

INVESTING FOR THE COMMON GOOD: A SUSTAINABLE FINANCE FRAMEWORK

Dirk Schoenmaker

Traditional finance focuses solely on financial return and risk. By contrast, sustainable finance considers financial, social and environmental returns in combination. This essay provides a new framework for sustainable finance highlighting the move from the narrow shareholder model to the broader stakeholder model, aimed at long-term value creation for the wider community. Major obstacles to sustainable finance are short-termism and insufficient private efforts. To overcome these obstacles, this essay develops guidelines for governing sustainable finance.

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Investing for the common good: a sustainable finance framework

Dirk Schoenmaker

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FOREWORD

The issue of sustainable development has multiple aspects, all of which need to be considered if sustainability is to be guaranteed. On the environmental front, climate change and depletion of natural resources are two factors that are threatening the earth's ability to regenerate. On the economic front, development that does not pay sufficient attention to income inequality and provision of basic needs to all is a process in danger of imploding. This essay explores the role that finance can play to ensure that investment protects the environment and promotes economic systems that are internally sustainable.

Dirk Schoenmaker argues that seeing the role of finance as one of allocating funding to productive investments in a narrow sense is no longer appropriate. What constitutes 'productive' cannot be independent of a project's environmental and socio-economic impact because there are often trade-offs between short-term profits and long-term impact. What might appear to be a profitable project over a given time period could have negative impacts that might only become apparent in the longer term. This essay discusses these trade-offs in the context of the conflicting objectives of shareholders and other stakeholders: the motivation of

the former to generate profits might at times jeopardise the long-term interests of the latter. This essay shows how that is a consequence of short-termism and a failure to act with the collective interest in mind. But if sustainability is paramount, as it should be, then the shareholders' and stakeholders' motives need to be better aligned.

This essay provides a framework for moving in this direction and offers guidelines to counter short-termism, with an emphasis on incentive-compatible measures for all. Moving from traditional to sustainable finance means having to counter attitudes that are embedded in the ways our economic systems are organised. Shifting away from them requires both new ways of operating but, importantly, new underlying principles that put sustainability centre stage to guide our thinking. It is important that we put this process in motion, and the earlier the better.

*Maria Demertzis, Deputy Director of Bruegel
Brussels, July 2017*

1 INTRODUCTION

The Industrial Revolution, and the development of production processes dependent on fossil fuels that it triggered, has brought prosperity in the form of economic and population growth. At the same time, this evolution 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 and access to education and health care. Mass production and consumption is also stressing the Earth system through pollution and depletion of natural resources. Climate change is now the most pressing ecological constraint.

There is broad agreement on the need for a transition to a low-carbon, circular economy to overcome these environmental challenges. While an early transition – with

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).

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.

Sustainable development is an integrated concept with three aspects: economic, social and environmental. This essay starts by explaining the sustainability challenges that society is facing. On the environmental front, climate change, land-use change, biodiversity loss and depletion of natural resources are destabilising the Earth system. Next, poverty, hunger and lack of health care 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, health care and energy, without stressing the Earth system.

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 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 they invest in. 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.

Table 1: A framework for sustainable finance

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

Source: Bruegel. 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.

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 essay 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 (1.0 in Table 1) would be for financial institutions to avoid investing in companies with very negative impacts, such as tobacco, cluster bombs or 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 models. 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 (very) 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).

This essay also looks at the obstacles to the adoption of sustainable finance, including a failure to act collectively and short-termism. 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 (eg appropriate carbon taxes). Finance is about anticipating such policies and incorporating expectations into today's valuations for investment decisions.

Possible solutions to counter short-termism are a more long-term oriented corporate reporting structure (moving away from quarterly reporting), pay structure for executives (eg deferred rewards and clawback provisions), investment performance horizons (moving away from quarterly benchmarking) and incentives for long-term investors (eg loyalty shares). It is important to design these measures in an incentive-compatible manner. In this way, executives' and investors' horizons can become more aligned and focused on the longer term.

Finally, this essay 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. In this essay, we develop guidelines for sustainable finance, which are summarised in Box 1.

Box 1: Guidelines for sustainable finance

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 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.

