financial institutions from exaggerated idiosyncratic risks, and macro-prudential policies, which aim to safeguard the broader financial system from more general or systemic risks. Moreover, these policies can take on an either informative or structural character. Informative prudential policies aim to improve the availability of information crucial to promoting price or financial stability. Structural prudential policies go beyond mere information gathering and aim to directly achieve the respective prudential goal by, e.g. forcing financial institutions to strengthen their portfolios in line with legal requirements.

We will in what follows comment on some of the most prominent examples of prudential policies that can be used to promote sustainable finance.

4.3.1 Prominent examples

Stress Tests/Sensitivity Analyses

Climate stress tests provide supervisory authorities with information on exposure of the financial system to climate risks. At its core, stress testing amounts to a modeling exercise in which the test subject is exposed to a number of hypothetical stress scenarios in order to test its resilience to distress. There are two variations of stress tests: micro and macro stress tests. Micro stress tests are designed to assess the resilience of single financial firms to specific threats, whereas macro stress tests assess the resilience of the financial system as a whole to specific threats. Climate stress tests typically focus specifically on the impact of physical and transition risks on either macroeconomic variables or the profits and losses of financial firms.

Sensitivity analyses constitute more targeted hypothetical exercises. More specifically, sensitivity analysis is well-suited to assess particularly dangerous idiosyncratic risks. The thematic nature of sensitivity analysis implies that only a few selected parameters are under consideration.

The ECB has already prepared and conducted both climate-related stress tests and scenario analyses. In

2019, the ECB conducted a sensitivity analysis of liquidity risk in the EU banking sector (ECB, 2021b). In September 2021, the ECB published the results of its 'economy-wide climate stress test', a macro climate stress test based on "a comprehensive dataset that combines climate and financial information for millions of companies worldwide and approximately 1,600 consolidated euro area banks" (ECB, 2021a). The stress test comprised three scenarios for the coming 30 years: first, an 'orderly transition scenario' that would ensure that global average temperature would not rise above 1.5°C; second, a 'disorderly transition scenario', in which required policy measures are delayed and global warming increases to 2°C and, finally, a 'hot house world scenario', in which global warming increases to at least 3°C until 2100. While transition risks are the lowest in the last scenario (since there is no transition), excessive physical risks imply that the default probability of the median firm is more than tripled compared to the orderly transition scenario (ECB/2021a/ 53). In short, the economy-wide climate stress test revealed that the short-term costs of timely transition are by far outweighed by the costs of delayed action. Another climate stress test is currently prepared to take place in 2022 (ECB, 2021b).

Capital requirements/leverage ratios

An important way in which financial institutions can be safeguarded from future risks is through holding high amounts of capital in relation to their total assets. Banks holding high amounts of capital are likely to consistently meet their payment obligations even when confronted with losses, and hence, they are less likely to become insolvent in situations of crisis. There are at least two ways in which the authorities can require such high amounts of capital. What is known as 'capital requirements' determine how much capital a bank (or other depository institution) is minimally required to hold against its risk-weighted assets. The higher the risk weight of a specific asset, the more capital will be required to counterbalance the asset's risk.

However, regulators realized during the Global Financial Crisis that monitoring capital adequacy was insufficient. Leverage ratios were implemented because it became clear that "banks built up excessive leverage while maintaining seemingly strong risk-based capital ratios" (BIS, 2017). Leverage ratios track the non-risk-adjusted ratio of capital to total assets in order to limit banks' reliance on debt funding for their assets (ECB, 2015).

Both capital requirements and leverage ratios could potentially be adjusted to further sustainability goals. Risk weights used to determine capital requirements could be adjusted via a 'green supporting' or 'brown penalizing' factor. A green supporting factor would decrease the amount of capital required to hold green assets (Cullen, 2018), whereas a brown penalizing factor would increase the amounts of capital required to hold high-carbon assets to reflect the inherent exposure of high-carbon assets to transition risks (D'Orazio and Popoyan, 2018).

Liquidity requirements

Liquidity requirements are a recent addition to the Basel III framework. Liquidity requirements subject banks to two requirements. First, the Liquidity Coverage Ratio, according to which banks must hold a certain amount of short-term assets. The Liquidity Coverage Ratio ensures that banks hold sufficient liquid assets to cover short-term payment obligations up to a month. Second, the Net Stable Funding Ratio, according to which banks must fund their long-term assets with more than one-year duration instruments. The Net Stable Funding Ratio ensures that banks have access to stable funding for at least a duration period of one year. D'Orazio and Popoyan (2018) suggest that the net stable funding ratio should explicitly distinguish between green and brown exposure portfolios and require lower stable funding ratios for green exposures.

Credit floors, ceilings and large exposure rules

Credit ceilings ensure that banks do not overexpose themselves to a particular type or group of assets. These tools followed as a direct consequence of the lessons learned during the US subprime mortgage crisis. Similarly, credit floors can incentivize banks to diversify their portfolio. Albeit similar in function, Large Exposure Rules differ from credit floors and ceilings by targeting counterparties, rather than asset groups. As Schoenmaker and van Tilburg (2016, p. 326) notice, these tools are likely to be most directly effective in shifting capital from high-carbon to green companies. An obvious prudential motivation to embrace these tools is the prevention of a 'carbon bubble', i.e. a systemic and potentially catastrophic overvaluation of high-carbon assets that might lead to an economic crisis once these assets become stranded.

Countercyclical capital buffers

Countercyclical capital buffers are a macro-prudential

policy tool that aims to dampen the exposure of banks to the credit cycle. In essence, such buffers require banks to increase their capital during periods of economic growth and thereby counter banks' tendency to lend more during the height of the credit cycle. The tool hence serves a twofold objective: first, it ensures banks' resilience to downward economic trends, and second, it aims at limiting credit availability at the peak of the credit cycle.

In the same manner that countercyclical capital buffers mitigate credit expansion and thereby could help to cushion excessive bank losses during the bursting of a financial bubble, countercyclical buffers could similarly prevent excessive losses due to a carbon bubble (D'Orazio and Popoyan, 2018, p. 15).

Eligibility as central bank collateral

The collateral framework determines which assets a central bank accepts as collateral for its loans. If an asset is accepted as collateral by a bank, the asset becomes more liquid, because banks can use it in their operations with central banks. Due to their liquidity, securities that fulfill the eligibility criteria for collateral accepted by a central bank can significantly lower funding costs for their issuer. So-called 'haircuts' have a similar impact on funding costs. Some assets vary significantly in value and in order to reflect this, central banks might accept the asset as collateral only at a fraction of its current market value. Hence, the lower the haircut, the more valuable the asset qua central bank collateral.

Including securities issued by green companies as acceptable central bank collateral, while keeping haircuts as low as possible, could have a very positive effect on their funding costs (Dafermos et al., 2021). But, as Schoenmaker points out, in order to be congruent with central banks' price stability mandate and a cautious transition, the pool of eligible assets should currently be broadened to include green assets, rather than exchanging high-carbon for green assets (Schoenmaker, 2019, p. 7).

Eligibility for quantitative easing

Quantitative easing is a policy instrument that primarily emerged in the aftermath of the financial crisis. Quantitative easing refers to central banks' direct purchases of sovereign or corporate bonds in order to drive interest rates down and stimulate investment in

the economy. Central banks engaged in quantitative easing primarily in order to reach their inflation targets, which was no longer possible through more conventional monetary policy channels, such as the setting of various key interest rates (see e.g. BoE, 2021).

The potential of quantitative easing for promoting sustainable finance should not be underestimated. "The overall purchases by the ECB during 2017, for instance, amounted to around € 730 billion, while the total additional annual investment required to achieve EU energy and climate targets is estimated at € 170 billion." (Campiglio et al., 2018, p. 465). Thus, if future stimulus measures from central banks would adopt a focus on green projects and sustainable companies, their expected effect would be great.

4.3.2 Critical analysis

Judging from the academic literature in the field, it seems likely that prudential policies have the potential to remedy a number of the shortcomings identified in relation to market functioning policies. Informative prudential policies such as stress tests, if they are properly calibrated, can help develop an understanding of the materiality of climate risks and thereby further minimize information asymmetries (ESRB, 2016). More importantly, structural prudential policies such as capital requirements or credit limits can constrain market participants from behaving in a manner that would undermine both prudential goals (i.e. price and financial stability) as well as sustainability goals. This constraining function could generate short-term incentives for achieving sustainability goals that market functioning policies lack. Moreover, some prudential policies such as credit limits might be well-suited to address both herding effects, by limiting credit for the high-carbon industry domestically, as well as international leakage effects, by restricting the flow of credit to foreign high-asset projects. Due to their constraining function, prudential policies are not only a necessary component of any successful policy mix aiming to bring about financial and price stability, but they are also essential for a successful transition to sustainable finance.

