

ROTTERDAM SCHOOL OF MANAGEMENT
ERASMUS UNIVERSITY

FROM RISK TO OPPORTUNITY

A FRAMEWORK FOR
SUSTAINABLE FINANCE

DIRK SCHOENMAKER





From Risk to Opportunity: A Framework for Sustainable Finance

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From Risk to Opportunity: A Framework for Sustainable Finance presents the switch from traditional finance to sustainable finance. While financial institutions have started to avoid unsustainable companies from a risk perspective (Sustainable Finance 1.0 and 2.0), the frontrunners are now increasingly investing in sustainable companies and projects to create long-term value for the wider community (Sustainable Finance 3.0). Major obstacles to sustainable finance are short-termism and insufficient private efforts. To overcome these obstacles, the book develops guidelines for governing sustainable finance.

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Although I am certainly missing names, the people listed below were instrumental throughout this process. My direct colleagues, Dr Steve Kennedy of the Department of Business-Society Management and Prof. Mathijs van Dijk and Dr Mathijs Cosemans of the Department of Finance at Rotterdam School of Management, Erasmus University (RSM) deserve a special thanks for making the time available to provide me with new insights and to critically read earlier drafts of this book. I am also grateful to my students in the MSc Finance & Investments Advanced Programme. Their questions and comments during the lectures on an earlier version of this book improved the framing of the framework. I would also like to thank Enrico Nano for excellent research assistance on coalitions for sustainable finance. **Dirk Schoenmaker**

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FOREWORD

Rotterdam School of Management, Erasmus University (RSM) launched a new mission statement in the summer of 2017: RSM is a force for positive change in the world. Admittedly, it is a bold statement. But it is our conviction that business can and should play an instrumental role in addressing the big challenges the world is facing, in order to create prosperity for all. As a business school, RSM aims to educate a new generation of change agents with the knowledge, skills, values and attitudes to make a difference in the world, using as guidance the UN Sustainable Development Goals (SDGs).

The SDGs, agreed by world leaders in 2015, set out a framework through which the most urgent social, economic and environmental challenges can be addressed. They are neutral, non-political and provide an internationally recognised point of reference for us to ensure that what we do – through our research, our education programmes, and through our engagement with society – is relevant, meaningful, and has real impact.

With the RSM Series on Positive Change publications we aim to inform managers about trends that we see as critical for the future, and opportunities for business to contribute to positive change.

The first publication in this series by RSM Executive Fellow Willem Ferwerda, *4 Returns, 3 Zones, 20 Years: A Holistic Framework for Ecological Restoration by People and Business for Next Generations* deals with the critical importance of healthy ecosystems and the opportunities for business to restore degraded landscapes in partnerships, while taking into account four returns: of financial capital, social capital, natural capital, and return of inspiration.

In this thought-provoking second publication of the series, Dirk Schoenmaker, Professor of Banking and Finance at RSM, explains how finance is a powerful force that can help to bring about positive change. He highlights a number of critical developments, insights and opportunities, and presents useful guidelines that will help to govern sustainable finance. It reviews the challenges and risks of the current financial system, which is held back by a short time horizon. The book highlights the opportunities that the transfer to sustainable finance practice will offer to the wider community through long-term value creation. We hope that reading it inspires and encourages you to share your thoughts, feedback and ideas with us on positivechange@rsm.nl



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SUMMARY

Traditional finance focuses on financial return and regards the financial sector as separate from the society of which it is part and the environment in which it is embedded. By contrast, sustainable finance considers financial, social and environmental returns in combination. We provide a new framework for sustainable finance highlighting the move from the narrow shareholder model to the broader stakeholder model.

This book starts by explaining the sustainability challenges that society is facing. On the environmental front, climate change, land degradation, biodiversity loss and depletion of natural resources are destabilising the Earth system, threatening the planet's future liveability. Next, poverty, hunger and lack of healthcare are signs that many people live below minimum social standards. *Sustainable development* means that current and future generations should have the resources they need, such as food, water, healthcare and energy, without stressing the Earth system. To guide the transformation towards a sustainable and inclusive economy, the United Nations has developed the 2030 Agenda for Sustainable Development, which will require behavioural change.

Why should finance contribute to sustainable development? The main task of the financial system is to allocate funding to its most productive use. Finance can play a leading role in allocating investment to sustainable companies and projects and thus accelerate the transition to a low-carbon, circular economy. *Sustainable finance* considers how finance (investing and lending) interacts with economic, social and environmental issues. In the allocation role, finance can assist in making strategic decisions on the trade-offs between sustainable goals. Moreover, investors can exert influence over the companies in which they invest. Long-term investors can thus steer companies towards sustainable business practices. Finally, finance is good at pricing risk for valuation purposes and can thus help to deal with the inherent uncertainty about environmental issues, such as the impact of carbon emissions on climate change. Finance and sustainability both look to the future.

The thinking about sustainable finance has gone through different stages over the last few decades (see Table 1). The focus is gradually shifting from short-term profit towards long-term value creation. This book analyses these stages and provides a new framework for sustainable finance. Financial and non-financial firms traditionally adopt the shareholder model, with profit maximisation as the main goal. A first step in sustainable finance (Sustainable Finance 1.0 in Table 1) is for financial institutions to avoid investing in companies involved in trades with very negative impacts on health (e.g. tobacco), international relations (e.g. cluster bombs) or the environment and wildlife/natural world (e.g. whale hunting). Some firms are starting to include social and environmental considerations in the stakeholder model (Sustainable Finance 2.0). We highlight the tension between the shareholder and stakeholder model. Should policymakers allow a shareholder-oriented firm to take over a stakeholder-oriented firm? Or do we need to protect firms that are more advanced in sustainability?

Another key development is the move from risk to opportunity. While financial firms have started to avoid unsustainable companies from a risk perspective (Sustainable Finance 1.0 and 2.0), the frontrunners are now increasingly investing in sustainable companies and projects to create value for the wider community (Sustainable Finance 3.0).

TABLE 1. Framework for Sustainable Finance

Sustainable Finance typology	Value created	Ranking of factors	Horizon
Sustainable Finance 1.0	Shareholder value	$F > S$ and E	Short term
Sustainable Finance 2.0	Stakeholder value	$T = F + S + E$	Medium term
Sustainable Finance 3.0	Common good value	S and $E > F$	Long term

Note: F = financial value; S = social impact; E = environmental impact; T = total value. At Sustainable Finance 1.0, the maximisation of F is subject to minor S and E constraints.

This book also looks at the obstacles to the adoption of sustainable finance, including short-termism and a failure to act collectively. Possible solutions to counter short-termism are a more long-term oriented corporate reporting structure (moving away from quarterly reporting), pay structure for executives (e.g. deferred rewards and clawback provisions), investment performance horizons (moving away from quarterly benchmarking) and incentives for long-term investors (e.g. loyalty shares). These loyalty shares for long-term investors are not only an incentive for a buy-and-hold strategy, but also a reward for engagement efforts with companies in which they invest. In this way, executives' and investors' horizons can become more aligned and focused on the longer term.

To address the shortfall in corporate efforts, governments should ultimately translate the aggregate long-term social and environmental preferences of their citizens into appropriate regulation and taxation (e.g. effective carbon taxes). Finance is about anticipating such policies and incorporating expectations into today's valuations for investment decisions.

Finally, this book outlines how long-term (institutional) investors can build effective coalitions to accelerate the transformation to sustainable development. While the early adopters of sustainability are primarily based in Europe, major players in North America and Asia have also joined the emerging coalitions for sustainable finance. Sustainable investing has thus become a global force. Throughout this book, we develop guidelines for sustainable finance, which are summarised in Box 1.

BOX 1 SUSTAINABLE FINANCE GUIDELINES

Social and environmental externalities are by their nature not incorporated in the decisions taken by companies and investors. As most externalities play out in the medium to long term, the problem is aggravated by the short horizon that executives and investors work to. Moreover, the efficient markets hypothesis, which states that stock prices incorporate all relevant information and thus reflect the fundamental value of the firm, reinforces the focus on stock price as a central performance measure for executive and investor performance.

We develop the following guidelines to govern sustainable finance:

Company perspective

- ▶ Move from shareholder to stakeholder value approach, whereby a company balances the interests of all its stakeholders: customers, employees, suppliers, shareholders and the community.
- ▶ More broadly, corporates should strive for long-term value creation for the common good (i.e. what is shared and beneficial for all or most members of a given community).

Lengthening executive and investors' horizons

- ▶ To counter short-termism, executive and investor horizons should be aligned to the long term.
- ▶ On the executive side, a more long-term oriented reporting structure (moving away from quarterly reporting) and pay structure for executives (e.g. deferred rewards and clawback provisions) would reduce short-termism.
- ▶ More generally, integrated reporting by companies facilitates social and environmental transparency and thus increases the accountability of executives.
- ▶ On the investment side, a more long-term investment performance horizon (moving away from quarterly benchmarking) and incentives for long-term investors (e.g. loyalty shares) would promote long-term investment.

Engagement

- ▶ To become a force for long-term value creation, long-term (institutional) investors should build investor coalitions to co-operate when engaging with corporates on social and environmental issues.

Market efficiency and liquidity

- ▶ Raise awareness of alternative theories of market efficiency.
- ▶ The dominant view of liquidity (the degree to which an asset can be quickly bought or sold in the market without affecting its price) favours listed securities and is based on the efficient markets hypothesis.
- ▶ An alternative view is the adaptive markets hypothesis, which implies that the degree of market efficiency depends on an evolutionary model of individuals adapting to a changing environment. That can explain why new risks, such as environmental risks, are not yet fully priced-in.

Supervisory treatment

- ▶ Reduce the supervisory bias towards favouring 'liquid' investments (which are listed) and allow for 'buy and hold' investments. An example is the introduction of sustainable retail investment funds, based on sustainability criteria (instead of transferability).
- ▶ Financial institutions should be stress-tested to identify overexposure to and concentration in carbon-intensive assets. These carbon stress tests make use of various climate scenarios, including the adverse scenario of late adjustment resulting in a 'hard landing', and have a long horizon over which adverse events could occur.

1 SUSTAINABILITY CHALLENGES

The Industrial Revolution, and the development of production processes dependent on fossil fuels that it triggered, brought prosperity in the form of economic and population growth. At the same time, increasing civilisation and development away from a previously 'empty' world¹ with *abundant natural resources* has intensified social and environmental challenges. Mass production in a competitive economic system has led to long working hours, underpayment and child labour, first in the developed world and later relocated to the developing world. Social regulations have been increasingly introduced to counter these practices and to promote decent work conditions and access to education and healthcare. Mass production and consumption is also putting the Earth system under stress through pollution and depletion of natural resources. Climate change is now the most pressing ecological concern.

There is broad acknowledgement of the need for a transition to a low-carbon, circular economy to overcome these environmental challenges. While an early transition - with substantial cuts in carbon emissions starting in 2020 - would allow for production and consumption patterns to be gradually adjusted, a late transition starting in 2030 is likely to cause sudden shocks and lead to the stranding of assets that have lost their productive value (ASC, 2016). Many natural resources companies are still in denial, irrationally counting on a late and gradual transition. To guide the transformation towards a sustainable and inclusive economy, the United Nations (2015) has developed the 2030 Agenda for Sustainable Development, which will require behavioural change.

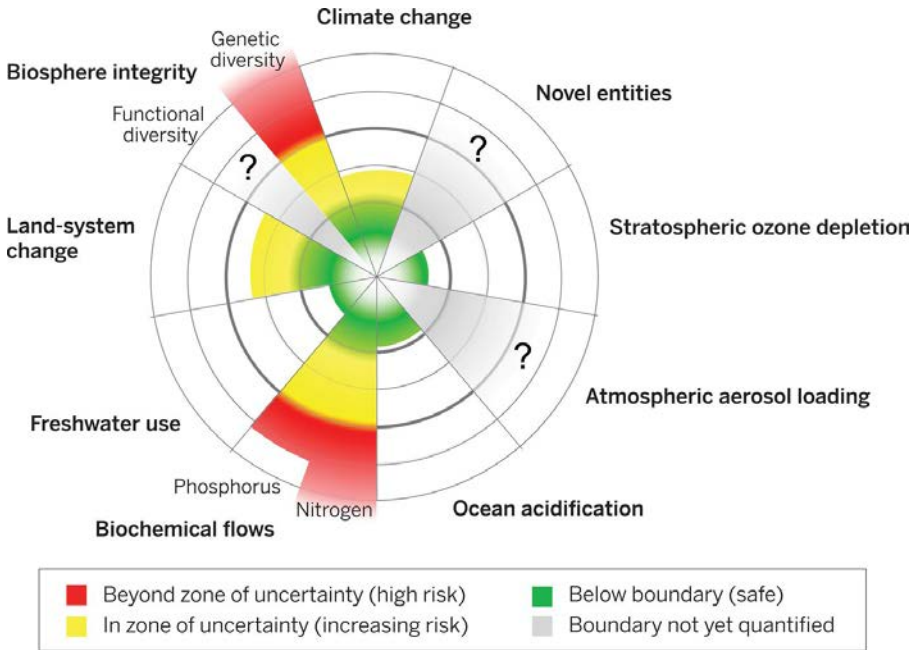
A. ENVIRONMENTAL CHALLENGES

There is increasing evidence that human activities are affecting the Earth system, threatening the planet's future liveability. The planetary boundaries framework of Steffen *et al* (2015) defines a safe operating space for humanity within the boundaries of nine productive ecological capacities of the planet. The framework is based on the intrinsic biophysical processes that regulate the stability of the Earth system on a planetary scale. The green zone in Figure 1 is the safe operating space, yellow represents the zone of uncertainty (increasing risk) and red indicates the zone of high risk.

Applying the *precautionary principle*, the *planetary boundary* itself lies at the intersection of the green and yellow zones. To illustrate how the framework works, we look at the control variable for climate change, the atmospheric concentration of greenhouse gases. The zone of uncertainty ranges from 350 to 450 parts per million (ppm) of carbon dioxide. We crossed the planetary boundary of 350 ppm in 1995, with a level of 399 ppm in 2015. The upper limit of 450 ppm is consistent with the goal (at a fair chance of 66 per cent) to limit global warming to 2° Celsius above the pre-industrial level and lies at the intersection of the yellow and red zones.

1 In the empty world scenario, the economy is very small relative to the larger environmental ecosystem and the environment is thus not scarce. Continued growth of the physical economy into a non-growing ecosystem will eventually lead to the 'full world economy' (Daly and Farley, 2011).

FIG. 1. The planetary boundaries



Source: Steffen et al (2015).

The current *linear production and consumption system* is based on extraction of raw materials (take), processing into products (make), consumption (use) and disposal (waste). Traditional business models centred on a linear system assume the ongoing availability of unlimited and cheap natural resources. This is increasingly risky because non-renewable resources, such as fossil fuels, minerals and metals, are increasingly under pressure, while potentially renewable resources, such as forests, rivers and prairies, are declining in their extent and regenerative capacity.

With this linear economic system, we are crossing planetary boundaries beyond which human activities might destabilise the Earth system. In particular, the planetary boundaries of climate change, land-system change, biodiversity loss (terrestrial and marine) and biochemical flows (nitrogen and phosphorus, mainly because of intensive agricultural practices) have been crossed (see Figure 1). A timely transformation towards an economy based on sustainable production and consumption, including use of renewable energy and reuse of materials, can mitigate these risks to the stability of the Earth system.