This essay develops 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 (ie 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 (eg 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 (eg 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 cooperate on engagement 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 the asset's 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.
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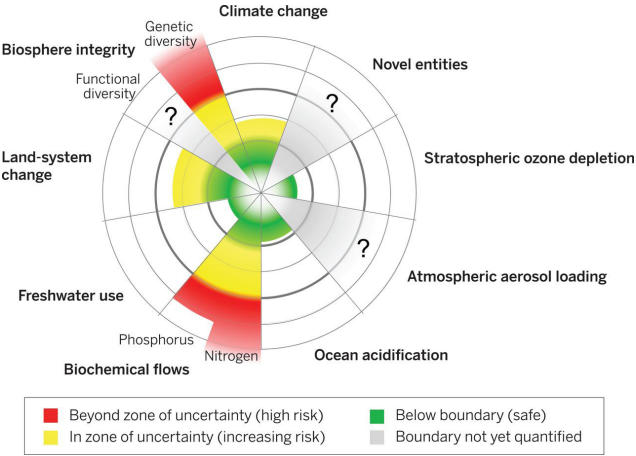
2 SUSTAINABILITY CHALLENGES

2.1 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 at the 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. At 399 ppm in 2015, we have already crossed the planetary boundary of 350 ppm. The upper limit of 450 ppm is consistent with the goal (at a fair chance of 66 percent) to limit global warming to 2° Celsius above the pre-industrial level and lies at the intersection of the yellow and red zones.

Figure 1: The planetary boundaries



Source: Reproduced with permission from 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 water, forests and fisheries, 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.

2.2 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, health care, 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 eleven 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 health care; 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,

health care and energy, without stressing the Earth system processes (Raworth, 2012).

But many people still live 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 below) 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 (eg 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 underinvestment in safety to increase short-term profits.

Box 2: The Deepwater Horizon oil spill

The oil spill from the Deepwater Horizon drilling platform began on 20 April 2010, in the British Petroleum-operated Macondo Prospect in the Gulf of Mexico. An explosion on the drilling rig killed eleven 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 utilising 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 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-setting spill. Notably, the US government's September 2011 report pointed to defective cement on the well, faulting mostly 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 that occurred on 24 April 2013 in Bangladesh. The collapse of the building caused 1,129 deaths, while approximately 2,500 injured people were rescued from the building alive. 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.

2.3 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 (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).

Box 4: UN Sustainable Development Goals (Source: UN, 2015)

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

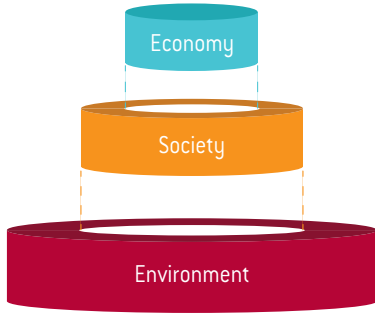
Environmental goals

- 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

Figure 2: Sustainable development challenges at different levels



Source: Adapted from Rockström and Sukhdev (2015).

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.

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.

Another cross-system interaction is global warming leading to more and more-intense disasters, such as storms, flooding and droughts. The low and middle-income countries

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

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 expenditures 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 ecosystem, because the melting of the ice cap could increase the pace of global warming (by reducing the refraction of solar radiation, which is 80 percent from ice, compared with 30 percent from bare earth and 7 percent from the sea) and of rising sea levels. These feedback mechanisms are examples of tipping points and shocks, which might happen.

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

3 A FRAMEWORK FOR SUSTAINABLE FINANCE

3.1 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 regarding which sectors and projects are eligible for lending and which not. Similarly, investment funds set their investment strategies, which direct choices over which assets to invest in and which assets to not 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 also can have an influence over 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 3.2, 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.

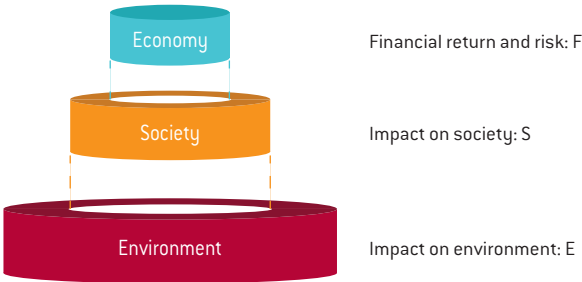
Finance is good at pricing the risk of future cash flows for valuation purposes. As there is inherent uncertainty about environmental issues (eg exactly how rising carbon emissions will affect the climate, and the timing and shape of climate mitigation policies), risk management can help to deal with these uncertainties. *Scenario analysis* is increasingly used to assess the risk and valuation under different scenarios (eg climate scenarios; see Caldecott *et al*, 2014). 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, as sustainability is about the future. The remainder of this section and section 4 discuss the appropriate horizon for sustainable finance and ways to overcome the bias towards short-termism.