Prudential policies may be viewed as a middle way between the entirely non-coercive market functioning policies and the more coercive or interventionist promotional policies. Even with structural prudential policies, such as large exposure or credit limits, market

participants retain significant freedom to buy high-carbon assets even at a discount. With this in mind, it is quite understandable that many countries seek to use the already established prudential framework in order to promote not only prudential goals but also sustainability goals.

It is important to note that a first argument for the alignment between prudential policies and sustainability goals is that some of the structural policies currently in place create obstacles to a successful transition to sustainable finance. For example, current capital requirements effectively disincentivize banks from engaging in sustainable investments. This is the case for two reasons. First, sustainable investments are typically long-term investments and, all things equal, this makes them riskier, simply because the risk of default increases with time (Cardona et al., 2020, p. 26). As a result, long-term investments (and in particular, green investments) receive a higher risk weight and require more capital to be counterbalanced. Second, because climate risks are as of now not adequately priced into brown investments, sustainable investments are comparatively riskier. In other words, the inherent risk of sustainable investments is 'scenario-dependent': At the moment, it is hard to explain why mature, carbon-intensive companies should carry a higher risk of default than newly-founded green companies. Should the transition to a net zero emission economy be successful, however, higher default rates in the carbon-intensive industry are to be expected. But since climate risks are not yet adequately reflected in asset prices, sustainable assets require more capital to counterbalance their comparative risk disadvantage (Chenet et al., 2021, p. 8).

Some authors notice that similarly to capital requirements, liquidity requirements might also have an adverse impact on green investments (d'Orazio and Popoyan, 2018). Roughly, this is so because, again, most green investments are long-term investments, which are disfavored under the current liquidity requirements. However, the risk of short-term, high carbon assets to become 'stranded' implies significant liquidity risks that are currently downplayed.

Quantitative easing initiatives and the eligibility criteria for central bank collateral have also thus far undermined sustainability goals. These purchasing

programs typically focused on achieving 'market neutrality': Insofar as possible, central banks attempted not to distort market allocations by, for example, buying specific types of bonds only in volumes proportional to their market share. As some authors note, the central focus on market neutrality had deep distributional consequences, which also affected green companies. Quantitative easing effectively strengthened the already favored high-carbon sector and thereby created an additional comparative disadvantage for green companies (Fontan and van t'Klooster, 2020, p. 875). As of now, all European companies engaged in the renewable energy sector fall outside of the ECB's eligibility criteria (Fontan and van t'Klooster, 2020, p. 873).

If the transition to sustainable finance is to be successful, then, prudential policies must be aligned with sustainability goals. To be more precise, the role of structural prudential policies must be to address climate risks to the degree that they affect prudential goals. But this also brings us to potential weaknesses of employing prudential policies to secure the transition to sustainable finance.

First, the promotion of sustainable finance in this manner should not come at an unnecessary cost to prudential goals. Across jurisdictions at the moment, capital requirements, leverage ratios and liquidity requirements all largely ignore climate-related risks and therefore implicitly favor high-carbon assets. Adjusting regulatory requirements to acknowledge climate risks is a delicate matter though. The attainment of sustainability goals should not come at the cost of undermining financial stability. As an illustration, take the case of a green supporting versus brown penalizing factors for capital requirements. A green supporting factor would further lower already insufficient levels of bank capital by requiring even less capital to be held against particular green loans. Further lowering capital requirements in this manner might threaten financial stability and hence disqualify a green supporting factor as a prudential policy tool (van Lerven and Ryan-Collins, 2018). This illustrates that, when possible, while prudential policy should not undermine sustainability goals, neither should sustainability goals undermine prudential goals.

Second, promoting sustainable finance exclusively via prudential tools will likely be unsuccessful. As we have

argued in various sections thus far, there are trade-offs between sustainability and prudential goals. Sustainable projects require long-term, patient and often risk-friendly capital. As such, the risks they pose are far more transparent than those of high-carbon assets, yet they are significant. But prudential policies are focused on promoting the mitigation of financial risks. Even European central bankers who are highly sympathetic towards the promotion of sustainability goals attest that their willingness to take “climate change into consideration in their monetary policy decisions” is subject to the “restriction that [their] actions must not prejudice [their] price stability objective.” (ECB, 2021c) In short: acknowledging climate risks will only ever constitute a means to achieve prudential goals for delegated authorities, but not an end in itself. As such, delegated authorities will rightfully be biased to consider the promotion of sustainable finance as a secondary objective. It must be political authorities who recognize the promotion of sustainable finance as an end proper and support it with non-prudential policies.

Third, there are severe concerns regarding the legitimacy of promoting sustainable finance via delegated authorities. Prudential policies are typically enforced by monetary and supervisory, i.e. delegated authorities. Delegated authorities operate not under democratic control, but via mandate. In other words, they receive ‘input legitimacy’ due to their mandate and ‘output legitimacy’ due to their effectiveness in fulfilling their mandate. However, these mandates will typically only legitimize the use of prudential policies for fulfilling price and financial stability goals. Delegated authorities hence face a trade-off: ignoring the materiality of transition and physical risks will in the long-term adversely affect their output legitimacy, since price and financial sustainability are susceptible to climate risks. But if they enforce prudential policies in order to promote sustainability goals beyond their narrow mandate, they are effectively undermining their input legitimacy (Fontan, 2022). As a result, central banks in developed nations (who typically follow a narrow mandate) have thus far shied away from embracing prudential policies to discriminate against high-carbon assets or promote other sustainability goals. Due to their status as delegated authorities outside of democratic control, we stand by the opinion that neither monetary nor supervisory institutions ought to promote prudential policies that have

unintended distributive side-effects unless these side-effects are unavoidable to achieve their mandate. Chartering the course of economic development must ultimately fall on political authorities that are under democratic control.

In conclusion, prudential policies are particularly suitable to constrain market participants from undermining sustainability goals due to their steering effect which is blatantly missing in market functioning policies. At the moment, many delegated authorities have yet to acknowledge the materiality of climate risks and adjust prudential policies accordingly in order to avoid not only undermining their mandate, but also broader sustainability goals. However, exclusive reliance on prudential policies is problematic in light of the fact that prudential policies must first and foremost be enforced to promote prudential, not sustainability goals. This is due to the fact that delegated authorities are not under the democratic control that would legitimize their stewardship over economic development. Ideally, prudential policies should thus be aligned with sustainability goals insofar as they mitigate climate risks that threaten prudential goals. This, of course, implies that the full force and materiality of climate risks is acknowledged by delegated authorities in the first place. But in the last instance, the transition to sustainable finance should be spearheaded by political authorities.

4.4. Directly promotional policies

Directly promotional policies aim to ensure specific non-prudential goals by more direct state interventions in the market’s allocation of resources. These policies either shift resources directly to a specific use via various types of subsidies, or they prohibit the use of resources for a specific use via various types of quotas. Contrary to market functioning and prudential policies, then, directly promotional policies are intended to have a distributive impact.

It may be noted that it has been ‘politically incorrect’ in developed countries over the last several decades to intervene in markets for explicitly distributive or other policy goals. In the European Union, for instance, such ‘state aid’ or ‘industrial policies’ have typically been deemed inconsistent with free and fair competition (European Commission, 2022). However, it seems that the tides now are turning on this point. In response to several years of economic turbulence due to such things

as the sovereign debt crisis, the Covid-19 pandemic, as well as rising climate concerns, many EU countries have shifted their stance. At the time of writing, the European Commission is looking into how the rules against state aid can be amended in order to facilitate the 'greening' of public investments (Dethier and Levick, 2020).

In many developing countries, direct interventions in financial markets have been standard routine for several decades. For instance, many developing countries have a state-owned 'national development bank' that functions similar to the private banks but with a stronger policy directive. Alternatively, their central bank operates under a mandate that is broader and includes goals like securing economic growth and limiting unemployment. For such reasons, it is interesting to note that developed countries now may have a lot to learn from developing countries when it comes to directly promotional policies for sustainable finance (UNEP Inquiry, 2015).