B. SOCIAL FOUNDATIONS

Human rights provide the essential social foundation for all people to lead lives of dignity and opportunity. Human rights norms assert the fundamental moral claim each person has to life's essentials, such as food, water, healthcare, education, freedom of expression, political participation and personal security. In the run-up to the 2012 Rio+20 Conference on Sustainable Development, the *social foundations* were defined as the 11 top social priorities, grouped into three clusters, focused on enabling people to be: 1) well: through food security, adequate income, improved water and sanitation and healthcare; 2) productive: through education, decent work, modern energy services and resilience to shocks; and 3) empowered: through gender equality, social equity and having political voice (Raworth, 2012).

While these social foundations only set out the minimum of every human's claims, sustainable development envisions people and communities prospering beyond this, leading lives of creativity and fulfilment. Sustainable development combines the concept of planetary boundaries with the complementary concept of social foundations or boundaries. Sustainable development means that current and future generations have the resources needed, such as food, water, healthcare and energy, without stressing processes within the Earth system (Raworth, 2012).

But many peoples' living conditions are still below the social foundations of no hunger, no poverty (a minimum income of \$1.25 a day), access to education and access to clean cooking facilities. More broadly, political participation, which is the right of people to be involved in decisions that affect them, is a basic value of society. The UN's Universal Declaration of Human Rights states that "*recognition of the inherent dignity and of the equal and inalienable rights of all members of the human family is the foundation of freedom, justice and peace in the world*". Human rights are an important social foundation. Next, decent work can lift communities out of poverty and underpins human security and social peace. The 2030 Agenda for Sustainable Development (United Nations, 2015; see section C) places decent work for all people at the heart of policies for sustainable and inclusive growth and development. Decent work has several aspects: a basic living income (which depends on a country's basic living basket), no discrimination (e.g. on the basis of gender, race or religion), no child labour, health and safety and freedom of association.

From a societal perspective, it is important for business to respect these social foundations and to ban underpayment, child labour and human right violations, which are still happening in developing countries. A case in point is the use of child labour in factories in developing countries producing consumer goods, like clothes and shoes, to be sold by multinational companies in developed countries. These factories often lack basic worker safety features (Box 3). Another example is the violations of the human rights of indigenous people, often in combination with land degradation and pollution, by extractive companies in the exploration and exploitation of fossil fuels, minerals and other raw materials.

To highlight the tension between unbridled economic growth and sustainable development, we provide two examples. Box 2 describes the Deepwater Horizon oil spill in the Gulf of Mexico. Box 3 shows the impact of the collapse of a factory building in Bangladesh. These examples have in common an underinvestment in safety to increase short-term profits.

BOX 2 THE DEEPWATER HORIZON OIL SPILL

Oil began to spill from the Deepwater Horizon drilling platform on 20 April 2010, in the British Petroleum-operated Macondo Prospect in the Gulf of Mexico. An explosion on the drilling rig killed 11 workers and led to the largest accidental marine oil spill in the history of the petroleum industry. The US Government estimated the total discharge at 4.9 million barrels. After several failed efforts to contain the flow, the well was declared sealed on 19 September 2010.

A massive response ensued to protect beaches, wetlands and estuaries from the spreading oil using skimmer ships, floating booms, controlled burns and oil dispersant. Oil clean-up crews worked on 55 miles of the Louisiana shoreline until 2013. Oil was found as far from the Deepwater Horizon site as the waters off the Florida Panhandle and Tampa Bay, where the oil and dispersant mixture was embedded in the sand. The months-long spill, along with adverse effects from the response and clean-up activities, caused extensive damage to marine and wildlife habitats and the fishing and tourism industries.

Numerous investigations explored the causes of the explosion and record-breaking spill. Notably, the US government's September 2011 report pointed to defective cement on the well, laying the fault mostly with BP, but also rig operator Transocean and contractor Halliburton. Earlier in 2011, a National Commission (2011) likewise blamed BP and its partners for a series of cost-cutting decisions and an inadequate safety system, but also concluded that the spill resulted from "systemic" root causes and that without *"significant reform in both industry practices and government policies, might well recur"*.

BOX 3 RANA PLAZA FACTORY COLLAPSE

The Rana Plaza collapse was a disastrous structural failure of an eight-storey commercial building on 24 April 2013 in Bangladesh. The collapse of the building caused 1,129 deaths, while approximately 2,500 injured people were rescued alive from the building. It is considered the deadliest garment factory accident in history and the deadliest accidental structural failure in modern human history.

The building contained clothing factories, a bank, apartments, and several shops. The shops and the bank on the lower floors were immediately closed after cracks were discovered in the building. The building's owners ignored warnings to evacuate the building after cracks in the structure appeared the day before the collapse. Garment workers, earning €38 a month, were ordered to return the following day, and the building collapsed during the morning rush-hour.

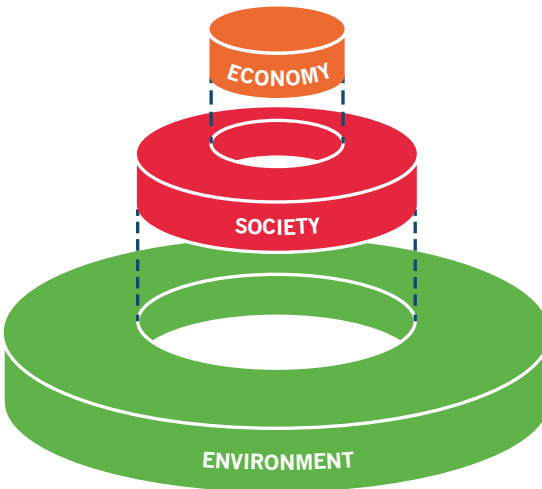
The factories manufactured clothing for brands including Benetton, Bonmarché, the Children's Place, El Corte Inglés, Joe Fresh, Monsoon Accessorize, Mango, Matalan, Primark and Walmart.

C. SUSTAINABLE DEVELOPMENT

To guide the transformation towards a sustainable and inclusive economy, the United Nations has developed the 2030 Agenda for Sustainable Development (UN, 2015). The 17 UN Sustainable Development Goals are intended to stimulate action over the 2015-30 period in areas of critical importance for humanity and the planet (see Box 4 for an overview). To facilitate implementation, the 17 high-level goals are broken down into 169 targets (see <https://sustainabledevelopment.un.org/topics/sustainabledevelopmentgoals>). The UN Sustainable Development Goals address challenges at the levels of the economy, society and the environment (or biosphere).

Figure 2 illustrates the three levels and the ranking between them. A liveable planet is a precondition or foundation for humankind to thrive. Next, we need a cohesive and inclusive society to organise production and consumption in order to ensure enduring prosperity for all. In their seminal book *Why nations fail*, Acemoglu and Robinson (2012) show that political institutions that promote inclusiveness generate prosperity. Inclusiveness allows everyone to participate in economic opportunities. Next, there can be resource conflicts: unequal communities might disagree over how to share and finance public goods. These conflicts, in turn, break social ties and undermine the formation of trust and social cohesion (Barone and Mocetti, 2016).

FIG. 2. Sustainable development challenges at different levels



Source: Adapted from Rockström and Sukhdev (2015).

BOX 4 UN SUSTAINABLE DEVELOPMENT GOALS

The United Nations has developed 17 Sustainable Development Goals (SDGs) as part of the 2030 Sustainable Development Agenda. Following Rockström and Sukhdev (2015), we classify the SDGs according to the levels of the economy, the society and the environment. Nevertheless, we stress that the SDGs are interrelated. A case in point is the move to sustainable consumption and production (economic goal 12) and sustainable cities (societal goal 11), which are instrumental to combat climate change (environmental goal 13).

Economic goals

- Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
- Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation
- Goal 10. Reduce inequality within and among countries
- Goal 12. Ensure sustainable consumption and production patterns

Societal goals

- Goal 1. End poverty in all its forms everywhere
- Goal 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture
- Goal 3. Ensure healthy lives and promote well-being for all at all ages
- Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
- Goal 5. Achieve gender equality and empower all women and girls
- Goal 7. Ensure access to affordable, reliable, sustainable and modern energy for all
- Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable
- Goal 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels

Environmental goals

- Goal 6. Ensure availability and sustainable management of water and sanitation for all
- Goal 13. Take urgent action to combat climate change and its impacts
- Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development
- Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

Overall goal

- Goal 17. Strengthen the means of implementation and revitalise the Global Partnership for Sustainable Development

Source: UN (2015).

Gladwin, Kennelly and Krause (1995) define five principles of sustainable development:

1. **Comprehensiveness:** the concept of sustainable development is holistic or all-embracing in terms of space, time and component parts. Sustainability embraces both environmental and human systems, both nearby and far-away, in both the present and the future;
2. **Connectivity:** sustainability demands an understanding of the world's challenges as systemically interconnected and interdependent;
3. **Equity:** a fair distribution of resources and property rights, both within and between generations;
4. **Prudence:** keeping life-supporting ecosystems and interrelated socioeconomic systems resilient, avoiding irreversible actions, and keeping the scale and impact of human activities within regenerative and carrying capacities;
5. **Security:** sustainable development aims at ensuring a safe, healthy, high quality of life for current and future generations.

Although sustainable development is a holistic concept, Norström *et al* (2014) argue to address trade-offs between the ambition of economic, social and environmental goals and the feasibility of reaching them, recognising biophysical, social and political constraints.

D. SYSTEM PERSPECTIVE

While it is tempting to start working on partial solutions at each level, the environmental, societal and economic challenges are interlinked. It is important to embrace an integrated social-ecological system perspective (Norström *et al*, 2014). Such an integrated system perspective highlights the dynamics that such systems entail, including the role of ecosystems in sustaining human wellbeing, cross-system interactions and uncertain thresholds.

Holling (2001) describes the process of sustainable development as embedded cycles with adaptive capacity. A key element of adaptive capacity is the *resilience* of the system to deal with unpredictable shocks (which is the opposite of the vulnerability of the system). An adaptive cycle that aggregates resources and periodically restructures to create opportunities for innovation is a fundamental unit for understanding complex systems, from cells to ecosystems. But some systems are maladaptive and trigger, for example, a poverty trap or land degradation (i.e. the undermining of the quality of soil as a result of human behaviour or severe weather conditions). Holling (2001) concludes that ecosystem management via incremental increases in efficiency does not work. For transformation, ecosystem system management must build and maintain ecological resilience as well as social flexibility to cope, innovate and adapt.

As we have argued, the economic, social and environmental systems interact. A well-known example of cross-system interaction is the linear production of consumption goods at the lowest cost contributing to 'economic growth', while depleting natural resources, using child labour and producing carbon emissions and other waste².

2 We use carbon emissions as shorthand for all greenhouse gas emissions, which include carbon dioxide (CO₂), methane compounds containing CH₄, and nitrous oxide (N₂O).

Another cross-system interaction is climate change leading to more and more intense disasters, such as storms, flooding and droughts. The low- and middle-income countries around the equator are especially vulnerable to these extreme weather events, which could damage a large part of their production capacity. The temporary loss of tax revenues, and increase in expenditure to reconstruct factories and infrastructure, might put vulnerable countries into a downward fiscal and macro-economic spiral with an analogous increase in poverty (Schoenmaker and Zachmann, 2015). Social and environmental issues are thus interconnected, whereby the poor in society are more dependent on ecological services and are less well protected against ecological hazards.

An example of an uncertain threshold combined with feedback dynamics is the melting threshold of the Greenland ice sheet. New research has found that it is more vulnerable to global warming than previously thought. Robinson, Calov and Ganopolski (2012) calculate that a 0.9°C global temperature rise from today's levels could lead the Greenland ice sheet to melt completely. Such melting would create further climate feedbacks in the Earth's ecosystem, because melting the polar icecaps could increase the pace of global warming (by reducing the refraction of solar radiation, which is 80 per cent from ice, compared with 30 per cent from bare earth and 7 per cent from the sea) and of rising sea levels. These feedback mechanisms are examples of tipping points and shocks, which might happen.

An important conclusion from this chapter is that we cannot understand sustainability of organisations in isolation from the socio-ecological system in which they are embedded: what are the thresholds, sustainability priorities, and feedback loops? Moreover, we should not only consider the socio-environmental impact of individual organisations, but also the aggregate impact of organisations at the system level. The latter is relevant for sustainable development.

2 A FRAMEWORK FOR SUSTAINABLE FINANCE

This chapter first discusses the functions of the financial system. Next, we introduce a new framework for sustainable finance, ranging from Sustainable Finance 1.0 to 3.0. We finish with an assessment of our situation in this new framework.

A. THE ROLE OF THE FINANCIAL SYSTEM

How can the financial system facilitate decision-making on the trade-offs between economic, social and environmental goals? Levine (2005) lists the following functions of the financial system:

- ▶ Produce information ex ante about possible investments, and allocate capital;
- ▶ Monitor investments and exert corporate governance after providing finance;
- ▶ Facilitate the trading, diversification and management of risk;
- ▶ Mobilise and pool savings;
- ▶ Ease the exchange of goods and services.

The first three functions are particularly relevant for sustainable finance. The allocation of funding to its most productive use is a key role of finance. Finance is therefore well positioned to assist in making strategic decisions on the trade-offs between sustainability goals. While broader considerations guide an organisation's strategy on sustainability, funding is a requirement for reaching sustainability goals.

Finance plays this role at different levels. In the financial sector, banks, for example, define their lending strategies for which sectors and projects are eligible for lending and which are not. Similarly, investment funds set their investment strategies; which direct choices of assets to invest in and which assets not to invest in. The financial sector can thus play a leading role in the transition to a low-carbon, circular economy. If the financial sector chooses to finance sustainable companies and projects, they can accelerate the transition.

In terms of monitoring their investments, investors can also influence the companies in which they invest. Investors thus have a powerful role in controlling and directing corporate boards. The governance role also involves balancing the many interests of a corporation's stakeholders. In section B., we review the progressive thinking about how interests should be balanced, including the interests of the environment and society. A rising trend in sustainable investment is engagement with companies in the hope of reducing the risk of adverse events occurring in those companies.

Finance is good at pricing the risk of future cash flows for valuation purposes. As there is inherent uncertainty about environmental issues (e.g. exactly how rising carbon emissions will affect the climate, and the timing and shape of climate mitigation policies), risk management can help to deal with these uncertainties. *Scenario analysis* is increasingly

used to assess the risk and valuation under different scenarios (e.g. climate scenarios; see Caldecott *et al*, 2014, and Bianchini and Gianfrate, 2016)). When the potential price of carbon emissions in the future becomes clearer, investors and companies have an incentive to reduce these emissions. The key challenge is to take a sufficiently long horizon, because sustainability is about the future. The remainder of this chapter and chapter 3 discuss the appropriate horizon for sustainable finance and ways to overcome the bias towards short-termism.

B. THREE STAGES OF SUSTAINABLE FINANCE

How can finance support sustainable development? The concept of sustainable finance has evolved as part of the broader notion of business sustainability over the last decades (e.g. Whiteman *et al*, 2013). We start with the typology for business sustainability developed by Dyllick and Muff (2016). The evolution highlights the broadening of the classification from ‘economic’ to ‘economic, societal and environmental’ considerations (called three dimensional concerns in Table 2). It also indicates a shift in ranking from economic goals first, to all three equal (the triple bottom line – profit, people and planet) and finally to putting societal and environmental challenges (the common good) first. To avoid the dichotomy of private versus public goods, we use the term *common good* referring to what is shared and beneficial for all or most members of a given community.

At the organisational perspective, Dyllick and Muff (2016) refer to the human habit of looking at individual organisations. They call this this the *inside-out perspective*, which is a micro approach. Dyllick and Muff argue that we need to go beyond this inward-looking approach and look from the outside to the impact of corporates on society and the environment. This *outside-in organisational perspective* facilitates a system approach (i.e. macro approach) towards meeting the sustainability challenges.