3.2 Three stages of sustainable finance

How can finance support sustainable development? 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.

Figure 3: Managing sustainable development



The concept of sustainable finance has evolved as part of the broader notion of business sustainability over the last few decades (eg Whiteman *et al*, 2013). Table 2 shows our typology for sustainable finance. The evolution highlights the broadening from *shareholder value* to *stakeholder value* (or triple bottom line: people, planet, profit). The final stage looks at the creation of common good value. To avoid the dichot-

omy 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. Next, the ranking indicates a shift from economic goals first to societal and environmental challenges (the common good). 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 financial return and risk combination. Table 2 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/quarterly benchmarking of investment performance (see section 4). 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 3.3 to 3.5 discuss our three stages of Sustainable Finance (SF) (Table 2). 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 2).

Table 2: 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

Source: Bruegel. 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.

3.3 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 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 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 3.5). 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 through setting a norm for acceptable standards.

A slightly more positive variant of the refined shareholder value approach is that financial institutions and companies put systems in place for energy and emissions management, sustainable purchasing, green IT, green building and infrastructure, diversity and old age 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.

3.4 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 (eg 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.

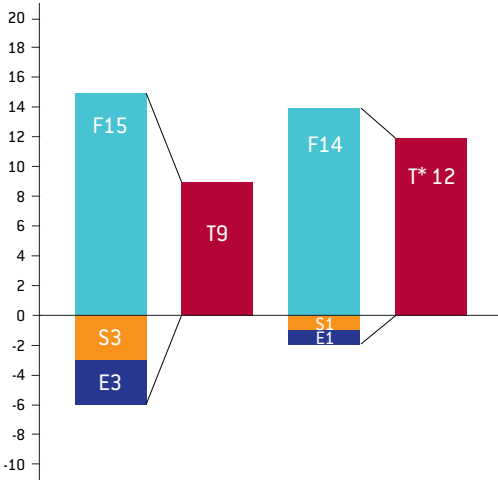
Attaching a financial value to social and environmental impacts facilitates the optimisation process among the different aspects (F, S, E). Innovations in technology (measurement, information technology, data management) and science (life-cycle analyses, social life-cycle analyses, environmentally extended 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 section 2, 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.

Figure 4: From financial value to total value



Source: Bruegel. 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, 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 (Source: True Price, 2014)

A true price analysis was conducted to identify a business case for sustainable rose farming (True Price, 2014). The study covered T-hybrid roses of 20 grams 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 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 mainly stemmed 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 on 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 would 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.

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, 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 substitutable. Next, working out total value can lead to

perverse outcomes: the negative environmental impact of deforestation, for example, can be offset by large economic gains (legitimising destruction). To avoid these outcomes, we incorporate the 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.

3.5 SF 3.0: Contributing to sustainable development, while observing financial viability

Sustainable Finance 3.0 moves from risk to opportunity. Rather than avoiding (very) 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, green 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 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 percent primarily target risk-adjusted, market-rate returns. Of the remainder, 25 percent primarily target below market-rate returns that are closer to market-rate returns, and 16 percent target returns that are closer to capital preservation. So the great majority pursues market, or close to market, returns, 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 (eg 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, it is *ex ante* 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 section 5).

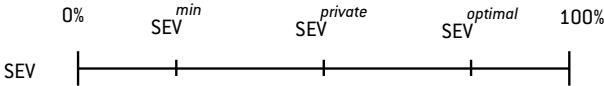
Moving to corporate governance, *legitimacy theory* underpins Sustainable Finance 3.0. Legitimacy theory indicates that companies aim to legitimise their corporate actions in order to obtain approval from society and thus, to ensure their continuing existence (Omran and Ramdhony, 2015). This social licence 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.

3.6 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, which

deliver this maximised social-environmental value, are eligible for investment (inclusion list).

Figure 5: Levels of social-environmental value (SEV)



Source: Bruegel. 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, as 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 percent of financial institutions and 20 percent of companies adopt sustainable principles in their investment and business practices (see Table 4). But these firms are only partly (fraction α) maximising total value. They are somewhere in 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 percent ($\alpha = 0.1$). This implies that we are 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 percent (Table 4).

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 to take over 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 stable 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 (shareholder model). Meanwhile, Unilever is better known for its strong brands and presence in some of the biggest emerging markets. Under its chief executive, Paul Polman, Unilever attempted to focus on

better balancing profitability with social and environmental sustainability (stakeholder model).