We will in what follows comment on some of the most prominent examples of directly promotional policies in this regard.

4.4.1 Prominent examples

Credit limits

We have already stated above that credit floors, ceilings and large exposure limits can be justified as prudential policy tools. However, it is clear that credit limits can also be implemented qua promotional policy tools, with the explicit purpose of channeling credit to specific usages. Depending on the legal specificities of the respective jurisdiction, credit limits could be implemented and enforced by both delegated and political authorities. Some developing countries' central banks, e.g. the Reserve Bank of India and Bangladesh Bank, have embraced state-directed priority lending programs, which require commercial banks and various other non-bank financial firms to allocate a certain percentage of their loans to green sectors (Ryan-Collins and Dikau, 2017, p. 19)

Financial subsidies and taxes

As a softer alternative to direct limits, subsidies permit states to incentivize the production and consumption of specific goods. Broadly speaking, subsidies can come in three forms. First, direct subsidies, which often come as cash transfers or interest-free loans. With regard to

finance, central banks can also provide subsidies in the form of preferential interest rate treatment and improved liquidity access for financial firms supporting sustainable projects (Ryan-Collins and Dikau, 2017, p. 10). Second, subsidies can come in the form of tax exemptions. In the context of finance, these taxes might be capital income or financial transaction taxes on sustainable assets or transactions involving sustainable assets. Third, public loan guarantees can be used to shift part of the default risk of particular loans or investments to the public sector.

As we have seen, Sweden has in recent years experimented with some of these possibilities. The Inquiry into Green Saving (2020) explored the possibility of giving tax relief to citizens that put their savings into certified 'environmental savings accounts'. While it seemed clear that such a measure would make considerable funding available for green investments by the banks that would offer the accounts, the Inquiry ultimately deemed it unclear whether the banks would use the money to support new and innovative projects – rather than to overinvest in already established projects and thereby risk creating a 'green financial bubble' (SOU 2020, p. 17). In 2021, the government instead moved forward with a program of state credit guarantees for new loans regarding large industrial investments that contribute to Sweden's climate goals. Simply put, the state accepts to guarantee up to 80% of the default risk of certain bank loans to large industrial companies, given that they are intended for investments that meet certain environmental requirements defined by the EU taxonomy and the Swedish Environmental Protection Agency. An interesting development on this point is that the relevant authorities are working on how to make the state credit guarantees consistent with existing EU regulations against state aid. We give further comments on these initiatives in the next chapter.

Green Financial Transaction Tax

In the absence of a fully-fledged penalizing framework on brown industries enforced by supervisory authorities, some authors suggest the temporary implementation of a green transaction tax (Gabor, 2021a). Financial transaction taxes are designed to discourage specific kinds of financial speculation by imposing a levy on the respective transactions. A green transaction tax could be set to reflect the degree of the traded assets' carbon impact according to the EU

taxonomy. Various already existing plans for financial transaction taxes – including the Financial Transaction Tax proposal that has been blocked by the European Council in 2019 (Council of the European Union, 2019) – could potentially be enhanced to become an effective green transaction tax.

Direct public investments

Instead of waiting on private investors, states have the option to directly shift public investment towards sustainability goals. Private capital is, on its own, likely to be insufficient to achieve the shift to an emission-neutral financial and economic system, primarily for two reasons. First, the long-term investments needed for a transition to a green economy are highly risky compared to investments in the established high-carbon sector. Second, as a consequence, these long-term investments require long commitments. Private investors are likely to react drastically to a diminution of expected revenues. If such long-term commitments are supported by public investment, however, they are much more likely to attract private investors. The insight that public investments can attract private investors in the long-term is notably a crucial strategic element of the InvestEU Programme (Claeys and Tagliapietra, 2020).

There are several ways in which public investments can be redirected towards sustainability goals, reflecting the several channels of public policy noted at the outset of this chapter. The government itself, through the Ministry of Finance, can extend direct loans and thereby act as a financier. (This is almost what is going on in the case of state credit guarantees outlined above, except that the loans here stem from private banks and the state's role is only to guarantee a certain portion of the risk). Alternatively, the state can work through one or more of its many delegated authorities or public companies. For instance, the public pension funds can be tasked with taking a strong stance against investment in fossil fuel companies, or something similar. Perhaps the most ambitious example in this regard is the establishment of public banks with explicit sustainability targets – such as the UK's Green Investment Bank (2012-2017). More on this below.

Green investment banks

Green investment banks are publicly-capitalized banks created to provide financial services that are tailor-made for green projects, as well as to facilitate the

transmission of private investments to low-carbon usages. For example, the UK's Green Investment Bank was tasked to invest in new and innovative projects within energy efficiency, waste and bioenergy, offshore wind, and onshore renewables. Part of the financing for this was raised from private sources through equity investment funds, such as the Operating Offshore Wind Fund. Green investment banks have also been established in countries such as Australia, Japan and Switzerland (OECD/GCEC, 2017, p. 2).

A similar initiative is to give a dedicated green agenda to already established 'national development banks or other similar authorities. The EU promotes green investment banking via the European Investment Bank Group. The European Investment Bank Group's Roadmap specifies that half of its lending activities will be explicitly focusing on increasing support for "climate action and environmental sustainability", while all financing activities will be "aligned to the goals and principles of the Paris Agreement by the end of 2020" (EIB, 2020, vi).

4.4.2. Critical analysis

In the long run, the main challenge of a transition to sustainable finance is to steer credit in the direction of green investments. By now, it is a commonplace insight that filling the green financial investment gap requires large public investments (Darvas & Wolff, 2021). Beyond the sheer necessity for public investment, there is widespread consensus in the political economy literature that the transition to sustainable finance ought to be spearheaded by political authorities via directly promotional policies (Baer et al., 2021; Fontan, 2022; Gabor, 2021). The literature identifies three reasons that speak in favor of promoting sustainable finance via such policies:

First, directly promotional policies are under the control of political authorities. Contrary to delegated authorities, political authorities' input legitimacy is directly determined via the democratic process. Directly promotional policies intentionally change market outcomes; winners and losers in the market are picked via political process rather than via changes in technology, price and so on (although we have seen that even supposedly prudential policies necessarily fail to meet the standard of 'market neutrality'). But precisely because political authorities, at least in principle, represent the manifold interests of their

constituency, they are the ones who have the input legitimacy to decide between the competing interests within the population (Schmidt, 2013). Since the course of economic development concerns a multiplicity of these interests and climate risks pose a grave threat to them, it is political authorities who are primarily and rightfully tasked with mitigating the economic threat of climate risks (Baer et al, 2021).

Second, the flipside of this argument is that no other party is capable of promoting sustainable finance to the degree that political authorities are. On the one hand, as we have already stated, delegated authorities lack the input legitimacy to steer economic development in a sustainable direction. Their input legitimacy is based on their mandate, which in turn does not typically encompass the authority to make decisions with distributive consequences (Fontan, 2022, p. 16). On the other hand, market participants left to their own devices will be subject to a number of severe market failures. The presence of these market failures entails that they are incentivized to continue to invest in high-carbon assets (see section 4.2.2). Market-functioning policies that focus on providing information to investors are likely insufficient on their own to create a counterbalancing incentive in favor of sustainable investments (de Bruin, 2022). This effectively leaves only political authorities to take on the challenge.

Third, more specifically, certain market failures can be directly tackled via directly promotional policies. In particular, the market for sustainable assets is nascent and highly risky, but requires 'patient' long-term investments to mature. Market participants, who are typically focused on short-term, low-risk investments will either be unwilling to provide this kind of funding or will do so at their own and potentially the entire financial system's peril, neither of which are desirable. But, as we have stated here, political authorities have a number of policy channels (e.g. credit guarantees, tax exemptions, state-owned banks) through which such long-term funding could become available where needed; either by providing funding directly via the treasury or delegated banking or by incentivizing private firms to take on loans at a significantly reduced risk. In short, political authorities have the power to stimulate the transition to sustainable finance by reverting counterproductive incentives favoring high-carbon investments and creating positive incentives for long-term, sustainable investments.