TABLE 2. *The Business Sustainability Typology*

Business Sustainability Typology	Concerns (What?)	Values created (What for?)	Organisational perspective (How?)
Business-as-usual	Economic concerns	Shareholder value	Inside-out
Business Sustainability 1.0	Three-dimensional concerns	Refined shareholder value	Inside-out
Business Sustainability 2.0	Three-dimensional concerns	Triple bottom line	Inside-out
Business Sustainability 3.0	Starting with sustainability challenges	Creating value for the common good	Outside-in
Key shifts involved	1 st shift: broadening the business concern	2 nd shift: expanding the value created	3 rd shift: changing the perspective

Source: Dyllick and Muff (2016)

Figure 3 shows our framework for managing sustainable development at the different levels. As we have argued, there are interactions between the levels. It is thus important to choose an appropriate combination of the financial, social and environmental aspects.

FIG. 3. Managing sustainable development

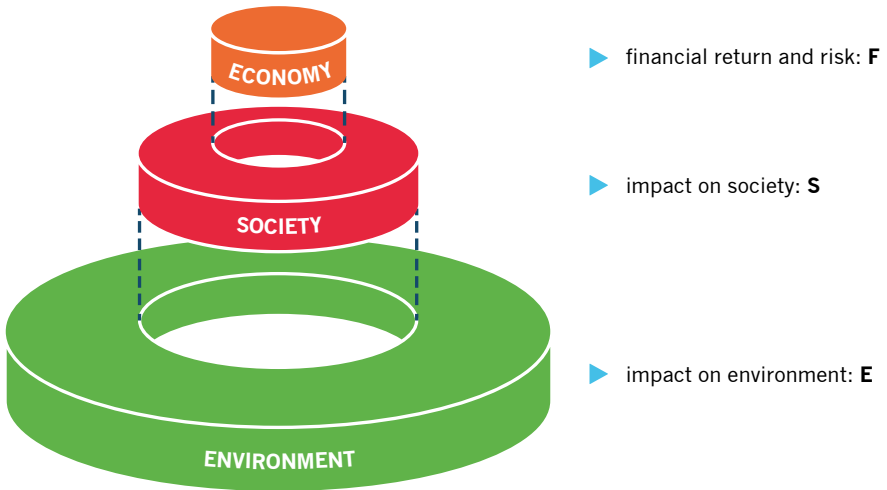


Table 3 shows our typology for sustainable finance. The evolution highlights the broadening from *shareholder value* to *stakeholder value*. The final stage looks at the creation of value for the common good. Next, the ranking indicates a shift from economic goals first to societal and environmental challenges (the common good) first. Importantly, the horizon is broadened from short term to long term as each stage is passed through.

In traditional finance, shareholder value is maximised by looking for the optimal combination of financial return and risk. Table 3 labels this the finance-as-usual approach. Although shareholder value should also look at the medium to long term, there are built-in incentives for short-termism, such as quarterly financial reporting and monthly or quarterly benchmarking of investment performance (see chapter 3). Finance-as-usual is consistent with the argument of Friedman (1970) that “*the business of business is business*” and the only social responsibility of business is to use its resources and engage in activities designed to increase its profits as long as it stays within the rules of the game. Friedman (1970) argues that it is the task of the government to take care of social and environmental goals and set the rules of the game for sustainability. We however argue, in line with the United Nations’ Sustainable Development Goals, that sustainable development is a joint responsibility of governments, companies and citizens. We do not see a case for not integrating sustainability into strategy and finance.

Sections C to E discuss our three stages of Sustainable Finance (SF) (Table 3). The stages move from finance first, to all aspects equal, and finally to social-environmental impact first (the ranking of factors in the third column of Table 3). The Annex contains the formal objective function of each stage in mathematical terms.

TABLE 3. Framework for Sustainable Finance

Sustainable Finance Typology	Value created	Ranking of factors	Optimisation	Horizon
Finance-as-usual	Shareholder value	F	Max F	Short term
Sustainable Finance 1.0	Refined Shareholder value	$F > S$ and E	Max F subject to S and E	Short term
Sustainable Finance 2.0	Stakeholder value	$T = F + S + E$	Optimise T	Medium term
Sustainable Finance 3.0	Common good value	S and E > F	Optimise S and E subject to F	Long term

Note: F = financial value; S = social impact; E = environmental impact; T = total value. At Sustainable Finance 1.0, the maximisation of F is subject to minor S and E constraints.

C. SF 1.0 - PROFIT MAXIMISATION, WHILE AVOIDING ‘SIN’ STOCKS

A first step in sustainable finance is that financial institutions avoid investing in, or lending to, so-called ‘sin’ companies. These are companies with very negative impacts. In the social domain, they include, for example, companies that sell tobacco, anti-personnel mines and cluster bombs or that exploit child labour. In the environmental field, classic examples of very negative impacts are waste dumping and whale hunting. More recently, some financial institutions have started to put coal and even the broader category of fossil fuels on the exclusion list because of carbon emissions. These exclusion lists are often triggered under pressure from non-governmental organisations, which use traditional and social media for their messages (Dyllick and Muff, 2016).

But the effects of exclusion and divestment are limited (Skancke, 2016). From a general equilibrium perspective, there is a willing buyer for every share a financial institution sells. Divestment by a growing number of investors might reduce a company’s share price, which might in turn make raising new capital through issuing shares more expensive for the company. However, this is a minor source of funding compared to retained earnings and debt financing. Another effect is that divestment may stigmatise a sector or companies to the point where they lose their social license to operate (see section E). This might lead to less investment in that sector. An exclusion criterion targeted at a sector or the worst performers within a sector could have an effect by setting a norm for acceptable standards.

A slightly more positive variant of the refined shareholder value approach is if financial institutions and companies put systems in place for energy and emissions management, sustainable purchasing, IT, building and infrastructure to enhanced environmental standards, and all kinds of diversity in employment. The underlying objective of these activities remains economic. Though introducing sustainability into business might generate positive side-effects for some sustainability aspects, the main purpose is to reduce costs and business risks, to improve reputation and attractiveness for new or existing human talent, to respond to new customer demands and segments, and thereby to increase profits, market positions, competitiveness and shareholder value in the short term. Business success is still evaluated from a purely economic point of view and remains focused on serving the business itself and its economic goals (Dyllick and Muff, 2016). Shareholder value or profit maximisation is still the guiding principle for the organisation, though with some refinements.

D. SF 2.0 - INTERNALISATION OF EXTERNALITIES TO AVOID RISK

In Sustainable Finance 2.0, financial institutions explicitly incorporate the negative social and environmental externalities into their decision-making. Over the medium to long-term horizon, these externalities might become priced (e.g. a carbon tax) and/or might impact negatively on an institution's reputation. Incorporating the externalities thus reduces the risk that financial investments become unviable. This risk is related to the maturity of the financial instrument, and is thus greater for equity (stocks) than for debt (bonds and loans). On the positive side, internalisation of externalities helps financial institutions and companies to restore trust, which is the mirror image of reputation risk.

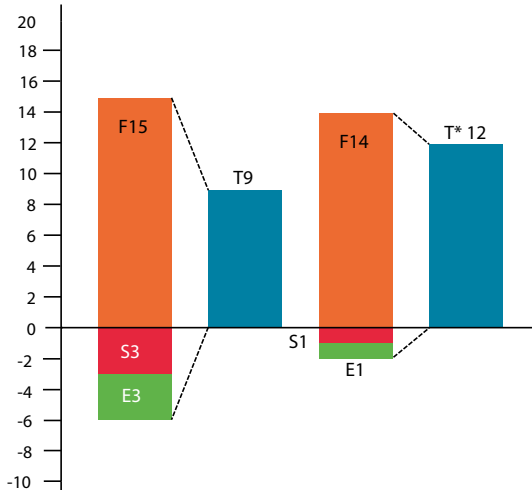
Attaching a financial value to social and environmental impacts facilitates the optimisation process among the different aspects (F, S, E). Innovations in technology (measurement, information technology, data management) and science (life-cycle analyses, social life-cycle analyses, environmentally extended input-output analysis, environmental economics) make the monetisation of social and environmental impacts possible (True Price, 2014). In this way, the *total or true value* T can be established by summing the financial, social and environmental values in an integrating way. Financial institutions and companies use a private discount rate (which is higher than the public discount rate because of uncertainties) to discount future cash flows. As social and, in particular, environmental impacts become manifest over a longer horizon and are also more uncertain than financial impacts, private discounting leads to a lower weighting of social and environmental value than financial value.

The methodology for calculating the total value involves measuring, monetising and balancing financial and non-financial values (True Price, 2014; KPMG, 2014). Figure 4 illustrates the four steps to calculate the total value:

1. We start by calculating the financial value and quantifying and monetising the social and environmental impacts (bar 1);
2. We then internalise the social and environmental externalities and calculate the total value as the sum of the values (bar 2);
3. Next, we adjust to account for the combination of the three factors. As explained in chapter 1, there are several non-linear trade-offs between the economic, social and environmental aspects of corporate investment. The monetisation helps corporations to find the optimal combination of the three factors. In our example, the corporation is able to reduce both the social and environmental impact from 3 to 1 at an extra cost of 1 (bar 3) by adapting its production process³;
4. Finally, we calculate the total value T* (bar 4).

3 It should be noted that reducing the social and environmental impact is not always costly. With the rapidly declining cost of solar energy for example, we are getting close to the point where the use of renewable energy can reduce carbon emissions without extra cost. Another example is the reduction of materials used.

FIG. 4. From financial value to total value



Note: F = financial value; S = social value; E = environmental value; T = total value; T* = optimised total value. The first two bars illustrate the values based on the original production process; the final two bars show the values based on the optimised production process. The vertical axis is expressed in monetary units.

Our example in Figure 4 shows that the internalisation of the externalities leads to an increase in the total value from 9 (bar 2) to 12 (bar 4). In the traditional finance approach, which maximises F only, the original production process would be continued (bar 1 at 15 is higher than bar 3 at 14) and the additional value would not be realised. When pricing of the externalities and/or reputation damage materialise in the medium term, the old production process becomes obsolete and the new production process becomes more favourable. In the case of medium to long-term investments, the assets used in the original production process might become stranded, resulting in a loss of financial value (Caldecott *et al*, 2014). To avoid this risk, companies (and their financiers) might start to internalise the externalities before the government (pricing, regulation), the employees (strike action, talent drain) or the public (reputation, customer strike) do so.

Box 5 gives an example of how a sector can apply the total value methodology, also called the true price methodology, to products and make changes over the full value chain.

BOX 5 THE TRUE PRICE OF ROSES FROM KENYA

A true price analysis was conducted to identify a business case for sustainable rose farming. The study covered cut blooms from T-hybrid roses from Lake Naivasha in Kenya and compared roses produced at a conventional farm to those produced at a sustainable farm. Mapping the supply chain showed that the retail prices of roses per stem produced on both types of farms are on average the same (€0.70). The true price on the other hand was much lower for the sustainable rose (€0.74) than the conventional rose (€0.92). This difference in true price comes mainly from the environmental impact associated with transporting the roses via airfreight and the social impact in terms of workers' incomes.

The true price analysis identified various projects to reduce environmental and social costs:

- ▶ Transport by ship to reduce carbon emissions;
- ▶ Solar powered greenhouse to reduce non-renewable energy use;
- ▶ Closed-loop hydroponics to reduce water and fertiliser usage;
- ▶ Training in health and safety to improve workers' skills;
- ▶ Gender committees to reduce harassment and gender discrimination;
- ▶ Pay a basic living wage to improve the wellbeing of workers.

The true price analysis maps the costs of each project and its effect on the profit and loss of an average farm. For example, health and safety training would generate about €4,500 profit per hectare, while switching to transport by sea would increase profit by €5,000 per hectare. Better social standards for rose-farm workers and more environmentally friendly growing and transportation techniques are financially feasible, without negatively affecting farm owners' bottom lines.

Some improvements in social standards, such as paying a living wage to workers, were less feasible if farm owners have to bear all the costs. Based on an economic value chain analysis, it was shown that providing a living wage could be possible when a fraction of the costs are borne by wholesale traders, retail traders and consumers. This strengthened the promotion of better social and environmental standards.

Source: True Price (2014)

While the monetisation of externalities helps to bring societal and environmental externalities into corporate decision-making, there are several caveats to the market-driven calculation of total or true value. First, optimisation is traditionally done on efficiency grounds: the minimal input of resources needed for the maximum output of goods. As discussed in Chapter 1, ecosystem management requires building and maintaining resilience or quality in the system or process to have the capacity to

absorb shocks and to stay away from tipping points. So, we propose optimisation with scope for adaptive capacity⁴. That is primarily an issue of taking a sufficiently long horizon extending over the full cycle of the production system or process. In that way, the benefits in terms of shock-absorbing capacity and the costs of extra resources are included. The total value approach is based on a medium to long horizon. For pricing of carbon emissions, for example, this long-term approach implies using an effective future carbon price of \$50 to 100 per tCO₂e (tonnes carbon dioxide equivalent) in the calculations (Stiglitz and Stern, 2017).

Next, monetisation cannot fully express the ethical aspects of externalities, such as human rights or health and safety (KPMG, 2014). The three capitals (financial, social and environmental) are also not substitutable⁵. Furthermore, working out total value can lead to perverse outcomes: the negative environmental impact of deforestation, for example, can be offset by large economic gains; in other words legitimising destruction. To avoid these outcomes, we incorporate the important constraint that the social-environmental value cannot be reduced compared to its initial value. A final issue is participation (Coulson, 2016). Producers could involve stakeholders in the application of the true-value methodology to form a more inclusive and pluralist conception of risk and values for social and environmental impacts.

Sustainable Finance 2.0 comes in different shapes. Examples are triple bottom line (people, planet, profit) and integrated profit and loss accounting. Within corporate governance, we can speak of an extended stakeholder approach, whereby not only direct stakeholders, such as shareholders, suppliers, employees and clients, but also society and environment, as indirect stakeholders, are included.

E. SF 3.0 - CONTRIBUTING TO SUSTAINABLE DEVELOPMENT, WHILE OBSERVING FINANCIAL VIABILITY

Sustainable Finance 3.0 moves from risk to opportunity. Rather than avoiding unsustainable companies from a risk perspective, financial institutions invest only in sustainable companies and projects. In this approach, finance is a means to foster sustainable development, for example by funding healthcare, sustainable buildings, wind farms, electric car manufacturers and land-reuse projects. The starting point of SF 3.0 is a positive selection of investment projects based on their potential to generate positive social and environmental impacts. In this way, the financial system serves the sustainable development agenda in the medium to long term.

The question that then arises is how the financial part of the decision is taken. An important component of sustainable development is economic and financial viability. Financial viability, in the form of a fair financial return (which at the minimum preserves capital), is a condition for sustainable investment and lending; otherwise projects might need to be aborted prematurely because of financial shortfalls. The key change is that the

4 Some industrial companies use safety not only for the protection of people and the environment but also to control the production process reducing production losses, and thus 'overinvest' in the quality of production facilities and safety procedures.

5 More broadly, the International Integrated Reporting Council (IIRC, 2013) moves from two capitals – financial and manufactured – to six capitals: intellectual, social and relationship (institutions that help to maintain and develop human capital in partnerships with others), human and natural.

role of finance turns from primacy (profit maximisation) to serving (a means to contribute to sustainable development). It moves from the front row to the back row.

What is a *fair financial return*? Of the respondents to the Annual Impact Investment Survey (GIIN, 2016), 59 per cent primarily target risk-adjusted, market-rate returns. Of the remainder, 25 per cent primarily target returns below market-rate that are closer to market-rate returns, and 16 per cent target returns that are closer to capital preservation. So the great majority pursues returns at market rate or close to it, while a small group accepts lower returns for sustainability reasons.