This was a big take-over 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 big financier behind Kraft Heinz, did not approve a hostile takeover and stopped the bidding of Kraft Heinz for Unilever.

In the aftermath of the aborted take-over, a debate started 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 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 fairness opinion of an investment bank as to whether 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.

4 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 3 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 investors⁴ and companies, we include also governments, civil society (NGOs) and households in Table 3 for completeness. This section discusses two main obstacles to sustainable finance: insufficient collective effort and a bias towards the short term. Section 5 discusses the opportunities for sustainable finance.

⁴ We use the term investors as shorthand for financial institutions, including pension funds, insurance companies, fund managers, private equity and banks.

Table 3: Players in sustainability

Player	Sphere of influence	Horizon	Mechanisms	Leading organisations and cooperation forums	Opportunities	Threats
Government	Country / Global	Up to 4 years	Strong leadership role <ul style="list-style-type: none"> • Taxation • Regulation 	United Nations: UNFCCC COP, New York	Economy wide impact Public role in energy and infrastructure	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 	Oxfam, Oxford Amnesty International, London Greenpeace, Amsterdam WWF, Washington DC	Agenda setting Stimulate citizenship of investors and corporates	Single issue Fragmentation Dependent on goodwill of (local) government
Investors	Investments	From ST to LT	Long term investors <ul style="list-style-type: none"> • Investment strategy • Lending strategy • Engagement 	PRI, London FCLT Global, Boston GINN, New York GABV, Zeist	Stimulate corporate sustainability Stewardship and engagement	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

Player	Sphere of influence	Horizon	Mechanisms	Leading organisations and cooperation forums	Opportunities	Threats
Corporates	Value chain of production	From MT to LT	Key players for transformation <ul style="list-style-type: none"> • Procurement • Production process 	WEF, Davos WBCSD, Geneva	Reputation building Sound and stable business practices	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	Steer corporates Steer investments Vote for policies	Poverty Lack of trust in government Environmental degradation Free rider behaviour Human aversion to change

Source: Bruegel. Note: Only a few of the main cooperation 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.

4.1 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 (macro) from the fact that it is true of every part (micro). 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 spur sustainable development, and call for a system perspective, which we explore in section 5.

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 percent of companies are actively managing their carbon footprints to some extent (Table 4). 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 coordination problem) in environmental regulation. Other examples are national regulations for products, which companies can circumvent by relocating production to less-strict countries. A solution to this problem might be the use of product or activity-based regulation (Schoenmaker and Wierdsma, 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 as an input either in the production or in the use of their products (eg car manufacturers) 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 low-carbon transition. 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 (eg car-sharing schemes) are emerging. The role of private coalitions for sustainable finance is explored in section 5.

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 wider public (eg more catastrophic weather events, droughts and flooding in countries close to the equator, 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 of Tesla and in solar technology. China, India and Mexico, for example, face similar, or even worse, air pollution today, which may

prompt at some point 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.

4.2 Short-termism

The tragedy of the horizon is a major obstacle to sustainable finance (Carney, 2015). The costs of action are borne now, while the benefits are 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 horizons that managers and investors in conventional finance work to are mostly short-term. As indicated in the right-hand column of Table 3, several practices reinforce *short-termism* (which we deal with in turn later in this section):

- Quarterly financial reporting by companies;
- Variable pay systems based on annual results;
- Monthly or quarterly benchmarks for measuring investor performance;
- Marking-to-market of investments;
- Supervisory treatment of illiquid investments.

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, 2015). 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, as not enough investors are examining these new risks⁵.

5 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.

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 ten-year economic value added, 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 periodic integrated report about value creation over time, and related communications regarding aspects of 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 the reported information differs 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 use by companies in providing

information about their climate-related financial risks to investors, lenders and insurance underwriters (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.