However, whether directly promotional policies will prove to be effective is subject to some concerns which we offer as important caveats here. A first concern is policy uncertainty. In particular, two sources of policy uncertainty can undermine an orderly transition to sustainable finance. First, uncertainty about which directly promotional policies will be implemented. Market participants react sensitively to expectations regarding the course and shape of credit steering. For example, if credit limits are imposed onto some high-carbon sectors in the future, market participants will likely attempt to limit their exposure in the present. Therefore, clear selection criteria and careful communication regarding the implementation of directly promotional policies is important to minimize this type of policy uncertainty (Gonguet et al., 2021). The second source of policy uncertainty is whether already implemented policies will be compromised in the future. Market participants' profit expectations depend on political authorities following through on the transition to sustainable finance. Insofar as market participants believe in political authorities' commitment to the transition to sustainable finance, they will invest in green assets, rather than investing in overvalued high-carbon assets which will eventually become stranded. A clear example for a similar mechanism can be found in the EU emission trading system. The reason why emission certificates have remained at a comparatively high price is that investors anticipate that these certificates will become vastly more valuable in the future. Market participants who buy these certificates now will be able to sell them for a profit in the future. However, if new emission certificates were to be issued at a later point, market participants' future profits would be diminished, and certificates will accordingly be bought at a lower marginal price (Tooze, 2020). In short, another important source of policy uncertainty is the potential for deviation from the transition pathway. In order to minimize this sort of policy uncertainty, it is of utmost importance for political authorities to commit fully and without deviation to the transition pathway to sustainable finance.

Second, directly promotional policies can increase the risk of a green bubble. In September 2021, the BIS stated that there is a significant risk that green, and more importantly, merely greenwashed assets are currently overvalued (Jones, 2021). Stimulating directly promotional policies might increase the overvaluation

of these assets even beyond current levels. Periods of excessive overvaluation are often referred to as 'bubbles'. Bubbles typically 'burst', i.e. experience periods of steep devaluation, when companies invested in fail to meet their repayment obligations. The resulting financial losses can, directly or indirectly, spread throughout the financial system and spark a full-blown financial crisis (Brunnermaier & Oehmke, 2012). To address the risk of a green bubble bursting, directly promotional policies must be complemented with strong prudential policies that promote financial stability, such as adequate capital and liquidity requirements and large exposure limits.

Third, directly promotional policies could create moral hazard via 'de-risking'. The central idea behind de-risking is that the state guarantees repayments for investments made by private market participants, thereby shifting risk to the public sector. The term 'moral hazard' describes a situation in which one party intentionally engages in risky behavior because they know that any resulting losses will be incurred by someone else. In the context at hand, the worry is that if de-risked projects are not accurately monitored, the risk that market participants attempt to greenwash projects is significantly increased (Gabor, 2020). Greenwashed assets will eventually, similar to other high-carbon assets, be sharply devalued and therefore impose significant financial losses onto market participants who hold them. If these potential losses are of significant magnitude, delegated authorities might have to step in as 'rescuers of last resort' to guarantee financial stability (Gabor, 2021, p. 447). Hence, in order to enable market participants to avoid greenwashed assets and enable supervisory authorities to accurately track market participants' exposure to climate risk, market functioning policies like adequate disclosure standards and a reliable taxonomy are key.

Fourth, directly promotional policies will lack effectiveness if delegated authorities effectively work against them. Unconventional monetary policy aimed at price stabilization (e.g. quantitative easing) could boost the price of high-carbon assets in the short-term, thereby working against the incentive in favor of green investments set by directly promotional policies. If directly promotional policies are to be effective, coordination between delegated and political authorities is of utmost importance. As Fontan (2022) suggests, coordination between political and delegated

authorities could be achieved either via installing committees composed of central bankers, elected officials and other representatives who together steer credit towards strategically important sectors, or, in a more mild version via 'comply or explain' procedures in which delegated authorities take input from political authorities to decide which high-carbon assets are to be removed from current asset purchasing programs (Fontan, 2022, p. 17).

The primary benefit of directly promotional policies is that they in principle permit political authorities to directly steer the course of economic development without relying on the cooperation of delegated authorities via prudential policies or market participants via market functioning policies. More specifically, this is beneficial because delegated authorities focused on achieving prudential goals lack the input legitimacy to steer economic development (Fontan, 2022, p. 6), and market participants on their own are unlikely to overcome a number of market failures that incentivize the purchase of high-carbon, rather than green assets (see section 4.2.2). However, we have also argued that directly promotional policies are only effective if they work in tandem with both market functioning and prudential policies to avoid policy uncertainty, asset bubbles, morally hazardous 'de-risking' and countervailing policy interaction between political and delegated authorities.

Chapter 5.

Recommendations for Sweden

What can and should the government of Sweden do to promote sustainable finance and thereby accelerate the climate transition of society? In this final chapter, we collate and combine our analyses and findings from previous chapters to give research-based advice to Swedish policymakers. We also delve into a more detailed discussion of the various policies that are on the government's table now and provide some critical analysis of these policies.

A general lesson from our analysis so far is that there is no 'silver bullet', in the sense of a single or simple solution to how to get financial markets to work harder for the sustainable development of society. Instead, policy initiatives in this regard need to come at many different levels and they need to be aligned with each other. There needs to be alignment between the government, central banks, supervisory agencies and other public institutions on the one hand, and banks, funds, and other actors in the financial sector on the other. As financial markets are heavily international, there also needs to be policy alignment between the national and the international levels.

In this chapter, we identify three overarching policy areas in which coordinated activities are needed. These three areas are not necessarily mutually exclusive, with some recommendations falling across more than one area, but they provide a useful structure. In the following pages, we discuss each of these areas in more detail:

(1) Strengthening the functioning of financial markets with regards to their ability to direct financial assets and flows towards sustainability. In order to harness the great potential of financial markets to allocate resources in efficient ways 'on their own', there is a need for policies that address central market failures and frictions that are barriers to more sustainable investments. This is the purpose of what we have called market functioning policies. Such policies are typically determined by legislation on either the national or the EU level. **We suggest that the Swedish government promotes policies that enhance financial markets' functioning in these regards, in particular their ability to recognize investors' preferences for sustainable investments and to reliably allocate these investments towards sustainable companies and green projects.**

(2) Updating the current framework of prudential regulations so that it gives increased attention to climate-related financial risks that are pertinent to both individual institutions (micro-prudence) as well the financial system as such (macro-prudence). This is the purpose of what we have called prudential policies. Such policies are typically administered by delegated authorities such as the central bank (the Riksbank) and the financial supervisory authority (Finansinspektionen). **We suggest that the Swedish government reviews the mandates given to the relevant authorities and enacts public policies that increase the alignment between prudential and sustainability goals.**

(3) More active and direct intervention by the public sector that can redirect financial flows and investments to sustainable companies and green projects 'here and now'. This is the purpose of what we have called directly promotional policies. Such policies are typically administered by the government as well as various public companies in the financial sector, such as EKN, SEK and the public pension funds. In our view, there is great potential in several recent initiatives by Swedish policymakers in this regard, but there are important issues to monitor and discuss for the future. **We suggest that the Swedish government continues to ramp up its activities that aim to swiftly and directly revert incentives away from high-carbon investments and towards more sustainable and long-term financing initiatives.**

5.2 Strengthening sustainable financial markets

Market functioning policies aim at strengthening the ability of financial markets as such to recognize and express investors' preferences for sustainable investments and to fully and reliably channel these to green projects. Economic theory tells us that markets can play a central role in enabling socially-optimal economic growth. We have argued that at least some market functioning policies are indispensable for the field of sustainable finance to take off, since they aim to 'correct' some of the market failures noted in Chapter 3 and thereby align market allocations with sustainability goals. However, these policies are not enough on their own to support a swift and strong transition. While they may be effective in addressing some of the market failures (such as information asymmetry, myopic investment, and policy risk), we need other policies to

address other failures (such as first mover friction and learning by doing).

The Swedish government can have an impact on both international and national financial markets, but their actions should differ in between those levels to be effective. At an international level, the government can participate in global financial market regulation and practice development. At a national level, the government can promote market practices that make Swedish financial firms better prepared for international expansion, so that Swedish financial firms can be benchmarks of 'best practice' internationally.

Our more precise recommendations in this context are organized along two main themes: harmonizing global standards and aligning regulatory frameworks.