More broadly, the question is whether investors including the ultimate beneficiaries, such as current and future pensioners are prepared to potentially forego some financial return in exchange for social and environmental returns (e.g. enjoying their pension in a liveable world). Social preferences play an important role for investors in socially responsible investment (SRI) funds, while financial motives appear to be of limited importance (Riedl and Smeets, 2017). SRI investors expect to earn lower returns from SRI funds than from conventional funds, suggesting that they are willing to forego financial performance in order to invest according to their social preferences. However, *ex ante* it is not clear what the ultimate effect of impact investing is on financial return. If investor coalitions, for example, could accelerate the transition towards sustainable development, there would be less chance of negative financial returns because of extreme weather events or stranded assets. This argument depends on sufficiently large amounts of investment moving to sustainable finance (see Chapter 4).

Ortiz-de-Mandojana and Bansal (2016) investigate the short and long-term benefits of organisational resilience through sustainable business practices. In the long run, a higher survival rate of sustainable organisations is expected, as resilience helps companies to avoid crises and bounce back from shocks. They show that companies that adopt responsible social and environmental practices, relative to a carefully matched control group, have lower financial volatility, higher sales growth and higher chances of survival over a 15-year period. Yet, they do not find any differences in short-term profits. This suggests that there is no short-term cost to adopting sustainability practices.

However, the evidence on socially responsible investing (SRI), which incorporates environmental, social and governance issues in investment decisions, is mixed. In a meta-study on the performance of SRI funds, Renneboog, Ter Horst and Zhang (2008) report that existing studies at the portfolio level hint but do not univocally demonstrate that SRI investment funds perform worse than conventional funds. But Bauer, Koedijk and Otten (2005) find little evidence that the average performance of SRI in the USA and UK is different from that of conventional funds. More recently, Ferrell, Liang and Renneboog (2016) find a positive relation between corporate social responsibility and value (measured by Tobin's Q, which stands for the market value divided by the book value). Corporate social responsibility can thus generate more returns for investors through enhanced firm value. Although results have been mixed, the majority of the research suggests a positive relationship between corporate environmental performance and corporate financial performance (Dixon-Fowler *et al*, 2013).

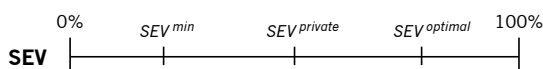
Moving to corporate governance, *legitimacy theory* underpins Sustainable Finance 3.0. Legitimacy theory indicates that companies aim to legitimise their corporate actions in order to obtain approval from society and thus, to ensure their continuing existence

(Omran and Ramdhony, 2015). This social licence to operate represents a myriad of expectations that society has about how an organisation should conduct its operations. The corporation thus acts within the bounds and norms of what society identifies as socially responsible behaviour, including meeting social and environmental standards.

F. COMPARING THE STAGES: WHERE ARE WE?

The three stages of sustainable finance lead to different levels of realised social-environmental value. Sustainable Finance 1.0 introduces a minimum level, SEV^{min} , below which investors cannot go. Companies or investment projects that do not meet this minimum level are on an exclusion list. The next stage, Sustainable Finance 2.0, balances the privately discounted financial, social and environmental value in an overall approach based on evaluating the total value. We label this $SEV^{private}$. For illustration purposes, we incorporate this privately discounted social-environmental value halfway along our social-environmental value scale in Figure 5. Finally, Sustainable Finance 3.0 maximises the social-environmental value, $SEV^{optimal}$. Companies and projects that deliver this maximised social-environmental value are eligible for investment and are on the inclusion list.

FIG.5. Levels of social-environmental value (SEV)



Note: SEV^{min} = minimum level of social and environmental value; $SEV^{private}$ = maximised total value (= privately discounted financial, social and environmental value); and $SEV^{optimal}$ = maximised social and environmental value.

The first two stages aim to avoid reputation risk, because the public demands a minimum level of corporate social responsibility and externalities are expected to be priced-in at some stage. The third stage aims to grasp the opportunities of realising social-environmental impact through investment and lending.

Where are we currently on the social-environmental axis? The majority of firms are at the Sustainable Finance 1.0 level, putting financial value first. About 30 to 40 per cent of financial institutions and 20 to 30 per cent of companies adopt sustainable principles in their investment and business practices (see Table 6). But these firms are only partly (fraction α) maximising total value. They are somewhere between Sustainable Finance 1.0 and 2.0, which can be expressed as: $\max V = (1 - \alpha) F + \alpha T = F + \alpha (S + E)$, in which V stands for the overall value maximised by the firm, F for financial value, T for total value ($T = F + S + E$), S for social value and E for environmental value.

A fair approximation is that financial value is dominant and social-environmental value is incorporated for about 10 per cent ($\alpha = 0.1$). This implies that we are only just above, but still quite close to, SEV^{min} . To increase the social-environmental value, the real issue is to switch from Sustainable Finance 1.0 to Sustainable Finance 2.0. Box 6 reports on a recent battle between the shareholder model (SF 1.0) and the stakeholder model (SF 2.0). Finally, the group of financial institutions adopting Sustainable Finance 3.0 is tiny, at less than 1 per cent (Table 6).

The framework is dynamic. Non-governmental organisations (NGOs) put pressure on investors to raise the minimum level by expanding the number of exclusions. The introduction of government regulation or taxation on social and environmental externalities can cause an upward shift of the social-environmental component in the total value calculation.

BOX 6 THE ABORTED TAKE-OVER OF UNILEVER BY KRAFT HEINZ

In February 2017, Kraft Heinz, the US food company, attempted a takeover of Unilever, the European food company (*Financial Times*, 2017). A deal would have brought together two companies with radically different business models and cultures. With a portfolio of slower-growing brands, Kraft Heinz is heavily concentrated in the US and underpinned by debt-financed deals. It implemented aggressive cost-cutting strategies to generate margin expansion that allowed it to repay the debt and bolster shareholder returns; this is the shareholder model framework. Meanwhile, Unilever is better known for strong brands and its presence in some of the biggest emerging markets. Under its chief executive, Paul Polman, Unilever attempted to focus on better balancing of profitability with social and environmental sustainability - the stakeholder model.

This was a big takeover battle. Kraft Heinz offered \$143 billion for Unilever, but Unilever did not want to give up its sustainable business model. In the end, Warren Buffett, the financier behind Kraft Heinz, did not approve a hostile takeover and halted Kraft Heinz from further bidding for Unilever.

The aftermath of the aborted takeover generated a debate on the 'protection' of companies with stakeholder models against the aggressive bids of shareholder-model companies. Defences against takeovers, such as certified shares or priority shares with friendly shareholders, can reduce market discipline, which in turn might decrease the stock price of the company. We propose a *societal cost-benefit analysis*, including financial, social and environmental factors, based on the total or true value methodology (De Adelhart Toorop, De Groot Ruiz and Schoenmaker, 2017). It is the responsibility of the management of both the acquiring and target company to conduct this test. Similar to the way that an investment bank decides if the terms of a merger or acquisition are fair, an independent advisor would give a fairness opinion on the outcome of the societal cost-benefit test. A Commercial Division of the Court or a Take-Over Panel (as in the United Kingdom) would only approve a take-over or merger if and when this cost-benefit test showed a positive value for society. When necessary the Court or Panel could appoint experts to re-calculate the societal cost-benefit test.

3 OBSTACLES TO SUSTAINABLE FINANCE

A move towards sustainable finance requires a transition away from the current financial system. What are the main obstacles to, and incentives for, adopting sustainable finance? Table 4 provides an overview of the sustainability players, including the instruments at their disposal, forums in which they might work together, and the opportunities and threats they face. While our focus is primarily on the role of investors⁶ and companies, we also include governments, civil society organisations such as NGOs and households in Table 4 for completeness. This chapter discusses three main obstacles to sustainable finance: insufficient collective effort, a bias towards the short term and aversion to change. Chapter 4 discusses the opportunities for sustainable finance.

6 We use the term 'investors' as shorthand for financial institutions, including pension funds, insurance companies, fund managers, private equity and banks.

TABLE 4. Players in sustainability

Player	Sphere of influence	Horizon	Mechanisms	Leading organisations and co-operation forums	Opportunities	Threats
Government	Country / Global	Up to 4 years	Strong leadership role <ul style="list-style-type: none"> • Taxation • Regulation 	<ul style="list-style-type: none"> • United Nations: UNFCCC COP, New York 	<ul style="list-style-type: none"> • Economy-wide impact • Public role in energy and infrastructure 	<ul style="list-style-type: none"> • Shortfall of efforts • Monitoring climate pledges • Policy differences • Free rider behaviour • Corruption
Civil society	Debate	From MT to LT	Public voice of NGOs <ul style="list-style-type: none"> • Media • Social capital • Deselection 	<ul style="list-style-type: none"> • Oxfam, Oxford • Amnesty International, London • Greenpeace, Amsterdam • WWF, Washington DC 	<ul style="list-style-type: none"> • Agenda setting • Stimulate citizenship of investors and corporates 	<ul style="list-style-type: none"> • Single issue • Fragmentation • Dependent on goodwill of national and local government
Investors	Investments	From ST to LT	Long term investors <ul style="list-style-type: none"> • Investment strategy • Lending strategy • Engagement 	<ul style="list-style-type: none"> • PRI, London • FCLT Global, Boston • GINN, New York • GABV, Zeist 	<ul style="list-style-type: none"> • Stimulate corporate sustainability • Stewardship and engagement 	<ul style="list-style-type: none"> • Shortfall of efforts • Short-termism: monthly / quarterly benchmarking • Marking-to-market • Supervisory treatment of illiquid investments • Alternative sources of finance: retained earnings, non-responsible investors • Monitoring
Corporates	Value chain of production	From MT to LT	Key players for transformation <ul style="list-style-type: none"> • Procurement • Production process 	<ul style="list-style-type: none"> • WEF, Davos • WBCSD, Geneva 	<ul style="list-style-type: none"> • Reputation building • Sound and stable business practices 	<ul style="list-style-type: none"> • Shortfall of efforts • Short-termism: quarterly reporting; shareholder value thinking • Lobbying for status quo • Reliability integrated reporting • Relocating production to less strict countries
Households	Consumption	From ST to LT	Ultimate beneficiaries <ul style="list-style-type: none"> • Buying decisions • Electing government 	Consumer associations	<ul style="list-style-type: none"> • Steer corporates, utilities, housing • Steer investments • Vote for policies 	<ul style="list-style-type: none"> • Poverty • Lack of trust in government • Environmental degradation • Free rider behaviour • Human aversion to change

Note: Only a few of the main co-operation forums or large players are listed for illustration purposes. COP = Conference of the Parties (governed by the UNFCCC); WWF = World Wildlife Fund; PRI = Principles for Responsible Investment (supported by the UN); FCLT Global = Focus Capital on the Long Term Global; GIIN = Global Impact Investing Network; GABV = Global Alliance for Banking on Values; WEF = World Economic Forum; WBCSD = World Business Council for Sustainable Development.

A. INSUFFICIENT PRIVATE EFFORT

While the adoption of sustainable business and finance practices is a major advance towards sustainable development, it might not be sufficient for two reasons. First, the *fallacy of composition* arises when one concludes that something is true of the whole, at the macro level, from the fact that it is true of every part, at the micro level. Even if individual companies internalise social and environmental externalities, it is not certain that the planetary boundaries are not crossed. One example is the current drive of companies to reduce their carbon footprints. This eco-efficiency push is a welcome trend in itself, but the available evidence suggests that the projected trajectories for carbon emissions exceed the allowable carbon budget for staying below 2° Celsius of global warming (eco-effectiveness). Dyllick and Muff (2016) called this discrepancy the “*big disconnect*”. Busch, Bauer and Orlitzky (2016) also made the paradoxical observation that increasing sustainable investment does not necessarily induce sustainable development, and call for a system perspective, which we explore in Chapter 4.

There are several reasons for the divergence between the micro and macro outcomes. First, financial institutions and companies use a private discount factor to discount future cash flows. Stern (2008) argues that the public discount factor should be very small or zero because the government should value current and future generations equally. Because social and environmental impacts are particularly felt in the long term, private discounting leads to insufficient effort from a social welfare perspective. Next, only about 20 per cent of companies are actively managing their carbon footprints to some extent (Table 6). These micro efforts are not enough to keep carbon emissions within the allowable carbon budget at the macro level.

Second, the *boundary problem* compounds the challenge of internalising externalities. When regulation for one sector is tightened, business will shift to other sectors and countries with fewer or no requirements (Goodhart, 2008). Exemptions in the EU emissions trading system, such as airlines operating between EU and non-EU countries, highlight the boundary problem – as well as the international co-ordination problem – in environmental regulation. This is an example of carbon leakage. Other examples are national regulations for products that companies can circumvent by relocating production to countries with less strict regulations. In the finance field, other investors pick up undervalued investments when ‘sustainable’ investors divest unsustainable companies. A solution to this problem might be the use of product or activity-based regulation (Schoenmaker and Wierds, 2015).

Another way to address the boundary problem would be to monitor and mitigate financial imbalances across the entire financial sector. Schoenmaker and Van Tilburg (2016) proposed that central banks and supervisors should monitor systemic financial imbalances resulting from ecological pressures building up and concentrating in financial institutions and markets. Supervisors can, for example, use *carbon stress tests* for a whole range of financial institutions to identify overexposures to, and concentrations in, carbon-intensive assets, which include not only the oil, gas and coal sectors but all sectors using fossil fuels either in the production or use of their products (e.g. car manufacturers or real estate) and services. These carbon stress tests make use of various climate scenarios, including the adverse scenario of late adjustment resulting in a ‘hard landing’, and have a long horizon over which adverse events could occur.

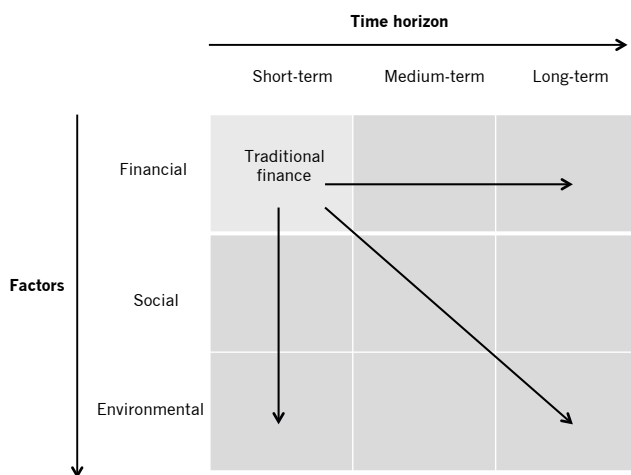
Finally, there are limits to what the private sector can achieve. While financial institutions are starting to look at social and environmental externalities, there is clearly a role for government to make finance fully sustainable through regulation and taxation of these externalities. The starting point is that much of the transition is driven by private investment, but that investment is threatened by government-induced risk (Stern, 2015). Policies, governance and institutions create a risk-return balance on the basis of which investors decide whether or not to act. But it is government policy, including the stability and credibility of policy that creates the framework for that investment and sets out a range of pricing and regulatory instruments to encourage the transition to low carbon. Stern (2015) adds that making sound policy is not just about the analysis and implementation of incentives, but also about social and personal responsibility and values. Moreover, the role of communities is often undervalued. Only with the involvement of community can we recycle and reuse. Interesting examples of the sharing economy (e.g. car-sharing schemes) are emerging. The role of private coalitions for sustainable finance is explored in Chapter 4.