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. 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 provi-

sions 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

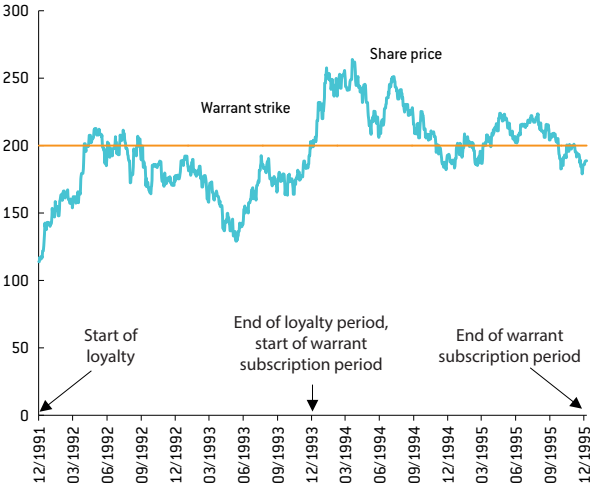
Fund managers are evaluated on a regular basis against performance benchmarks. The quarterly relative performance monitoring to which many funds and fund managers are subject results in the adoption of short-termist attitudes and approaches to the management of funds (Baker, 1998). Moreover, a greater 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 (eg 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 incentives for investors to hold their shares for the long-term is that it facilitates engagement of (institutional) investors with companies (see section 5).

An early example of a loyalty share 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 (ie 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 6).

Figure 6: Call warrant for loyal shareholders (Michelin share price and warrant strike)



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.

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, Sapra 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 can be in particular at work 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, Sapra 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 junior assets trading in liquid markets, such as traded stocks, marking-to-mar-

ket 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 (ie impairments).

In the aftermath of the global financial crisis, the international accounting standard for financial instruments (IAS 39) was amended to exempt financial instruments from fair value accounting, when they are managed on an amortised cost basis in accordance with a financial firm's business model. To keep the appropriate perspective, the fair value discussion focuses on a subset of assets (ie 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 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 (eg 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 on a daily basis, 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 on a frequent basis. The results are only visible after a period of time. Land restoration projects, for example, have a horizon of twenty years (Ferwerda, 2016). When regulated financial institutions hold an investment to maturity, solutions 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 (eg 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 funds⁶

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. 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 finan-

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

cial 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 notion that only listing provides sufficient liquidity be revised into a concept of ‘liquidity that ensures a balanced control of in- 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 different 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 reach out to retail investors, the European Commission could prepare legislation for setting up liquid, sustainable retail investment funds or undertakings with a 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, ie balanced control of in- and outflow of cash by fund managers. Finally, UCISS would incorporate a definition of eligible investments that meet enforceable sustainability criteria.

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 percent, 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 (eg clawback provisions and deferred rewards) and incentives for long-term investors (eg loyalty shares). Moreover, the reliance on mark-to-market valuations should be reduced.

5 COALITIONS FOR SUSTAINABLE FINANCE

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. Common resources are not only natural resources, which can be depleted, but also the use of the air or water as sinks, which can be overused. A standard approach to preserve a common good is government taxation or regulation (top row of Table 3) or vesting of private property rights. However, an exclusive regulatory approach towards curbing carbon emissions has been elusive to date.

5.1 Coalitions as an alternative

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, which develop rules governing the use of the common good, monitor members' behaviour, use graduated

sanctions for rule violators and provide accessible means for dispute resolution. 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 essay, the rules governing the use of a common good, such as the available carbon budget, should follow a system approach.

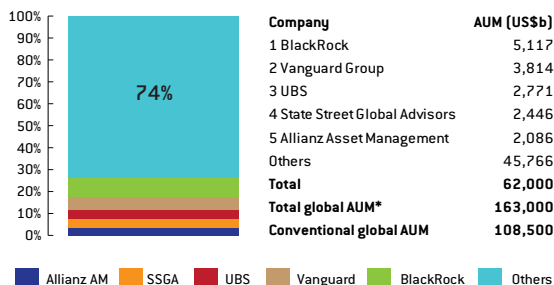
The efforts to limit climate change provide an illustration of the proposed system approach. Currently, countries make climate pledges within the framework of the annual conferences of the parties (COPs) to the United Nations Framework Convention on Climate Change (UNFCCC, 2015). The aggregated climate 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)⁷ 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 4 and Figure 7)⁸. Private and public corporations (including utilities) would be included.

7 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.

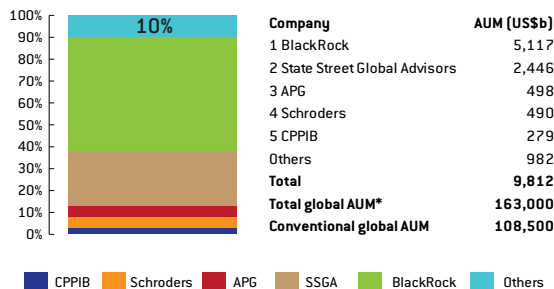
8 This idea emerged in discussions with Patrick Bolton.