Harmonizing global standards on sustainable finance

Sweden is not a nation that is big enough to have a commanding influence on global financial markets, and so, the influence that Sweden's government and policy will have on EU and global financial markets is primarily through Sweden's influence in international public sector organizations, such as the Bank for International Settlements (BIS), the EU, the UN, the World Bank, the IMF, etc. As we demonstrated in Chapter 2, there is currently a significant amount of work being done on these levels, especially in the EU. **We suggest that the Swedish government continues to support the development and implementation of global sustainability standards through international organizations, but it can potentially play a more active role in areas in which Sweden has particular strengths.** Examples are certain areas of national competence which include: industrial sectors such as hydropower, the paper and pulp industry, manufacturing, and government sectors such as construction materials standards and public digital sustainability data.

The Swedish government can combine the international and national levels to the benefit of Swedish sustainable finance and business. An example is that EU standard setting has a strong influence on the viability of products and business models of Swedish firms (Swedish Competition Authority, 2020). The adverse effect of sustainability standards can be mitigated by the Swedish government intervening to remedy unfair trade practices internationally. The adverse effect of sustainability can also be mitigated by the Swedish

government supporting competence development of how businesses can use sustainability to increase their competitiveness. **We suggest that the Swedish government should task the Swedish Competition Authority (Konkurrensverket) to focus on unfair sustainability practices, so that the government can act swiftly to prevent possible adverse effects of international sustainability standards on Swedish industry.**

Sweden has entered into around 70 bilateral investment treaties (BITs) and will participate as an EU member in several recently-negotiated/under-negotiation EU agreements. A purpose of bilateral investment treaties is to promote foreign direct investments by protecting Swedish investors against policies undertaken by a host country (receiving such investments from Sweden). BITs have been the topic of heated debate and a concern is that they constrain host countries from implementing public policy. Under the Energy Charter Treaty, Vattenfall launched a EUR 1.4 billion claim against Germany over permit delays for a coal-fired power plant in Hamburg and won. More recently, the German energy company RWE invoked the Energy Charter Treaty to sue the Netherlands for EUR 1.4 billion as compensation for phasing out coal by 2030. It is unclear to what extent Sweden is using its BITs to constrain climate policy efforts overseas. **We suggest the Swedish government should review its bilateral investment treaties (BITs) and renegotiate them where necessary to ensure they are aligned with climate policy objectives.**

Opportunistic investors may shift their resources to countries that have less ambitious climate policy objectives – so called climate policy leakage – and policy efforts are already underway at the EU level to respond to leakage. The flip side of carbon leakage is that ambitious climate policy signals opportunities in carbon-friendly economic activities and can spur investment inflows and the establishment of activities that need reliable and clean energy sources. The Swedish government can support economic growth and climate policy objectives by supporting clean investment inflows, rather than exporting clean energy. **We suggest that the Swedish government promotes investment inflows by developing policy to support foreign businesses that can benefit from Sweden's comparative advantages in clean energy, rather than supporting the export of clean energy.**

Aligning regulatory frameworks with climate policy objectives

There is a well-established positive relationship between the level of policy certainty facing investors and the levels of investments made. Flexible, price-based policy may have efficiency advantages, but these advantages should be considered along with the potential impact of reducing the certainty of investment returns and corresponding effects on investment levels. **Uncertainty arising from policy, and especially climate policy, are a key barrier to increased investment in the climate transition. The Swedish government should explore opportunities to reduce this uncertainty with policy that offers greater certainty on investment returns.**

Regulation across different public policy areas can potentially work at cross purposes with each other. Potential gains in climate protection could be realized by aligning regulatory frameworks nationally, within the EU, and internationally. The Swedish government should shape financial markets to enable growth of sustainability business in Swedish private sector firms. This can be achieved by the regulation of financial markets, and by promoting investment in sustainable businesses. **We suggest that the Swedish government takes a leadership position in regulation of financial markets towards increased sustainability.**

The Swedish government should use financial markets for the development of private sector sustainability business, because there is a need to develop sustainability-based business models, and because sustainability-related business and finance has great growth potential. Government agencies such as Finansinspektionen, the Swedish Energy Agency, the Swedish Transport Administration, the Swedish Agency for Economic and Regional Growth, VINNOVA, the Swedish National Board of Housing, Building and Planning, SEK, EKN, etc. could potentially be used in coordinated efforts to achieve change in the sustainability business ecosystem. **We suggest that the Swedish government promotes sustainable finance and business models through further employing coordinating agencies.**

Furthermore, the Swedish government should enhance its capacity to swiftly evaluate, adapt, and implement better sustainable finance regulation. Sustainable finance regulation, and environmental and social

regulation more generally, is developing rapidly. At the same time retail and institutional demand for sustainable finance products is growing. In this dynamic environment, there is a danger of policy mistakes that lead to adverse effects that can undermine legitimate efforts to finance the transition. For example, policy to support increased investment in the cleanest 'green assets' may divert resources from 'brown assets' that require investment to upgrade and convert to green. The conversion of 'brown assets' to 'green assets' may benefit sustainability objectives, but regulation may direct too little investment into this type of conversion. There is a need for a robust evidence base to evaluate the effectiveness of sustainable finance regulations to ensure a more efficient and cost effective transition towards sustainability. The government needs to develop a capacity to respond quickly to unsustainable finance practices because large amounts of financial resources may otherwise not most effectively contribute toward sustainability.

The COP26 meeting presented a strong showing of private sector actors, where financial market firms and accountants proclaimed their willingness to transform society towards sustainability. They formed the Glasgow Financial Alliance for Net Zero, and the International Sustainability Standards Board. However, the initiatives of these private sector actors will not be effective without the support of matching international governing organizations, regulations, standards, etc. **We suggest that the Swedish government should actively promote regulation and standards that support the private sector's international sustainable finance initiatives. Furthermore, Sweden should seek to lead the way internationally by, for instance, requiring more detailed sustainability accounting data from companies.**

There are systematic biases in the information currently used by investors to guide their investment decisions. These biases can undermine Sweden's efforts to support investment in climate-friendly projects. One source of bias is that smaller companies are often unable to meet the informational demands being put to them by investors. Increasingly demanding sustainability reporting requirements impose costs that disproportionately affect smaller companies that do not have the resources to meet these reporting requirements. The effect is that smaller companies that have been identified as an important driver of

innovation miss out on the investment that would allow them to expand cleaner production for example. **We suggest that the Swedish government deploys policy to ensure that smaller companies can access sustainable finance.** This could be accomplished by for example supporting the development of simpler reporting standards for smaller companies.

5.3 Aligning prudence with sustainability

Another important policy area is so-called prudential policies, which are financial regulations that aim to safeguard price and financial stability. As we have noted, there is a growing trend in many countries to expand the existing prudential framework in order to address concerns about climate risks and to promote more sustainable investments. We argued in Chapter 4 that prudential policies can be effective tools for the promotion of sustainable finance since they have a direct steering effect that is missing in market functioning policies. Probably the strongest argument for the alignment between prudential policies and sustainability goals is that some of the prudential policies currently in place create obstacles to a successful transition to sustainable finance. At the same time, however, exclusive reliance on prudential policies is problematic in light of the fact that they must, first and foremost, be enforced to promote price and financial stability goals rather than sustainability per se.

Swedish prudential policies are mainly administered by the Riksbank, and Finansinspektionen. As we saw in Chapter 2, the government expects both of these authorities to integrate concerns about sustainability in their operations. More specifically, Finansinspektionen has been tasked with keeping tabs on the sustainability work of Swedish banks and investment funds, as well as to provide recommendations that reduce the exposure of Swedish financial markets to climate-related risks. They have recently worked on, among other things, a series of reports concerning climate risks prevalent on Swedish financial markets, as well as a series of supervisory dialogues with the banks about various disclosure and reporting initiatives (Finansinspektionen, 2021). The Riksbank is a more independent authority, but it is nevertheless expected to integrate sustainability concerns in both its internal and external operations, where the latter includes its work on both monetary policy and financial stability. The Riksbank has also worked on, among other things, a series of analyses of the exposure of Swedish financial

markets to climate risks, as well as on recommendations concerning adequate disclosure and reporting of such risks (Riksbank, 2021).