We are in the transition to a low-carbon, circular economy. The externalities of the current carbon-intensive economy are becoming increasingly clear to the general public (e.g. more catastrophic weather events such as droughts and flooding in countries close to the Equator, and air pollution). A case in point is California, where air pollution from heavy traffic in the 1990s prompted environmental regulations and stimulated innovation, for example, in the electric cars from Tesla and in solar technology. China, India and Mexico, for example, face similar or even worse air pollution which may at some point prompt stricter environmental regulations in these countries. Finance is about anticipating such events and incorporating expectations into today's valuations, which underpin investment decisions. Finance can thus contribute to a swift transition to a low-carbon economy.

B. SHORT-TERMISM

The tragedy of the short-term horizon is a major obstacle to sustainable finance (Carney, 2015). The costs of action are borne now, while the benefits remain in the future. The impact of economic activity on society, and even more so on the environment, is typically felt in the long term. By contrast, the horizon of managers and investors in traditional finance is mostly focused on the short-term. How can financial firms steer business towards sustainable practices? That is ultimately a question of *corporate governance* (see Chapter 4). The changes require adopting social and environmental factors in decision-making and moving decision-making from short to long term. Figure 6 highlights these challenges for the shift from traditional finance (the top left cell) to sustainable finance (covering all nine cells).

FIG. 6. Time horizon and factors in sustainable finance



Source: Sikken (2014)

As indicated in the right-hand column of Table 4, several practices reinforce *short-termism* (which we deal with later in this section):

- ▶ Quarterly financial reporting by companies;
- ▶ Variable pay systems based on annual results;
- ▶ Monthly or quarterly benchmarks for measuring investor performance;
- ▶ Long and complicated investment chains;
- ▶ Marking-to-market of investments;
- ▶ Supervisory treatment of illiquid investments;
- ▶ Short political horizon.

These practices make the transition to sustainable finance difficult. There is a trade-off between using markets as a disciplining device for managers and investors, and designing measures or incentives that foster their long-term behaviour. A common theme behind these practices is the widely accepted *efficient markets hypothesis*, which states that stock prices incorporate all relevant information and thus on average reflect the long-term fundamental value of the firm (Fama, 1970). The efficient markets hypothesis reinforces the focus on stock price as a central performance measure for executive and investor performance.

An alternative to the efficient markets hypothesis is the *adaptive markets hypothesis* (Lo, 2004; 2017). Contrary to the neoclassical view that individuals maximise expected utility and have rational expectations, an evolutionary perspective makes considerably more modest claims. The degree of market efficiency depends on an evolutionary model of individuals adapting to a changing environment. Prices reflect as much information as dictated by the combination of environmental conditions and the number and nature of distinct groups of market participants, each behaving in a common manner and having a common investment horizon. For example, retail investors, institutional investors,

market makers and hedge fund managers can be seen as distinct groups with differing investment horizons. If multiple groups (or the members of a single highly populous group) are competing within a single market, that market is likely to be highly efficient. If, on the other hand, a small number of groups are active in a given market, that market will be less efficient. The adaptive markets hypothesis can explain why new risks, such as environmental risks, are not yet fully priced in, because not enough investors are examining these new risks⁷.

QUARTERLY FINANCIAL REPORTING

There is ample evidence that the majority of firms view quarterly earnings as the key metric for an external audience, more so than the underlying cash flows (Graham, Harvey and Rajgopal, 2005). The pressure created by a high reporting frequency to continuously achieve a strong share price induces managers to adopt a short-term perspective (myopia) in choosing the firm's investments. Such pressures disappear when the reporting frequency is decreased. Infrequent reports could provide better incentives for project selection decisions even though they provide less information to the capital market (Gigler *et al*, 2014). Nevertheless, timely publication of information that has a material impact on a firm's performance remains important.

Barton and Wiseman (2014) recommended focusing on metrics like economic value added over ten years, R&D efficiency, patent pipelines and multiyear return on capital investments. More generally, the nature of financial reporting should be broadened. Integrated reporting is a process founded on integrated thinking within a firm that results in a regular integrated report about value creation over time, and related communications covering value creation. Integrated reporting facilitates transparency of social and environmental aspects. The current process is largely bottom-up, with the exception of South Africa, which already requires integrated reporting: some firms have started to publish integrated reports. However, the quality and reliability of reported information varies significantly. To speed up this process, the Financial Stability Board set up the Bloomberg Task Force to provide a set of voluntary, consistent disclosure recommendations for companies to use to provide information to investors, lenders and insurance underwriters about their climate-related financial risks (Task Force on Climate-related Financial Disclosures, 2017). At some point, best practices need to be incorporated into binding international accounting standards, adopted by the International Accounting Standards Board (IASB) and supported by the International Organisation of Securities Commissions (IOSCO). Finally, integrated reports would need to be audited, according to these future standards, to provide assurance of the reported information.

Faced with a large percentage of investors that chase short-term returns, companies could benefit by attracting investors with longer-term horizons and incentives that are more consistent with the long-term strategy of the company. Knauer and Serafeim (2014) argue that there is no need for companies to take their investor base as a "given". One promising way of attracting long-term investors is a commitment to integrated thinking and the adoption of integrated reporting, which provides companies with a means of

7 Andersson, Bolton and Samama (2016) argued that there is little awareness of carbon risk among (institutional) investors, and it is thus not priced by the market. Hong, Li and Xu (2016) investigated whether stock markets efficiently price risks brought on or exacerbated by climate change. Their findings support regulatory concerns that markets that are inexperienced with climate change underreact to such risks. Hong, Li and Xu (2016) thus call for corporate exposure to climate risks to be disclosed.

credibly communicating the commitment of its top leadership to dispersing integrated thinking across the organisation and to building strong relationships with important external stakeholders.

VARIABLE PAY SYSTEMS

Executive directors' bonuses based on annual results or paid in stock options reinforce the focus on short-term results (Edmans *et al*, 2017). More broadly, executives are primarily concerned with the direct impact of investments during their tenure, as current performance is a key factor for their career prospects. To address this short-term bias, a more long-term oriented pay structure for executives can be introduced. The *deferred reward principle* suggests that pay for exerting effort in the current period is spread over the current and future periods to achieve intertemporal risk-sharing (Edmans *et al*, 2012). The payment of all or part of a bonus can thus be deferred and made contingent on subsequent events, such as the completion of a major strategy or project when the full impact of the investment becomes clear. Also the vesting period (or the lock-up period) for equity compensation can be lengthened, even after retirement. Another powerful tool is *clawback provisions* in executive compensation whereby an employer takes back money that has already been disbursed, sometimes with an added penalty (Bolton and Samama, 2013). Clawback provisions can be activated in case of fraud or accounting errors, but also in cases where subsequent losses show in hindsight that the executives received excess compensation.

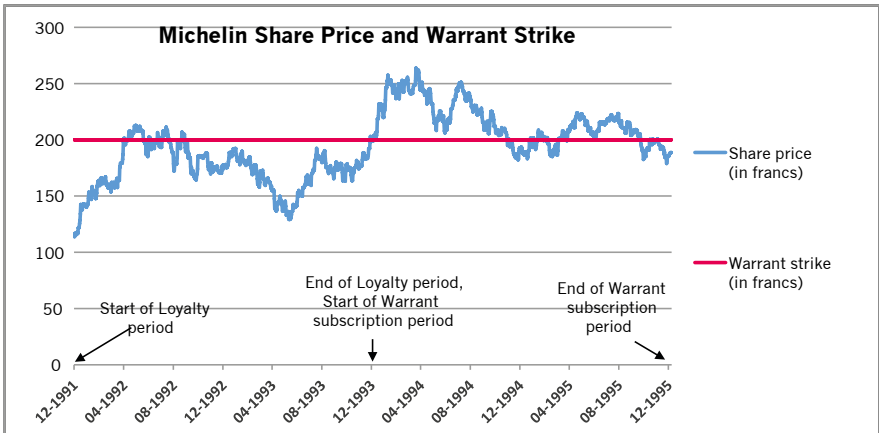
QUARTERLY PERFORMANCE BENCHMARKING

Fund managers are evaluated on a regular basis against performance benchmarks. The quarterly relative performance monitoring to which many funds and fund managers are subject results in the adoption of short-termist attitudes and approaches to the management of funds (Baker, 1998). Moreover, a greater proportion of institutional investors simply pursue passive, broad asset-class-allocation investment strategies, which means that a smaller fraction of shareholders is informed about any individual firm and its fundamental long-term value.

To overcome short-term interests, performance evaluation should be aligned with the time horizon of the investment strategy and underlying investments. Bolton and Samama (2013) proposed to introduce *loyalty shares*, which provide an additional reward to shareholders if they have held on to their shares for a contractually specified period of time, the so-called loyalty period (e.g. three, five or ten years). More specifically, Bolton and Samama (2013) suggested a reward in the form of a warrant giving the right to purchase a pre-determined number of new shares at a pre-specified price and granted to loyal investors at the expiration of the loyalty period. A major benefit of incentivising investors to hold onto their shares for the long-term is that it facilitates engagement of (institutional) investors with companies (see Chapter 4).

An early example was Michelin in 1991, which granted loyalty shares – in the form of warrants following a dividend cut – to compensate the most loyal shareholders for this loss of income (Bolton and Samama, 2013). Specifically, Michelin granted one call-warrant for every 10 shares held on 24 December 1991, with a two-year loyalty period. The call-warrant was exercisable at a four-year horizon (31 December 1995) at an out-of-the-money strike price (i.e. a strike price – at which the warrant can be exercised – well above the share price) of 200 French francs, compared to a share price of about 115 francs at the time of the announcement (Figure 7).

FIG. 7. Call-warrant for loyal shareholders



Source: Bolton and Samama (2013). Note: The share price and warrant strike are in French francs (vertical axis). The loyalty period covered two years from end-1991 to end-1993, after which loyal shareholders received the warrant. The subsequent warrant subscription period, in which they could exercise the warrant, was from end-1993 to end-1995.

LONG AND COMPLICATED INVESTMENT CHAINS

Delegated investment management – with multiple parties in the investment chain – causes agency problems between the asset owner or principal, and the delegated asset manager or agent responsible for making investment decisions. Investment objectives, risk appetite, incentives, horizons and knowledge are typically not fully aligned, neither across nor within organisations. These problems are exacerbated when investing for the long term, where the payoff is distant and often highly uncertain (Neal and Warren, 2015). Moreover, investment decisions are often made across multi-layered investment organisations. Similarly, within asset managers, the investment decisions made by portfolio managers are constrained by input from analysts, managers and compliance departments. A pension fund, for example, has typically a long chain:

- ▶ Beneficiaries (pensioners and future pensioners);
- ▶ Governing board;
- ▶ CEO and/or CIO;
- ▶ Asset class heads;
- ▶ External and internal asset managers.

Problems arise from differences in investment horizons, the tendency to evaluate and reward based on short-term results, and failure to commit. While an institutional investor might wish to pursue a long-term investment strategy for its beneficiaries, it might use a quarterly benchmark to evaluate its asset managers internally. Next, an institutional investor might appoint internal and external asset managers to benchmark them against each other. In such a setting, it is very difficult to avoid tactical investment decisions aimed at short-term investment gains. Neal and Warren (2015) propose that long-term investors should aim to create an environment in which all principals and agents along

the chain of delegations are aligned, engaged, incentivised to work towards long-term outcomes, and committed to investing for the long run. The earlier proposal of loyalty shares can foster the long-term commitment.

MARKING-TO-MARKET

Market prices give timely signals that can aid decision-making. But in the presence of distorted incentives and illiquid markets, there are other harmful effects that inject artificial volatility into prices, which distorts real decisions. When markets are only imperfectly liquid in the sense that sales or purchases affect the short-term price dynamics, the illiquidity of the secondary market causes another type of inefficiency (Plantin, Sapiro and Shin, 2008). A bad outcome for the asset will depress fundamental values somewhat, but the more damaging effect comes from the negative externalities generated by other firms selling. Under a mark-to-market regime, the value of someone's assets depends on the prices at which others have managed to sell their assets. When others sell, observed transaction prices are depressed more than is justified by the fundamentals exerting a negative effect on all others, but especially on those who have chosen to hold on to the asset. Anticipating this negative outcome, a short-horizon investor will be tempted to pre-empt the fall in price by selling the asset itself. However, such pre-emptive action will merely serve to amplify the price fall. In this way, the mark-to-market regime generates endogenous volatility of prices that impedes the resource allocation role of prices. This process comes into effect particularly during times of crises.

The alternative, the historical cost regime, also leads to inefficiencies, as there are no adjustments for subsequent changes in the market values of assets. Assessing the pros and cons, Plantin, Sapiro and Shin (2008) found that the damage done by marking to market is greatest when claims are (I) long-lived, (II) illiquid, and (III) senior. For trading of junior assets in liquid markets such as traded stocks, marking-to-market is superior to historical cost in terms of the trade-offs. But for senior, long-lived and illiquid assets and liabilities, such as bank loans and insurance liabilities, the harm caused by distortions can outweigh the benefits. Banks loans are, for example, typically carried at historic or nominal value, with deduction of expected credit losses (i.e. impairments).

In the aftermath of the global financial crisis in 2007, the international accounting standard for financial instruments (IAS 39) was amended to exempt financial instruments from fair value accounting when they are managed based on amortised cost in accordance with a financial firm's business model. To keep the appropriate perspective, the fair value discussion focuses on a subset of assets (i.e. financial instruments) and on unusual circumstances. Shleifer and Vishny (2011) considered fire sales, where fair value accounting reinforces the downward spiral and is thus counterproductive. The unusual circumstances should be confined to these instances when the markets are clearly illiquid, otherwise undue forbearance or tolerance may arise. The benefit of fair value accounting is that management and regulators get a clear signal from the markets prompting them to act. Several studies (e.g. Laux and Leuz, 2010) argue that fair value accounting did not play a major role in the financial crisis.

SUPERVISORY TREATMENT

Liquid investments, which can be traded and thus marked to market daily, carry a relatively low supervisory capital charge, as financial firms can divest these assets at short notice. The supervisory treatment is based on marking-to-market, liquidity and efficient market measures. By contrast, private market and direct investments carry a higher capital

charge to cater for the ‘risk’ that the investment cannot be liquidated at short notice. Environmental projects typically have a long horizon and cannot be measured frequently; results are visible only after a certain amount of time has passed. Land restoration projects, for example, have a horizon of 20 years (Ferberda, 2016). When regulated financial institutions keep hold of an investment to maturity, ways to avoid or reduce the need for a supervisory surcharge for illiquidity can be found in measuring the potential and the risk of a project over the full cycle of that project (e.g. using scenario analysis) rather than on a daily mark-to-market basis. Also at the retail level, there is bias towards liquid and transferable securities. Box 7 provides a proposal for *sustainable retail funds*.

BOX 7 SUSTAINABLE RETAIL FUNDS⁸

The main vehicle for retail investors is the Undertakings for Collective Investments in Transferable Securities (UCITS; 2009/65/EC). UCITS are collective investment funds operating freely throughout the European Union on the basis of a single authorisation by a supervisory authority. The UCITS concept is based on a small set of core criteria: 1) diversification rules; 2) concentration limits; 3) transferability of listed securities; and 4) strictly regulated use of derivatives for protection purposes only.

The transferability requirement assumes a liquid market in the respective securities. An overreliance on market liquidity is misguided. Shleifer and Vishny (2011) analysed the role of asset ‘fire sales’ in depleting the balance sheets of financial institutions and aggravating the fragility of the financial system during the 2007-08 financial crisis. Assets sold in fire sales can trade at prices far below value in best use, causing severe losses to sellers. While liquidity is useful for retail investors, we suggest that the concept that only listing provides sufficient liquidity be revised to ‘liquidity that ensures a balanced control of inflow and outflow of cash by fund managers’ combined with a withdrawal limit on fund shares. This would acknowledge that fund managers should hold a diversified buffer of liquid assets consisting of various asset categories that they can use to cover short-term liquidity needs.

The objectives of the EU capital markets union (CMU) include among others fostering retail investment in capital markets and harnessing finance to deliver sustainability (European Commission, 2015). To engage retail investors, the European Commission could prepare legislation for setting up liquid, sustainable retail investment funds or undertakings with an EU-passport. The UN Sustainable Development Goals (see Box 4) could be used to incorporate sustainability in the investment criteria of these funds. Such ‘Undertakings for Collective Investments in Sustainable Securities’ (UCISS) would keep the UCITS’ diversification rules and concentration limits, as well as the strictly regulated use of derivatives for protection purposes only. For liquidity, UCISS would replace the requirements of listing and transferability with the concept of sound liquidity management, i.e. balanced control of inflow and outflow of cash by fund managers. Finally, UCISS would incorporate a definition of eligible investments that meet enforceable criteria of sustainability.

8 I would like to thank Linda van Goor for the idea of sustainable retail funds based on the UCITS concept.

SHORT POLITICAL HORIZON

A final threat is the short political horizon. Democratic governments and parliaments typically have a governing and legislative period of four years, after which they are up for re-election. This puts a premium on policies that can reap benefits within the four-year cycle, and a discount on long-term structural reforms, such as increasing the retirement age or implementing carbon taxes. Although countries try to counter the short-term bias of the election cycle through semi-governmental agencies and think tanks that can develop medium to long-term policy proposals, negotiations about the necessary legislation take place between elected politicians in the political arena.

In summary, a possible cost of financial markets is short-termism, with agents in the financial intermediation chain giving near-term outcomes too much weight at the expense of longer-term opportunities. There is evidence that stock prices in the UK and the US have historically over-discounted future dividends by 5 to 10 per cent, suggesting significant evidence of myopia (Davies *et al*, 2014). Possible incentive-compatible solutions to counter short-termism would be more long-term oriented pay structures for executives (e.g. clawback provisions and deferred rewards) and incentives for long-term investors (e.g. loyalty shares). Moreover, the reliance on mark-to-market valuations should be reduced.

C. AVERSION TO CHANGE

The sustainable development agenda requires behavioural change (Barr, Gilg and Shaw, 2011). Related to short-termism, there is however a general aversion to change. Table 4 identifies several practices that reinforce the status quo:

- ▶ Lobby against change by incumbent companies;
- ▶ Human aversion to change;
- ▶ Lack of new frameworks.

A major obstacle to change is lobbying by incumbent companies to maintain the status quo in order to preserve the current value of their assets. A case in point is the oil industry lobbying against electric cars in California in the 1990s, which is documented in the 2006 film *'Who killed the electric car?'* (Bedsworth and Taylor, 2007). Another example is the lobby of the energy-intensive steel industry against the EU's Emissions Trading Scheme (Bloomberg News, 2014). More broadly, the Global Climate Coalition was an international lobbyist group of businesses from 1989 to 2001 that opposed action to reduce carbon emissions and challenged the science behind global warming.⁹ Similarly, the Council for Tobacco Research promoted misleading science about the links between tobacco and disease. NGOs, such as the Climate Action Network, play a key role in making the counter arguments, although they cannot match company budgets for lobbying. Another solution is for investors, as part of shareholder engagement, to engage with companies and ask them to stop their lobbying and, if not successful, exclude lobbying companies.

9 More recently, Exxon has been linked to spreading misleading information on climate change. It is now subject to a SEC investigation over how Exxon factors in climate risk in pricing its projects (Wall Street Journal, 2016).

A related obstacle is the inherent human aversion to change. Aversion to change is a short-term negative reaction to changes in products, services, routines or patterns (e.g. consumption, working or investment patterns). The solution is to introduce changes in a way that minimises anxiety and discomfort, and shows the long-term benefits.

A final obstacle to change is a lack of new frameworks to use. Education as well as developing and visualising new frameworks can help to gather support for change. Moreover, multinational development banks, which have an explicit mission for development, can take the lead in co-financing new sustainable projects. This facilitates the start of innovative projects and the building up of a track record. Similarly, Zhan and Karl (2016) suggest that investment promotion agencies broaden their objective from economic goals to sustainable development. Embedding sustainable development into investment promotion strategies can foster investment in renewable energy, infrastructure development, research and development, health, and education in developing countries. Investment incentives can overcome inadequate risk-return ratios for sustainable development related investments. Zhan and Karl (2016) stress that policy makers must balance the need for attractive risk-return rates for the investor with the need for accessible and affordable services, such as electricity, water, education and health services, for all. Moreover, investment promotion should be balanced with adequate regulation in these areas.

4 COALITIONS FOR SUSTAINABLE FINANCE

Companies and consumers are at the forefront of the transformation towards a sustainable and inclusive economy. By changing their behaviour, they can reduce carbon emissions and materials use, prevent land degradation and promote social standards at work and in the wider communities. Investors and lenders can use their influence to steer companies towards sustainable business practices. They have the power to provide finance, but also the power to withhold or withdraw it from new and existing companies and projects. A new trend in corporate governance is to engage with companies on environmental, social and governance (ESG) issues. This chapter first discusses corporate governance at the level of individual investors and companies and then moves to emerging coalitions of investors, which have the capacity to jointly engage with companies. We show how these investor coalitions can turn into powerful agents of change and steer business towards truly sustainable development.

A. CORPORATE GOVERNANCE

There can be disconnects between the owners or shareholders of a corporation, the managers of a corporation and the society in which the corporation operates. There is a key role for *corporate governance*, which refers to the mechanisms, relations and processes by which a corporation is controlled and directed. It involves balancing the many interests of the stakeholders of a corporation. Modern insights from corporate governance go beyond financial factors.

As corporate ownership varies around the world, so do corporate governance challenges. The Anglo-Saxon countries typically have firms with dispersed shareholders and active share trading in stock markets. Table 5 indicates that the UK, the USA, Australia and Canada fit this picture (first column). The shareholder model (Sustainable Finance 1.0) is the leading model in these common law countries. In this setting, the classical *agency theory* focuses on conflicts of interests between owners (i.e. shareholders) as principals and managers as agents (Jensen and Meckling, 1976). Does the manager put in enough effort? Does he or she act in the interest of the shareholder? Solutions are found in the control and incentivisation of managers. Examples are contracts for a limited term (typically four years) and performance related pay, as discussed in Chapter 3. A strong element of the shareholder model is the accountability of management and the scope for correction, such as the removal of management or takeover of the company in case of underperformance. At the same time, the focus can be too much on short-term shareholder interests only.

By contrast, mainland Europe and Asia have more firms with controlling shareholders, which may disadvantage minority shareholders. A case in point is the illegal business practice of tunnelling, whereby a controlling shareholder directs company assets to himself or herself for personal gain (e.g. to other parts of their business group) at the expense of minority shareholders (Bae *et al*, 2002). Strong shareholder protection

measures are then a solution to protect minority shareholders. The controlling shareholder, often the family or the state (see Table 5), can directly appoint the manager. In these civil law countries, the market for corporate control is less active and management is held less accountable and more entrenched than in common law countries. As a result, intervention in underperforming companies can be delayed. Examples of these countries are Germany, France and South Korea in Table 5. The civil codes typically embrace the interest of a broad set of stakeholders, notably employees. An interesting example is the recent adjustment of the Dutch corporate governance code, which now includes long-term value creation for its various stakeholders as an objective of companies.

TABLE 5. *Corporate ownership around the world*

Country	Widely Held	Family	State	Financial	Corporate	Miscellaneous
United Kingdom	0.90	0.05	0.00	0.05	0.00	0.00
United States	0.80	0.20	0.00	0.00	0.00	0.00
Australia	0.55	0.10	0.05	0.05	0.25	0.00
Canada	0.50	0.30	0.00	0.00	0.15	0.05
Japan	0.50	0.10	0.05	0.00	0.00	0.35
Switzerland	0.50	0.40	0.00	0.05	0.00	0.05
Ireland	0.45	0.15	0.00	0.05	0.05	0.30
South Korea	0.40	0.35	0.15	0.00	0.05	0.05
Germany	0.35	0.10	0.30	0.25	0.00	0.00
France	0.30	0.20	0.20	0.20	0.10	0.00
Netherlands	0.30	0.20	0.05	0.00	0.10	0.35
Finland	0.15	0.10	0.35	0.25	0.00	0.15
Italy	0.15	0.20	0.50	0.00	0.00	0.15
Spain	0.15	0.25	0.45	0.15	0.00	0.00
Denmark	0.10	0.35	0.20	0.05	0.00	0.30
Hong Kong	0.10	0.70	0.05	0.05	0.00	0.10
Austria	0.05	0.15	0.70	0.00	0.00	0.10
Greece	0.05	0.65	0.30	0.00	0.00	0.00
Israel	0.05	0.50	0.40	0.00	0.05	0.00
New Zealand	0.05	0.45	0.25	0.05	0.20	0.00
Norway	0.05	0.25	0.40	0.10	0.00	0.20
Singapore	0.05	0.45	0.45	0.00	0.00	0.05
Argentina	0.00	0.65	0.20	0.10	0.05	0.00
Belgium	0.00	0.50	0.05	0.35	0.00	0.10
Mexico	0.00	1.00	0.00	0.00	0.00	0.00
Portugal	0.00	0.50	0.25	0.20	0.00	0.05
Sweden	0.00	0.55	0.10	0.30	0.00	0.05
Sample average	0.24	0.35	0.20	0.08	0.04	0.09

Note: The table classifies countries according to corporate ownership. The table presents means for each variable using 10 per cent as the criterion for control for a sample of the largest 20 largest firms in 27 countries.

Source: La Porta, Lopez-de-Silanes and Shleifer (1999).

SOCIETAL TEST AND FIDUCIARY DUTY

The challenge is to combine the best of both worlds: the accountability of the shareholder model in which a takeover is possible in case of structural underperformance, and the broad approach of the stakeholder model that incorporates all interests. Our proposed *societal cost-benefit analysis*, which includes financial, social and environmental factors based on the total or true value methodology, could be a way forward (see Box 6 in Chapter 2). Management would be required to conduct this societal test for major corporate events such as a takeover or a split of the company. If the societal cost-benefit analysis were positive (i.e. the 'true' value of the combined companies in the case of a takeover or the 'true' value of the separate companies in the case of a split is higher than the 'true' value of the original companies or company), the planned event would go ahead without a blockade of the management or labour council of the target company. By contrast, if the societal test were negative, the target would be allowed to defend itself against the hostile takeover. This approach combines the broader interests of the stakeholder model with the market discipline of the shareholder model.

A societal test is consistent with a trend towards broadening the responsibility of investors and lenders. The High Level Expert Group on Sustainable Finance (2017) proposes a single set of principles of *fiduciary duty* that encompasses sustainability. Fiduciary duty sets out the responsibilities that financial institutions owe to their beneficiaries and clients. The expectation is to be loyal to beneficiary interests, prudent in handling money with care and transparent in dealing with conflicts. The duties of loyalty and prudence are partly codified in several EU directives, but standards vary. The High Level Expert Group recommends that regulatory authorities need to make clear to all involved in the investment and lending chain that the consideration and management of ESG risks is integral to fulfilling fiduciary duty, acting loyally to beneficiaries and operating in a prudent manner.

Moving to shareholder influence, how can investors exert influence on companies in which they invest? Institutional investors have two choices for action when they become unhappy with an investee company: (I) they can engage with management to try to institute change ('voice' or direct intervention); or (II) they can leave the company firm by selling shares ('exit' or divestment) or threaten to leave. As argued before, divestment has less impact because another investor buys the shares. *Engagement* refers to investors' dialogue with investee companies on a broad range of ESG issues.

In a survey of 143 investors, McCahery, Sautner and Starks (2016) report that institutional investors, mostly very large ones with a long-term focus, find voice – especially when conducted behind the scenes – very important; 63 per cent of respondents have engaged in direct discussions with management in the last five years, and 45 per cent have had private discussions with a company's board outside of management's presence. The investor's horizon makes a difference. Long-term investors intervene more intensively than short-term investors. Next, investors who choose engagement do so more often because of concerns over a company's corporate governance or strategy than over short-term issues. These findings support the view that interventions are not primarily conducted by short-term, 'myopic' activists who intend solely to reap short-term gains. In the next sub-section, we discuss how institutional investors can increase their impact by joint engagement.

B. GOVERNING SUSTAINABILITY

A classic problem in environmental economics is the *tragedy of the commons*. This refers to the situation within a shared-resource system when individual users acting independently according to their own self-interest, behave contrary to the common good of all users by depleting that resource through their collective action (Hardin, 1968). Common resources are not only natural resources, which can be depleted, but also the use of the atmosphere or hydrosphere as sinks, which can be overused. A standard approach to preserving a common good is government taxation or regulation (top row of Table 4) or vesting of private property rights.

An example of an international regulatory approach is the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer. The ozone layer in the earth's stratosphere filters ultraviolet solar rays that are harmful to humans. In 1987, 24 governments agreed to phase out chlorofluorocarbons (CFCs) by 2000, leading to a long-term recovery of the ozone layer. The Montreal Protocol is a landmark agreement that has successfully reduced the global production, consumption, and emissions of CFCs and included trade sanctions to achieve the stated goals of the treaty (Velders *et al*, 2007). The treaty negotiators justified the sanctions because depletion of the ozone layer is an environmental problem most effectively addressed at the global level. Without the trade sanctions, there would be economic incentives for non-signatories to increase production, damaging the competitiveness of the industries in the signatory nations as well as decreasing the search for less damaging CFC alternatives.

C. COALITIONS AS AN ALTERNATIVE

However, an exclusive regulatory approach towards curbing carbon emissions has been elusive to date. Ostrom (1990) looked beyond centralised regulation by external authorities or private property rights as the means to govern common pool resources. She offered design principles for how common resources can be governed sustainably and equitably in a community. The central idea is to build coalitions in which their members spontaneously develop rules to govern the use of the common good in question, to monitor members' behaviour, to apply graduated sanctions for rule violators and to provide accessible means for dispute resolution. In sum, the essence of a coalition is that membership is voluntary, but members must follow internal rules. The key to build an effective and inclusive coalition is to define clear group boundaries, whereby the major parties are covered, and to ensure that those affected by the rules can participate in modifying the rules (Ostrom, 1990). As suggested in this book, the rules governing the use of a common good, such as the available carbon budget, should follow a system approach.

The efforts to limit climate change provide an illustration of the proposed system approach. Currently, countries make climate pledges within the framework of the annual conferences of the parties (COPs) to the United Nations Framework Convention on Climate Change (UNFCCC, 2015). The Paris Agreement is an example of a coalition – at the country level – as a means to govern shared resources. The aggregated climate pledges so far (technically called the Nationally Determined Contributions) still imply likely global warming of more than 2°C (UNFCCC, 2016), but there is an expectation that

countries will increase their pledges over time (the *ratchet effect*)¹⁰ as part of predefined five-year review cycles. For instance, within the overall COP framework, companies could introduce a global sub-COP framework with a downward trajectory of corporate carbon budgets under the auspices of the World Economic Forum (WEF) or the World Business Council for Sustainable Development (WBCSD) (see Table 6 and Figure 8)¹¹. Private and public corporations (including utilities) would be included. The starting point could be the pledged carbon reductions of the largest companies (e.g. the Fortune 500). The Bloomberg principles for climate-related financial disclosures could be used for yearly reporting and monitoring of corporate progress (Task Force on Climate-related Financial Disclosures, 2017). This system approach would thus be based on a mix of top-down calculation of the overall sustainable carbon budget and bottom-up declarations of carbon reduction intentions by companies.