Due to space constraints, we have only been able to give a broad outline of these authorities' sustainability operations in the present report. However, taking a broad look at the prudential policies that currently are in place, it seems safe to say that the Swedish focus has been more on informational rather than structural policies (with a few exceptions). That is, the relevant authorities have mainly worked with improving the availability of information pertaining to the relationship between prudential and sustainability goals and used this to provide non-coercive advice to market participants on how to, for example, reduce their exposure to climate-related risks. They have very seldom used more structural or coercive policies, such as adjustments to capital or liquidity requirements or direct credit limits. **Given the urgency of the challenge of climate change and its associated risks to the financial system, we believe that there are reasons to rethink this balance in the current policies – and to go towards more structural or coercive policies.**

There are some exceptions to the picture above, mainly pertaining to how the Riksbank has chosen to administer its own investments. Since 2019, the Riksbank takes certain sustainability considerations into account in its investment of the national reserve of gold and foreign currencies. Since 2021, the Riksbank also applies so-called negative screening to its purchases of corporate bonds as a stimulus measure (i.e. quantitative easing), which means that it does not purchase bonds issued by companies that fail to comply with certain ESG standards (Andersson and Stenström, 2021). These are some of the Riksbank's most direct and visible activities and it is perhaps understandable that it wants to avoid criticism to the effect that public money could go towards companies in the fossil fuel industry or other brown industries. In any case, these recent initiatives should be applauded.

Mandate and legitimacy

Why have the authorities not moved further with other policies of a more structural or coercive nature? One reason seems to be their understanding of the mandate that they work under. For instance, Finansinspektionen states that "it is not part of our mandate to raise or lower the capital requirements for certain types of

exposures for the sole purpose of promoting sustainable development” (Finansinspektionen, 2021). Similarly, the Riksbank states that it accepts the ‘principle of market neutrality’ which holds that “state market interventions [are not] allowed to distort competition without objective grounds” (Andersson and Stenström, 2021). Based on our arguments in Chapter 4, we largely agree with these statements. That is, delegated authorities are not under the democratic control that would legitimize their direct stewardship over economic development. However, we have also noted a major criticism directed at the principle of market neutrality, namely that all prudential policies have distributive consequences of some sort or another. Most importantly, the current prudential framework seems to be unreasonably biased towards supporting brown industries.

Interestingly, even the ECB now rejects the principle of market neutrality in the context of policies for sustainable finance. Their main argument is that “in the presence of market failures, adhering to the market neutrality principle may reinforce pre-existing inefficiencies that give rise to a suboptimal allocation of resources” (Schnabel, 2021). In other words, there is little value in respecting market-based allocations if they are unlikely to be efficient. As we argued in Chapter 3, there is reason to believe that current markets underestimate the risks inherent in brown investments and over-emphasize the risks involved in green investments. Consequently, the current prudential framework is likely to support an inefficient allocation of resources which only can be corrected by policies for sustainable finance.

It is important to note that the ECB’s argument does not require a broader sustainability mandate, but actually also pertains to the narrow prudential mandate. To the extent that unregulated markets are unable to put a reasonable price on climate-related risks, there is an important role to play for prudential policies such as adjustments to capital or liquidity requirements. In conclusion, we do not agree that the narrow mandate of delegated authorities prohibits them from taking more coercive measures to mitigate climate-related risks and to promote more sustainable investments. Quite to the contrary, a failure to promote sustainable finance may jeopardize both prudential goals and broader sustainability goals. If any questions remain about these things, **we recommend further dialogue to clarify**

the mandate of delegated authorities such as Finansinspektionen and the Riksbank as they relate to utilizing prudential policies to promote sustainable development.

Choice of policies

Another reason for why the Swedish authorities have resisted structural prudential policies may be more specific worries related to some such policies. For instance, Finansinspektionen was originally skeptical towards the government’s proposal (in January 2021) to reduce the capital requirements for occupational pension funds investing in green infrastructure projects. One of their criticisms here was that reductions in capital requirements could increase the risk for financial instability (Finansinspektionen, 2020). The Riksbank expresses a similar argument when it states that: “Capital requirements exist for a reason – to build resilience in the financial system. Eroding these requirements risks undermining financial stability. Incentives to increase sustainable investment should be created in other ways” (Riksbank, 2019: 18).

It should be noted that the argument above is mainly directed at the idea of a ‘green supporting factor’ in capital requirements, i.e. a reduction in capital requirements for certain green projects. However, the argument does not affect the corresponding proposal for a ‘brown penalizing factor’, i.e. an increase in capital requirements for certain brown projects. We have been unable to find any lengthier discussion about this from the Swedish authorities. For this reason, **we recommend that the appropriate authorities should investigate the possibility of adjusting capital requirements by the introduction of a brown penalizing factor to address concerns about climate-related risks to financial stability.**

Our line of argument above suggests that the Swedish authorities should rethink the balance of their prudential policies towards a stronger use of what we have called structural policies, such as adjustments to capital or liquidity requirements or direct credit limits. At this point in time, it is difficult to say with any certainty what such more specific policy would be most suitable in the Swedish context. We therefore recommend that the authorities **start with conducting further investigations into the benefits and drawbacks of various structural policies for the Swedish context, including adjustments to capital requirements and direct credit limits.**

5.4 Direct promotion of sustainable finance

A final important policy area is what we have called directly promotional policies, which involve some degree of direct public investment to support climate objectives. Directly promotional public investment is necessary to spur activity in new markets or support new solutions that, for various reasons discussed in Chapter 3, private sector investors are unable or unwilling to finance. This is a contrast to policy that targets market functioning and prudential policies discussed above. Through directly promotional policies, governments have the power to, swiftly and directly, revert counterproductive high-carbon investments and to promote positive and more long-term investments.

Several recent initiatives by Swedish policymakers can be classified as directly promotional policies. Direct mandates have been given to the public pension funds AP1 to AP4, as well as AP6, to manage their funds in a more sustainable manner. Through the 'platform for international sustainable business', some other delegated authorities and public companies are also expected to provide financial support for sustainable business activities at home and abroad. Another example is the Swedish climate declaration for new buildings (Swedish National Board of Housing, Building and Planning, 2021). The National Debt Office recently issued Sweden's first sovereign green bond. And finally, the flagship activity of the current government is the provision of state credit guarantees for large industrial investments with high sustainability ambitions. We here provide some more detailed comments on these policies.

Guidance for implementation and administration

An interesting question is how directly promotional policies are best organized or administered. As we argued in Chapter 4, there are several potential channels of public policies for sustainable finance, including the legislative channel, the monetary/supervisory channel, and the direct involvement channel. The Swedish government is currently using several of these channels; sustainability mandates are given to the public pension funds as well as other delegated authorities, but the Ministry of Finance is also directly involved through its provision of green credit guarantees.

As we noted in Chapter 4, the effectiveness of directly promotional policies hinges on minimizing policy

uncertainty through: a) clear selection criteria and careful communication, and b) committing fully and without discontinuation to the transition pathway. Reduction of these policy uncertainties creates trust and reduces uncertainty among market actors regarding the permanence of the policies, which is essential for market actors to make investments and organize their business. This is because investments and finance have a future-oriented direction and market participants are likely to disregard policies that they see as fickle.

Based on this reasoning, it seems that directly promotional policies are more likely to work if they are implemented as robustly as possible. That is, they should not be perceived as 'policies of the day' that may well change tomorrow if only the political winds change. This could be a reason to prefer administration by delegated authorities rather than by the Ministry of Finance itself. Since the mandates given to delegated authorities and public companies are announced in advance, and they cannot be changed too often, they are likely to minimize both types of policy uncertainties discussed here. In line with this reasoning, **we recommend that directly promotional policies are implemented as robustly as possible, which entails that they most often will take the form of public mandates, assigned to delegated authorities.**

Balance in risk-bearing

Another important desideratum in this context is the distribution of risk-bearing inherent in the different policies and their implementation. The strongest argument for directly promotional policies is that some of the risks involved in the transition to sustainable finance can only be taken by the state, and not by private actors. Because some sustainability risks are too high for traditional market actors, they will be reluctant to invest or develop their businesses, unless the state mitigates the risks. An important counterargument against directly promotional policies is that they can create moral hazard via 'de-risking' (Gabor, 2021). The central idea behind de-risking is that the state guarantees repayments for investments made by private market participants, thereby shifting risk to the public sector. The term 'moral hazard' describes a situation in which one party intentionally engages in risky behavior because they know that any resulting losses will be incurred by someone else. To avoid this problem, it is of utmost importance that directly promotional policies are implemented in a way that

maintains a good balance of risk-bearing between the state, financial institutions, business in general, and individual consumers.