As part of their intensifying corporate governance approach, long-term asset managers, such as pension funds and insurance companies, can stimulate companies to operate within the 'system' boundaries and can hold them accountable (Cliff *et al*, 2017). To ensure companies stay within these boundaries or budgets, asset managers also need to report the carbon footprint (as well as other environmental and social dimensions) of their investments. Next, asset managers need to co-operate on engagement with companies by forming investor coalitions on long-term sustainable investment (McNulty and Nordberg, 2016). Examples of long-term investor coalitions include the Principles for Responsible Investment (PRI), Focusing Capital on the Long Term Global (FCLT Global), the Global Impact Investing Network (GIIN) and the Global Alliance for Banking on Values (GABV).

Figure 8 describes the two main coalitions for asset managers, banks and corporates, by outlining their total size, main members and size of the reference group they belong to (respectively, global assets under management, global banking assets and Fortune 500 total revenues). Some of the coalitions are very small in comparison to their benchmark, with a few members making up most of the coalition's total size (for example FCTL Global or GABV). Others are very big, with the five biggest members representing less than 30% of the total (for example PRI, Equator Principles, WEF).

This overview shows that the coalition members are drawn from North America, Europe and Asia. These coalitions thus have the potential to become a global force for change. The long-term focus of these coalitions would include avoiding environmental and social hazards, which materialise over the medium to long term, and grasping the opportunities offered by low-carbon investment, which pays off in the long term. Engagement is a very powerful tool to improve social and environmental standards in the corporate sector, where the social and environmental externalities are caused (Skancke, 2016). The ultimate aim is to steer business to truly sustainable practices spurred by a macro perspective.

10 The ratchet effect refers to escalations in price or production that tend to self-perpetuate. Once prices have been raised, it is difficult to reverse these changes, because people tend to be influenced by the previous best or highest level.

11 This idea emerged in discussions with Patrick Bolton. See also Cliff *et al* (2017): "Where governance of the 'safe operating space of the planet' is absent or ineffective, there is a particular need for metrics and approaches to measurement and allocation that have a chance of achieving acceptance by business and others with the foresight to see that sustaining humankind is dependent on not violating the Planetary Boundaries and is a prerequisite for any future economy."

The largest asset manager, BlackRock with global investments at \$5.1 trillion, is member of both investor coalitions. In his annual letter to CEOs of large companies, Larry Fink, the chief executive at BlackRock, focuses on long-term value creation. From the 2017 annual letter, we take the following extracts for illustration purposes:

“Each year, I write to the CEOs of leading companies in which our clients are shareholders. These clients, the vast majority of whom are investing for long-term goals like retirement or a child’s education, are the true owners of these companies. As a fiduciary, I write on their behalf to advocate governance practices that BlackRock believes will maximize long-term value creation for their investments.

Last year, we asked CEOs to communicate to shareholders their annual strategic frameworks for long-term value creation and explicitly affirm that their boards have reviewed those plans. Many companies responded by publicly disclosing detailed plans, including robust processes for board involvement. These plans provided shareholders with an opportunity to evaluate a company’s long-term strategy and the progress made in executing on it.

BlackRock engages with companies from the perspective of a long-term shareholder. Since many of our clients’ holdings result from index-linked investments – which we cannot sell as long as those securities remain in an index – our clients are the definitive long-term investors. As a fiduciary acting on behalf of these clients, BlackRock takes corporate governance particularly seriously and engages with our voice, and with our vote, on matters that can influence the long-term value of firms. With the continued growth of index investing, including the use of ETFs by active managers, advocacy and engagement have become even more important for protecting the long-term interests of investors.

As we seek to build long-term value for our clients through engagement, our aim is not to micromanage a company’s operations. Instead, our primary focus is to ensure board accountability for creating long-term value. However, a long-term approach should not be confused with an infinitely patient one. When BlackRock does not see progress despite ongoing engagement, or companies are insufficiently responsive to our efforts to protect our clients’ long-term economic interests, we do not hesitate to exercise our right to vote against incumbent directors or misaligned executive compensation.

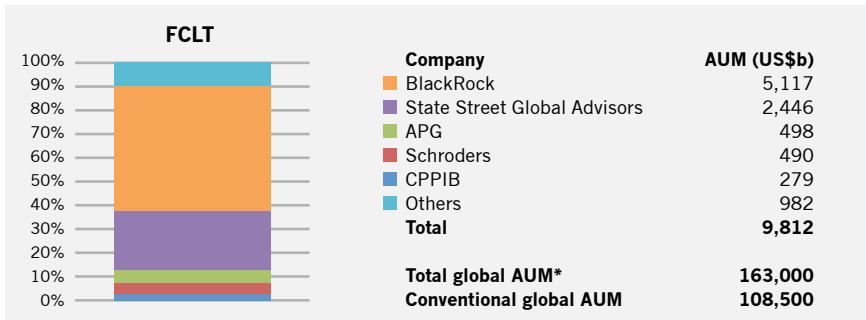
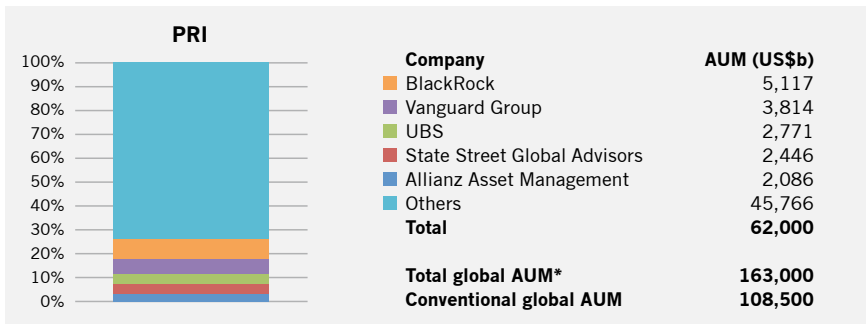
Environmental, social, and governance (ESG) factors relevant to a company’s business can provide essential insights into management effectiveness and thus a company’s long-term prospects. We look to see that a company is attuned to the key factors that contribute to long-term growth: sustainability of the business model and its operations, attention to external and environmental factors that could impact the company, and recognition of the company’s role as a member of the communities in which it operates. A global company needs to be local in every single one of its markets.

BlackRock also engages to understand a company's priorities for investing for long-term growth, such as research, technology and, critically, employee development and long-term financial well-being. The events of the past year have only reinforced how critical the well-being of a company's employees is to its long-term success."

However, there is a gap between what executives of asset managers say in public letters where they stress the need for long-term orientation and broad notions of value creation, and the focus on the current year and financial metrics by their investment analysts and portfolio managers (High Level Expert Group on Sustainable Finance, 2017).

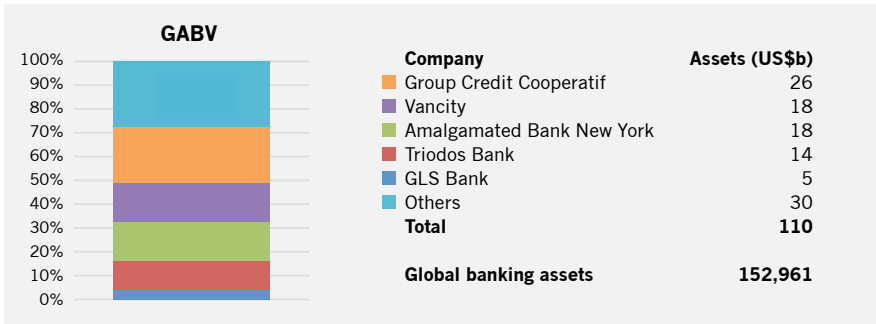
FIG. 8. Coalitions for sustainable finance

Panel A. Asset managers

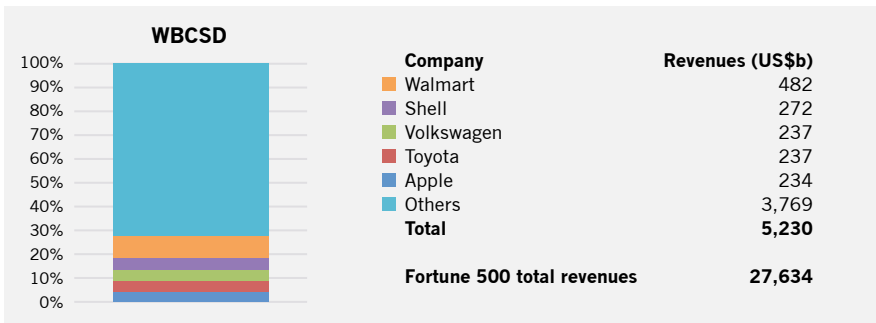
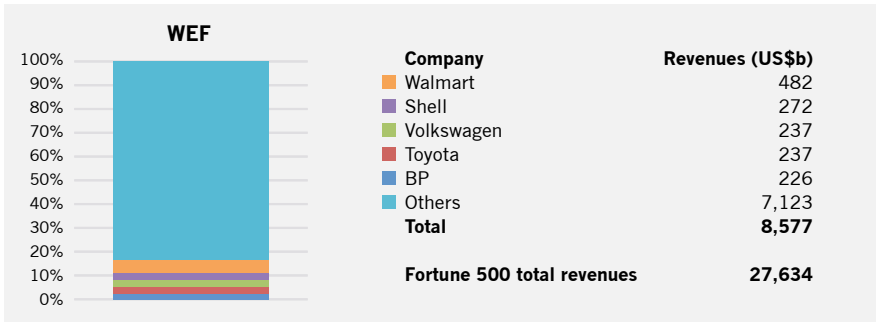


Panel B. Banks





Panel C. Corporaties



Source: See Table 6.

D. REASONS TO JOIN COALITIONS FOR SUSTAINABLE FINANCE

But why would an investor, bank or firm join a coalition? A major reason to join is that members can seize the opportunities of the transition towards a sustainable economy and are thus intrinsically – or even just instrumentally – motivated to work on long-term value creation. Remember, the long-term focus of these coalitions usually includes avoiding social and environmental hazards, which materialise over the medium to long term. These issues are harder to capture in a traditional short-term profit-maximising approach to finance. However, all organisations – especially large ones – are complex. There are various complementary reasons why any given organisation might decide to join a coalition:

- ▶ **Peer effect:** the size of the coalition and the membership of key competitors push other peers to join to avoid a competitive disadvantage in the long term;
- ▶ **Outside pressure:** consumers and NGOs can prompt an organisation to align its Corporate Social Responsibility principles to those of the coalition;
- ▶ **Reputation:** an organisation may want to join a coalition to be identified as a leader in sustainable practices or just to improve the perception of its corporate identity – in some cases it may become an actual marketing operation;
- ▶ **Risk avoidance:** a firm might be incentivised to join in order to avoid the risk of stranded assets (Litterman, 2015);
- ▶ **Collective advocacy:** a coalition is stronger than individual entities in pushing governments to clarify their agendas and lobby for sustainable change. This can help coalition members to reduce policy-related uncertainty over the future value of assets (Skancke, 2016);
- ▶ **Collective engagement:** Dimson, Karakas and Li (2015) provide evidence that collaboration among activist investors is instrumental in increasing the success rate of social and environmental engagements. Coalitions of long-term investors are thus a major force for change through collective engagement with companies.

We recommend further research on building effective coalitions for sustainable finance in parallel with regulatory initiatives to address the social and environmental externalities. Private and public initiatives can reinforce each other. Private action can pave the way for public rules and taxes. In turn, public endorsement can strengthen private coalitions. To start this broad research agenda, we make an initial assessment of the main coalitions for sustainable finance (Table 6). For asset management, we take PRI, FCLT Global and GINN. For banking, we include the Equator Principles for project finance and GABV. For companies, we take WEF and WBCSD.

Even if a new coalition has a clear joint mission or ideology, many issues and undesirable incentives can arise. This can lead the coalition to self-destruct or underperform. The most obvious risk is free riding, whereby an organisation enjoys (part of) the benefits of a coalition's membership without observing its principles and rules. The pioneering work of Ostrom (1990) on the design of institutions for governing common resources can be applied in this context to understand what principles should be followed by a coalition for a proper and effective functioning. In order to make an initial assessment, we follow the design principles developed by Ostrom. Thus we assess each coalition on the following features:

1. **Clearly defined boundaries.** Which percentage of the relevant sector is covered by the coalition?
2. **Membership rules restricting the use of the common good.** How ambitious is the vision of sustainable finance that the coalition applies? Scores range from 1.0 to 3.0 with 3.0 being the most advanced – see Table 3 in Chapter 2.
3. **Collective choice arrangements.** Can individuals or organisations affected by the coalition's operational rules and principles participate in the modification of these rules and principles?
4. **Monitoring.** Is there effective reporting on progress towards meeting the rules and principles, with assessment of the extent to which the rules and principles are followed?
5. **Sanctions and rewards.** How are violations of coalition rules and principles punished; and how is compliance rewarded?

6. **Conflict resolution mechanism.** Do coalition members and their officials have rapid access to low-cost local arenas to resolve conflicts between members or between members and officials?

TABLE 6. Coalitions for sustainable finance

Coalition	Coverage (in %)	Sustainable finance typology	Collective-choice arrangement	Monitoring	Graduated sanctions or rewards	Conflict-resolution mechanisms
PRI	38.0% ¹⁾	1.0 / 2.0	Yes, six principles for responsible investment and mandatory reporting	Yes, assessment reports	Only for the board	No
FCLT Global	6.0% ¹⁾	1.0 / 2.0	No, but collective goal to encourage long-term behaviour in business and investment	Partly, demonstrated commitment to long term value creation for new members	No	No
GIIN	0.05% ¹⁾	3.0	Partly, activities to support impact investing	No	No	No
Equator Principles	30.0% ²⁾	1.0 / 2.0	Yes, principles setting out a framework for managing environmental and social risk in projects	Yes, requirement to report; EP association assesses compliance with reporting requirements, but does not verify content	No, compliance with principles of members	No
GABV	0.07%	2.0 / 3.0	Yes, principles of sustainable banking	Yes, scorecard to measure the economic, social and environmental impact of banks	No	No
WEF	31.0%	1.0 / 2.0	No, but mission based on stakeholder theory, which stresses accountability to all parts of society	No	Only for the managing board	No
WBCSD	18.9%	1.0 / 2.0	Yes, principles of sustainable development	Yes, council reviews and benchmarks annual sustainability report of members	Yes, cessation of membership for non-adherence	Partly, crisis management

Notes: The two or three main coalitions are shown for each group (asset managers, banks; corporates). PRI = Principles for Responsible Investment (supported by the UN); FCLT Global = Focus Capital on the Long Term Global; GIIN = Global Impact Investing Network; GABV = Global Alliance for Banking on Values; WEF = World Economic Forum; WBCSD = World Business Council for Sustainable Development. The coverage is calculated as follows: the assets of members as percentage of global assets under management at conventional, alternative and private wealth funds - for asset managers; as the assets of member banks as percentage of global banking assets - for banks; and as revenues of member Fortune 500 corporates as percentage of total revenues of Fortune 500 corporates - for corporates. The Sustainable Finance typology (1.0, 2.0 and 3.0 from Table 3) is based on the author's assessment. 1) Confining the analysis to global AUM of conventional funds at \$109 billion (instead of global AUM of all funds at \$163 billion), PRI members' assets are 57 per cent of global AUM; FCLT Global members' assets 9 per cent; and GIIN members' assets 0.07 per cent. 2) 89 banks have officially adopted the Equator Principles, covering over 70 per cent of international Project Finance debt in emerging markets.