Based on this reasoning, one could argue that there is a potential problem in giving a sustainability mandate to the public pension funds, as well as requiring all funds in the premium pension system to have a sustainability policy. Because those who will bear the risk here are future pensioners (as individuals) rather than the public as a whole. If the pension funds were to lose significant amounts of money due to their sustainable investments, this would lead to lower pensions in the future. This is true also for the public pension funds, since the pension reform of 1999 separated the budget available for public pensions from the more general state budget.

With regards to the other policies in place, there seems to be a better balance of risk-bearing. Regarding the green credit guarantees, for instance, the risk is carried by the general state budget. Moreover, the state only guarantees up to 80% of the default risk on the loans. This leaves at least some risk for the financial institutions involved, which serves to mitigate the problems of 'de-risking' and 'moral hazard'. From what we have heard, however, the ultimate balance of risk-bearing here remains unclear since the relevant authorities are working on adjusting the state credit guarantees to make them consistent with EU regulations that forbid state aid. This may entail that the state must charge some form of insurance fee for its assistance.

Sustainable finance will inevitably mean that the government will need to consider the balance of risk bearing to a larger extent in the future, not only because new investments and businesses have complex risks, but also because the risks pertaining to existing assets and businesses change. **We therefore recommend that the government builds its capacity for risk balancing between the private and public sector, for instance through procedures for swift development of enabling legislation and agency action.** The government could start by making a commission that combines private sector actors with Fossil Free Sweden, Finansinspektionen, and the government.

Which projects should receive funding?

Another important question in this context concerns

the best recipients of directly promotional policies. That is, what types of sustainable companies or green projects should the government seek to promote through its policies? A central challenge with direct public investment is that it can be difficult for governments to identify the right investment. Examples of public investment failure, and how to make public investment more efficient, are topics with a long history of debate. However, in some cases, direct government investment is the best option whereas in other cases a better allocation is achieved by private sector actors. A mixed public/private investment approach can also be adopted as a hybrid strategy that could harness the best of both the public and private sector investment practice.

As we argued in Chapter 4, it is of utmost importance in this context to be mindful of the risk of green financial bubbles. Directly promotional policies could potentially increase the valuation of certain green assets beyond sound levels, which eventually could lead to rapid price falls and a financial crisis. To address the risk of a green bubble bursting, we said, directly promotional policies must be complemented with strong prudential policies that promote financial stability, such as adequate capital and liquidity requirements and large exposure limits. Moreover, to minimize the risk of creating a green bubble in the first place, it is also important that the policies reach the right type of recipients.

Our recommendation in this regard is that the government seeks to use its interventions in the market to be as complementary as possible to what the market is already doing. In other words, it seems plausible that directly promotional policies are used to support precisely those type of sustainable investments which the financial markets on their own struggle the most with. Prominent types of investments and finance are: (1) the most innovative new products, services, projects or new technologies that show considerable potential, but the market perceives as too risky to fund, and (2) the most long-term investments, in e.g. infrastructure, which are vital to the climate transition but that go beyond the investment horizon of many private market participants.

Based on this reasoning, we see many reasons to be optimistic about the policies currently in place. For instance, we wish to highlight the important role played by Almi and Almi Invest to support small and medium-

sized enterprises (SMEs) in the green sector. Such support can be incredibly valuable for the establishment of new competitive businesses in this expansive sector. Moreover, there seems to be good reason to direct the state credit guarantees towards large industrial investments that contribute to reaching the national environmental or climate goals. As we argued in Chapter 3, the market seems to have particular problems with supporting large and complex projects that require support from multiple stakeholders and risks that private actors do not normally take.

We generally recommend that the government develops its capacity to take direct action in sustainable finance that is as complementary as possible to that of the private sector's sustainable finance initiatives.

As a side note, we also think that our reasoning above gives further credence to the negative conclusions of the inquiry into tax exemptions for green savings. If such savings are allowed to go to any kind of green projects selected by the commercial banks, rather than just to projects that really need the money, there is a risk that the policy can contribute to the risk of a green financial bubble.

A Swedish green investment bank

At this juncture, it seems interesting to discuss a policy option that has not yet been pursued in Sweden, namely the establishment of a green investment bank (GIB). This would be a publicly-capitalized bank created to provide financial services that are tailor-made for green projects and to facilitate the transmission of private investments to low-carbon usages. We note that commentators from a broad range of backgrounds have called for the establishment of a green investment bank in Sweden – as demonstrated by reports from the Swedish Society for Nature Conservation (Naturskyddsföreningen) (2015), the Haga Initiative (Hagainitiativet) (2016), Fossil Free Sweden (2021), Reformisterna (2021) and Global Challenge (Global Utmaning) (2021). The government's own working group on the green transition and competitiveness' also supports the idea of a Swedish GIB (Analysgruppen för grön omställning och konkurrenskraft, 2016).

It is interesting to note that several of the desiderata introduced above seem to support the establishment of a green investment bank. A GIB should operate with a strong and transparent sustainability objective and

could thereby help reduce policy uncertainties with regards to the government's endorsement of directly promotional policies. That is, such policies would be implemented in the most robust manner possible through the establishment of a special-purpose green bank. Very few market participants could doubt the purpose and dedication of the bank. Moreover, the GIB could take over or coordinate the relevantly similar activities that today are performed by a multitude of agencies, including Almi, EKN, SEK, etc.

A GIB could be capitalized by the state but also take in private capital, and thus potentially contribute to a good balance of risk-bearing between the state, financial institutions and individual consumers. It is of course difficult to evaluate this balance in advance, but there are several reasons to be optimistic in this context. The rationale for a GIB rests partly on the idea that it would be able to provide financial resources where other financial market actors are unable or unwilling to. The purpose of a GIB is to overcome market failures that are a barrier to the transition. This purpose is akin to the role played by development banks in some other countries. Experience from other countries concerning their own publicly-backed investment banks (including their design, governance and operation) could provide valuable insights on the way forward for Sweden in this regard. For instance, the experience of the UK GIB suggests that it contributed to a more efficient use of public funding for sustainable finance (see Box 5). To the extent that the bank could develop a closer understanding of its various investments than the Ministry of Finance or other public agencies could, it could also keep a closer eye on the risks inherent in the investments.

A green investment bank could presumably be tasked with directing its operations to the recipients that are deemed to need them the most. In this way, it could be expected to offer a broad range of services, including not only loans to SMEs but also equity investments in the most delicate projects, credit guarantees to larger projects, as well as the possibility for individuals or companies to support its activities through a mutual fund. However, if the bank is supposed to survive on the market without continuous inflows of public capital, it will likely need to strike some appropriate balance between climate objectives and risk-adjusted returns. The bank could have a substantially lower profit requirement than commercial banks, but presumably not below zero.

In principle, a GIB could be an effective way of overcoming financial market barriers but there are a number of challenges that need to be thought through to ensure it works as intended. One challenge is to clearly delineate the role and scope of the GIB, which lies somewhere between direct public funding and private financing. A GIB that crowds out private investment, or undermines or duplicates direct public funding efforts, would be counterproductive and likely to be costly in terms of both time and money.

In conclusion, **we recommend that the Swedish government should immediately launch an investigation into the feasibility of establishing a national green investment bank (GIB).** Based on our reasoning above, we tentatively suggest that the purpose of a GIB should be to demonstrate the feasibility of new solutions and technologies that commercial financiers are unwilling to fund. We suggest that the GIB should operate in a way that encourages private sector transition investments rather than crowding it out. We suggest that the GIB should be owned by the state, with an investment criterion comprising green/social (such as additionality) and commercial factors (such as risk-adjusted return, financial sustainability). We suggest that the GIB should build on experience gathered in other countries (such as Germany, the UK, etc.)

Box 5 – The UK’s experience with its own GIB

In the UK, a GIB was established in 2012 to overcome market failures and thereby support a more rapid transition to meet e.g. climate change objectives. The barriers identified by the UK government reflect those market failures discussed in Chapter 3 of this report, but information asymmetry including lack of expertise and knowledge of new technology, risks associated with new and complicated technologies figure prominently in the UK’s own assessment of what the GIB should seek to overcome (UK Government, 2011).

In response, the UK decided to set up an institution at arm’s length to the government that would allow it to develop in-house expertise and assume risks that other actors could not. The idea was to set up a state-backed bank with a specific green investment objective that could help draw private sector

investment into risky climate-related technologies that may be unproven and/or complex. Opinions on the effectiveness of the GIB varied, but it seems that it was successful in that it managed to invest in projects that were considered crucial for demonstrating feasibility in new, untested sectors and that it cleared its mandate to invest GBP 3 billion before 2016.

The UK’s decision to sell its GIB in 2017 was met with some criticism.¹ After the sale, the GIB shifted its funding towards easier-to-finance, more profitable projects. The GIB no longer could play the role of venturing into new markets for less established technologies and solutions. Public backing of the GIB was essential to maintaining its role in helping to overcome the market failures slowing transition finance and for striking a balance between public policy and financial objectives. The UK is currently considering the establishment of a second GIB in part to fill the void left by the first.

1 <https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/contentious-macquarie-sale-back-in-focus-as-uk-plans-new-green-investment-bank-62480596>

Sovereign green bonds

Finally, the recent initiative to issue ‘sovereign green bonds’ is also interesting in this context. As noted in Chapter 2, the aim of the bonds was to give investors an opportunity to contribute to the Swedish state’s activities related to the transition to an environmentally-sustainable society. The SEK 20 billion raised in 2020 will e.g. go to climate investments, railway maintenance and the protection of valuable natural environments. Since the government here acts as an issuer of a financial product, it is perhaps unclear whether it should be treated as a directly promotional policy for sustainable finance. It is likely that many investment funds with a sustainability profile will buy the bonds as a counterweight to their riskier investments in corporate shares. The sovereign green bonds could therefore be said to function as a safe anchor for such funds, but they do not promote more sustainable investments beyond that.

A relevant criticism of the sovereign green bonds is that they were not intended to facilitate additional expenses in the state budget. That is, the noted climate

investments and railway maintenance costs were already included in the budget, and therefore the government failed to utilize the financial market's interest in sustainability to facilitate additional climate-related activities. As an alternative, **we recommend that the government investigates the possibility of channeling the money raised from sovereign green bonds into a separate budget for climate-related public investments, which is distinct from the broader state budget so that such investments do not have to compete against other public costs.**

Box 6 – Sector- specific comments

The EU highlights the Transportation, Real Estate and Construction sectors as central to achieving climate goals (EU FS/20/1609), because these sectors use much energy and fossil fuels. The real estate sector is in strong development currently, where increasing real estate valuations, influx of capital, investor demand for green real estate investments, and technical developments all work towards creating new sustainable real estate. Examples of developments on the physical real estate object are more energy-efficient buildings, new sustainable materials, re-cycling of construction components, automated construction. Examples of developments on utilization and urban life in buildings are roof top gardens, indoor agriculture, driverless electric transportation and home delivery of goods, sensors-driven building utilization, etc.

The entrepreneurial creativity is very high, and it is facilitated by Sweden's high degree of digitalization and the high capability of people in Sweden to use advanced digital systems. The Swedish government and its agencies continue to develop digitalization in Sweden, and there is great future growth potential in sustainable real estate. The government agency Lantmäteriet has implemented a 3D cadaster, and Boverket implemented a mandate on life cycle climate declarations of building components in January 2021. Together, these changes will most likely lead to sustainable business development. Research and development in this area is already funded by government agencies such as the Agency for Digital Government (DIGG), VINNOVA, the government research council

for sustainable development Formas, the Swedish Transport Administration, and the Swedish Energy Agency. The development of business and financial models for sustainability in real estate and built environment is still lacking and needs to be developed. Government agencies can play a large role here. The real estate and construction sectors are very capital intensive, and so, private actors are motivated to change towards sustainable solutions if financiers request that.

For the real estate sector, digital information on sustainability characteristics can be utilized in decision-making on sustainable finance. The problem is that the sustainability metrics cannot easily be assessed, even with digital information. Technological progress and climate change render estimates for CO2 emissions highly volatile. Technology is now available to make 'green steel', real estate is increasingly recycled, and transportations to and from buildings are increasingly conducted by electric vehicles. Climate effects also change real estate sustainability impacts, since flooding and increasing humidity cause repairs and maintenance work to increase and extreme temperatures cause energy consumption of buildings to rise. These are changes that need to be continuously monitored, so that the financial sector can adapt its investments in the real estate sector to effectively contribute towards climate change mitigation and adaptation. If continuous monitoring and re-evaluation of policies is not done, then the risk is very high that the financial sector will misdirect its financial resources towards real estate funding that is less effectively sustainable. This is illustrated by the fact that investors prefer to invest in already 'green' buildings, rather than buildings that require renovation to become 'green'.

In fact, high quality data of Swedish real estate that could be used to support investment already exists. A challenge though is that data access is often restricted. There are good reasons for restricting access to this type of data including e.g. issues with privacy or abuse of this information for targeted marketing efforts. There are also gains to be realized from carefully considering how access to

this data can be increased. A specific example relates to data on the energy efficiency declarations (energideklarationer). The housing authority has data on the energy performance of hundreds of thousands of Swedish buildings, which would be a valuable resource for lending institutes who must report the energy performance of their mortgage portfolios under the EU's Sustainable Financial Disclosure Regulation (SFDR). However, access to this data is restricted, which is a challenge for developing metrics and conducting analyses that can help support better investments for the climate transition.

Transportation is also a system where technical progress is substantial. Electric vehicles are perhaps the most obvious example. Transportation can be improved by improvement of the transportation infrastructure, and this infrastructure is a complex system of roads, railways, air, and sea movement of goods. But the system is not only the movement of goods, it is also how households and businesses utilize transportation and how national and international supply chains work. New systems investments may require innovative solutions that are very expensive, and that may require partial funding from the government. An example is that the Swedish Transport Administration has developed a test site of an electrified road for driverless trucks. The development of technical solutions works fairly well today, but the development of large-scale infrastructure solutions requires very large investments. There are three reasons why it would be positive if funding of these large investments could be done in public-private collaboration:

1. The scale is so big that pooling public and private financial assets will give more sustainable infrastructure much faster than if the public or private sector did it alone.
2. There are considerable risks in these large investments, and the public can assume risk that the private sector cannot assume. Therefore, risk sharing at different stages of sustainable infrastructure development is important.
3. The private sector is traditionally better able to capture entrepreneurial benefits of assets, and development of sustainable infrastructure could

be done better by private sector financiers, than by public sector financiers.

Investments in the energy sector are obviously critical for the transition to a net zero economy, yet financial market actors cite a number of barriers to increased investment in the sector. One such barrier relates to coordination problems where e.g. actors with little history of collaboration need to collaborate on a project together. This increases investor risk. An example of this type of coordination problem is low-temperature district heating projects that we mentioned in Box 3 and bio energy carbon capture and storage projects in Box 4. These challenges of coordination of complex, untested and innovative projects compound climate policy risks, and are a further barrier to clean energy investments which results in levels of private sector investment that are too low.

Based on the above, we suggest that the Swedish government should support the real estate and construction sectors to lead and develop sustainable businesses that are competitive nationally and internationally. This can be achieved through the coordinated action of government agencies and industry.

Lenders and investors need access to high quality information on the energy performance of real estate. **We suggest Swedish government agencies with responsibility for collecting, managing and organizing Swedish real estate data, such as the Swedish Housing Authority (Boverket) and the Swedish Survey Authority (Läntmäteriet), should review data access rules to help support better lending and investment decisions.**

We suggest that the Swedish government should leverage new forms of public and private sector co-funding to develop more groundbreaking transportation solutions, and to let the private sector develop new entrepreneurial products and services for sustainable transportation and spin-offs. The transportation sector requires systems-level investments, and the government can guarantee those services. Large systemic changes in transportation systems, such as new forms of

cargo freight, electric vehicles, etc. require investments that are too large and risky for private actors. Government agencies, such as the Swedish Transport Administration, are already tasked with encouraging innovation, but primarily in technical innovation, and not so much in financial markets innovations. It is likely that innovations in large systems will be costly, and that the systems will involve several agencies, and other government branches. It may therefore be necessary for the government to coordinate systems-level initiatives at a high level in the government.

The Swedish government should review options to increase support for innovative projects that require collaboration between unfamiliar actors. Increasing public-private risk sharing initiatives, such as a GIB or direct support for demonstrator projects for promising energy projects, should be explored.

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