Source: Website of respective coalitions and author's calculations and assessment.

As we see, there is clearly an inverse relationship between the quality of the sustainable finance typology and the size of the coalition. Table 6 shows that the larger coalitions – covering 20 to 40 per cent of the relevant reference group – sit somewhere between Sustainable Finance 1.0 and 2.0. These coalitions thus include social and environmental factors in their decision-making, at most alongside the financial factor, but do not give priority to them over profits.

However, it is interesting to note that coalition members tend to progressively tighten the coalition principles in subsequent versions, providing a dynamic component – some sort of virtuous cycle. However, not all coalitions even have clear principles guiding the behaviour of their members. PRI and WBCSD have well-defined sustainability principles, which are monitored and are also closer to Sustainable Finance 2.0 than the other coalitions (FCLT Global, the Equator Principles and WEF). Conversely, coalitions adopting Sustainable Finance 3.0 put social and environmental factors first, with financial factors as a viability constraint. The coverage of these advanced coalitions is very small with less than 1 per cent of the relevant group covered. We classify GABV between Sustainable Finance 2.0 and 3.0, because GABV stresses the triple bottom line (2.0) – people, planet and profit – as well as social and environmental challenges (3.0).

A key question for the effectiveness of these coalitions is the monitoring of the coalition members. Here the picture is very diverse. Some coalitions leave monitoring and reporting explicitly to the members (such as the Equator Principles Association), while the WBCSD explicitly reviews and benchmarks its members' annual sustainability reports. Organisations need to map their whole scope tree and monitor not only their direct impact on society and environment, but also that of their clients and of the full value chain. Reporting is a powerful mechanism that brings incentives for concrete action, often even without the threat of sanctions. However, the latter are even more effective and some coalitions do have a sanction-reward system in place. But this is often to a limited extent (for example, only for the board). The WBCSD instead threatens to expel members that do not meet the 'membership conditions' and is the only coalition with a conflict-resolution mechanism. The lack of a system that ensures enforceability is a clear weak spot of many coalitions.

Finally, because short-termism is one of the main barriers to sustainable finance, we recommend that the coalitions should adopt a long-term focus and allow time for new solutions to develop and flourish without quarterly benchmarking.

5 CONCLUSION

Sustainable finance looks at how finance (investing and lending) interacts with economic, social, and environmental issues. This book shows how sustainable finance has the potential to move from finance as a goal (profit maximisation) to finance as a means. In his book *Finance and the Good Society*, Shiller (2012) provides some stimulating examples of how finance can serve society and its citizens by allocating funding to new projects. The same could be done to address the environmental challenges.

This book provides a new framework for sustainable finance. The traditional shareholder model places finance first and has a short-term horizon, while the stakeholder approach seeks to balance the financial, social and environmental aspects and is more focused on the long term. Our assessment of the current system shows that the social and environmental factors are only partly incorporated; the financial factor still dominates. There is also tension between the models. To avoid a fall back to the narrow shareholder model during takeover contests, we recommend application of a societal cost-benefit test when a shareholder-oriented firm tries to take over a stakeholder-oriented firm. The takeover should be approved only if the test indicates a positive total value – based on financial, social and environmental values – for society.

This book also examines obstacles to the adoption of sustainable finance. To address insufficient corporate efforts, governments should adopt appropriate regulation and taxation (e.g. appropriate carbon taxes). Finance is about anticipating such policies and incorporating expectations into today's valuations for the purposes of investment decisions. However, we argue, in line with the United Nations' Sustainable Development Goals, that sustainable development is a joint responsibility of governments, financial and non-financial companies and citizens. We see a strong case for integrating sustainability into strategy and finance.

To counter short-termism, we recommend several incentives to align executive and investor horizons over the longer term. On the executive side, incentive-compatible measures include a more long-term oriented financial reporting structure (moving away from quarterly reporting) and an executive pay structure with deferred rewards and clawback provisions. On the investment side, the investment performance horizon should go beyond the current standard of quarterly benchmarking. Institutional investors can be incentivised to engage with companies by providing loyalty shares if they hold shares in the company for a loyalty period of three, five or ten years.

Finally, we outline how long-term investors can build effective coalitions to engage with, and exert influence on, the companies in which they invest. In this way, long-term investors can steer companies towards sustainable business practices and accelerate the transformation to sustainable development.

ABOUT THE AUTHOR

Dirk Schoenmaker is a Professor of Banking and Finance and Academic Director of the MSc Finance & Investments Advanced programme at Rotterdam School of Management, Erasmus University (RSM). He integrates sustainability in his teaching and research.

Dirk is also a Senior Fellow at the Brussels-based think tank Bruegel, a member of the Advisory Scientific Committee of the European Systemic Risk Board at the ECB and a Research Fellow at the Centre for European Policy Research (CEPR). He has published in the areas of central banking, financial supervision and stability, European financial integration and sustainable finance.



Dirk is author of *Governance of International Banking: The Financial Trilemma* (Oxford University Press) and co-author of the textbook *Financial Markets and Institutions: A European perspective* (Cambridge University Press). Dirk Schoenmaker studied business economics and law at Erasmus University and earned his PhD in economics at the London School of Economics.

Before joining RSM, Dirk was Dean of the Duisenberg School of Finance from 2009 to 2015. From 1998 to 2008, he served at the Netherlands Ministry of Finance. In the 1990s he served at the Bank of England. He is a regular speaker at academic and professional conferences and consultant for the International Monetary Fund (IMF), the Organisation for Economic Co-operation and Development (OECD) and the European Commission.

LIST OF ABBREVIATIONS

ASC	Advisory Scientific Committee
AUM	Assets under Management
CFCs	Chlorofluorocarbons
COP	Conference of the Parties of a UN Convention
ESG	Environmental, social and governance criteria
EU	European Union
GABV	Global Alliance for Banking on Values
GIIN	Global Impact Investing Network
FCLT Global	Focus Capital on the Long Term Global
FV	Financial Value
IAS	International Accounting Standard
IASB	International Accounting Standards Board
IOSCO	International Organisation of Securities Commissions
IIRC	International Integrated Reporting Council
NGO	Non-Governmental Organisation
PRI	Principles for Responsible Investment
SDGs	Sustainable Development Goals
SEV	Social-Environmental Value
SF	Sustainable Finance
SRI	Socially Responsible Investing
TV	Total or True Value
UCISS	Undertakings for Collective Investments in Sustainable Securities
UCITS	Undertakings for Collective Investments in Transferable Securities
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
WBCSD	World Business Council for Sustainable Development
WEF	World Economic Forum

GLOSSARY

A general glossary of key concepts applied in the fields of finance and sustainability.

Abundant natural resources refers to the plentiful availability of natural resources like minerals, metal ores, fossil fuels, land and freshwater

Adaptive markets hypothesis implies that the degree of market efficiency depends on an evolutionary model of individuals adapting to a changing environment

Agency theory looks at conflicts of interest between people with different interests in the same assets. An important conflict is that between shareholders and managers of companies

Boundary problem indicates that when regulation for one sector is tightened, business will shift to other sectors with fewer or no requirements

Carbon stress tests employ climate scenarios to identify overexposures to and concentrations in carbon intensive assets

Clawback provision is a provision in executive compensation whereby an employer takes back money that has already been disbursed

Common good refers to what is shared and beneficial for all or most members of a given community

Corporate governance refers to the mechanisms, relations and processes by which a corporation is controlled and is directed. It involves balancing the many interests of the stakeholders of a corporation.

Deferred reward principle states that pay (reward) for exerting effort in the current period is spread over the current and future periods to achieve intertemporal risk-sharing

Efficient markets hypothesis states that stock prices incorporate all relevant information and thus on average reflect the long-term fundamental value of the firm

Engagement refers to investors' dialogue with investee companies on a broad range of environmental, social and governance (ESG) issues

Environmental issues or ecological issues are issues, abiotic or biotic, that influence living organisms; see planetary boundaries for the most critical environmental issues

Externalities refer to consequences of activities, which affect other (or third) parties without this being reflected in market prices

Fair financial return preserves at the minimum the (real) value of capital

Fallacy of composition arises when one concludes that something is true of the whole from the fact that it is true of every part

Fiduciary duty sets out the responsibilities that financial institutions owe to their beneficiaries and clients. The expectation is to be loyal to beneficiary interests, prudent in handling money with care and transparent in dealing with conflicts

Inside-out perspective asks how business can reduce their social and environmental impact (micro dimension); this perspective contrasts with the outside-in perspective

Legitimacy theory indicates that corporates aim to legitimise their corporate actions to get approval from society and thus to ensure their continuing existence

Linear production and consumption system is based on extraction of raw materials (take), processing into products (make), consumption (use) and disposal (waste)

Loyalty shares provide an additional reward to shareholders if they have retained their shares for a contractually specified period of time, the loyalty period (e.g. three years)

Outside-in perspective asks how business can contribute effectively to solving social and environmental challenges (macro dimension)

Planetary boundaries framework consists of the boundaries of the nine productive ecological capacities of the planet within which humanity can continue to develop and thrive for generations to come; these boundaries include climate change, biosphere integrity, land-system change, freshwater use, biochemical flows, ocean acidification, atmospheric aerosol loading, stratospheric ozone depletion and novel entities

Precautionary principle states that an action should not be taken (or a boundary should not be crossed) if the consequences are uncertain and potentially dangerous

Ratchet effect refers to escalations in price or production that tend to self-perpetuate. Once prices have been raised, it is difficult to reverse these changes, because people tend to be influenced by the previous best or highest level

Resilience of a system (e.g. an ecosystem or organisation) is the adaptive capacity of a system to deal with unpredictable shocks

Scenario analysis is a process of analysing possible future events by considering alternative possible outcomes

Shareholder value approach means that the ultimate measure of a corporate's success is the extent to which it enriches its shareholders

Short-termism refers to myopic behaviour of executives and investors, focusing on the short term

Social foundations consist of the top 11 social priorities, grouped into three clusters, focused on enabling people to be: 1) well: through food security, adequate income, improved water and sanitation and healthcare; 2) productive: through education, decent work, modern energy services and resilience to shocks; and 3) empowered: through gender equality, social equity and having political voice

Societal cost-benefit analysis or test refers to the analysis of the joint financial, social and environmental values in the case of a corporate takeover. This test is based on the total or true value methodology

Stakeholder value approach means that a corporate should balance or optimise the interests of all its stakeholders: customers, employees, suppliers, shareholders and the community

Sustainable development means that current and future generations have the resources needed, such as food, water, healthcare and energy, without stressing the Earth system processes

Sustainable finance looks at how finance (investing and lending) interacts with economic, social, and environmental issues

Sustainable retail funds are funds for retail investors with investments based on sustainable criteria

Total or true value is obtained by summing the financial, social and environmental values

Tragedy of the commons refers to the situation within a shared-resource system in which individual users acting independently according to their own self-interest behave contrary to the common good of all users by depleting that resource through their collective action

Tunnelling is a practice whereby a controlling shareholder directs company assets to himself for personal gain (e.g. to other parts of his business group) at the expense of the minority shareholders

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ANNEX

Chapter 2 discusses our three stages of Sustainable Finance. This annex contains the formal objective function for each of these stages. The mathematical expressions show how sustainable finance moves from finance first, to all aspects equal, and finally to social-environmental impact first.

SUSTAINABLE FINANCE 1.0: REFINED PROFIT MAXIMISATION

In Sustainable Finance 1.0, financial institutions maximise profit, while avoiding so-called 'sin' companies with very negative impacts. Investors optimise the financial value FV of their portfolio by increasing profits and decreasing their risk (i.e. the variability of profits), while avoiding excessive negative social and environmental impact by setting a minimum level. The objective function is given by:

$$\max FV = F(\text{profits, risk}) \quad \text{subject to } F'_{\text{profits}} > 0, F'_{\text{risk}} < 0, SEV \geq SEV^{\min} \quad (1)$$

Where FV = financial value = expected current and discounted future profits, SEV = social and environmental value. F'_{profits} is the partial derivative of F with respect to the first term, and F'_{risk} with respect to the second term. This optimisation can be used by investors in a mean-variance framework to optimise their portfolio and by banks and corporates in a net present value formula to decide on financing new projects.

SUSTAINABLE FINANCE 2.0: INTERNALISATION OF EXTERNALITIES

In Sustainable Finance 2.0, financial institutions internalise externalities to avoid risk. To internalise the social and environmental externalities, investors optimise the total or true value TV of their portfolio. The total value is the sum of the financial value, the social value and the environmental value: $TV = FV + SV^p + EV^p$. The superscript p stands for the privately discounted value of the social and environmental impacts. Investors thus optimise the total value TV of their portfolio by increasing their total profits, and decreasing their risk (i.e. the variability of total profits), while not worsening their social and environmental impact SEV^p . The objective function is given by:

$$\max TV = F(\text{total profits, total risk}) \quad \text{subject to } F'_{\text{total profits}} > 0, F'_{\text{total risk}} < 0, \\ SEV^p_{t+1} \geq SEV^p_t \quad (2)$$

Where SEV^p_{t+1} = next period social and environmental impact. In line with the total value methodology, not only profits but also risk are assessed in an integrated way (i.e. integrated across the three values), which includes the covariance between the profits.

SUSTAINABLE FINANCE 3.0: CONTRIBUTING TO SUSTAINABLE DEVELOPMENT

In Sustainable Finance 3.0, financial institutions contribute to sustainable development, while observing financial viability. To foster sustainable development, investors optimise the social-environmental impact or value SEV of their portfolio, which is the sum of the social and environmental value $SEV = SV + EV$, by increasing their impact, and decreasing their risk (i.e. the variability of impact), subject to a minimum financial value FV^{\min} . The objective function is given by:

$$\max SEV = F(\text{impact}, \text{risk}) \quad \text{subject to } F'_{\text{profits}} > 0, F'_{\text{risk}} < 0, FV_{t+1} \geq FV_{t+1}^{\min} \quad (3)$$

The financial viability or minimum financial value can be presented as follows:

$FV_{t+1}^{\min} = (1 + r^{\text{fair}}) FV_t^{\min}$, where $r^{\text{fair}} \geq 0$ is a fair financial return for one period.

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From risk to opportunity: a framework for sustainable finance

The main task of the financial system is to allocate funding to its most productive use. Finance can play a leading role in allocating investment funds and loans to sustainable companies and projects and thus accelerate the transition to a low-carbon, circular economy. Traditional finance focuses on financial return and regards the financial sector as separate from the society of which it is part, and from the environment in which it is embedded. By contrast, sustainable finance considers financial, social and environmental returns in combination. In this book, we provide a new framework for sustainable finance highlighting the move from the narrow shareholder model to the broader stakeholder model.

How can finance contribute to sustainable development? In the allocation role, finance can assist in making strategic decisions on the trade-offs between sustainable goals. Next, investors can exert influence over the companies in which they invest. Long-term investors can thus steer companies towards sustainable business practices. Finally, finance is good at pricing risk for valuation purposes and can thus help to address the inherent uncertainty about environmental issues.

This book also looks at obstacles to adopting sustainable finance, including short-termism and a failure to act collectively. Countering short-termism could include adopting a corporate reporting structure that is more long-term oriented, revised pay structures for executives and incentives such as loyalty shares for long-term investors that reward buy-and-hold strategies. In this way, executives and investors can become aligned in their focus on the longer term. Finally, this book outlines how long-term investors can build effective coalitions to accelerate the transformation to sustainable development.

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