Figure 7: Coalitions for sustainable finance

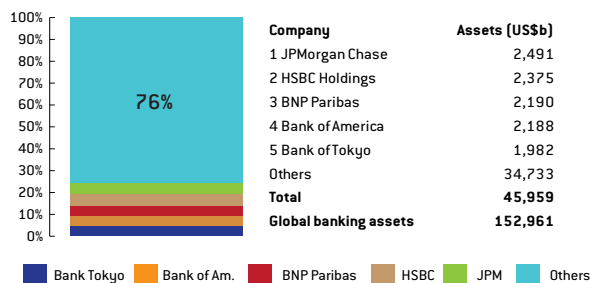
Asset managers: Principles for Responsible Investment



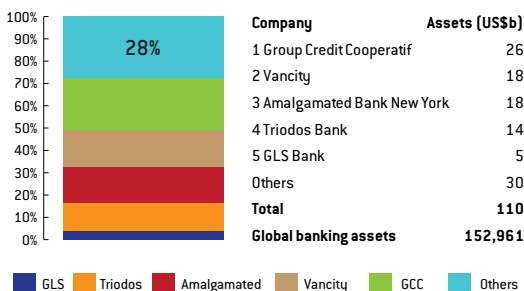
Asset managers: Focusing Capital on the Long Term Global



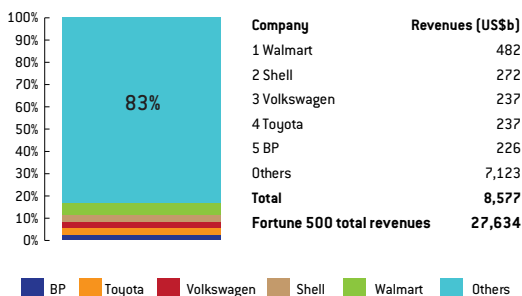
Banks: Equator Principles



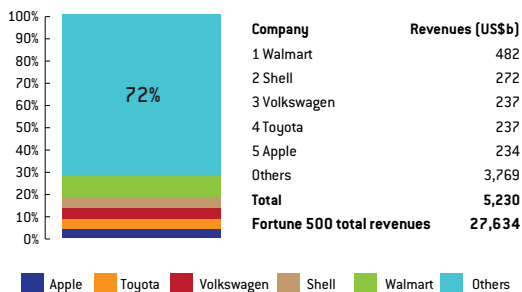
Banks: Global Alliance for Banking on Values



Corporations: World Economic Forum



Corporations: World Business Council for Sustainable Development



Source: See Table 4.

The starting point could be the pledged carbon reductions of the largest companies (eg 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. 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 cooperate on engagement with companies by forming investor coalitions on long-term sustainable investment (McNulty and Nordberg, 2016). Examples of long-term investor coalitions are the Principles for Responsible Investment (PRI), Focusing Capital on the Long Term Global (FCLT Global), the Global Impact Investing Network (GINN) and the Global Alliance for Banking on Values (GABV). Figure 7 provides an overview of these investor coalitions, including the five largest members. This overview shows that the members are drawn from North America, Europe and Asia. These coalitions have thus 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.

5.2 Reasons to join coalitions for sustainable finance

What are the incentives for long-term investors to join these emerging coalitions for sustainable finance? One incentive is that members can seize the opportunities of the transition towards a sustainable economy. The members of PRI, FCLT Global, GIIN, GABV and WBCSD are intrinsically motivated to work on long-term value creation (see Table 4). Other investors might be prompted by NGO campaigning and/or pressure from their peers to join these coalitions. Next, investors might be incentivised to join in order to avoid the risk of stranded assets (Litterman, 2015). Collective advocacy by an investor coalition to push governments to clarify their agendas on, for example, climate mitigation (including timing of regulations and taxes) could reduce policy-related uncertainty over the future value of assets (Skancke, 2016). Such clarity over future policies would also help to stimulate investment in new clean technologies and projects. Finally, Dimson, Karakas and Li (2015) provided evidence that collaboration among activist investors is instrumental in increasing the success rate of social and environmental engagements.

As a follow-up to the pioneering work of Ostrom (1990) on design of institutions for governing common resources, 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 4). 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. Following the design principles developed by Ostrom (1990), we examine the following features of the coalitions:

1. Clearly defined boundaries: which percentage of the relevant group is covered by the coalition;
2. Congruence between provision rules and local conditions: membership rules restricting the use of the common good are related to local conditions; this can be translated into the sustainable finance typology that the coalition follows;
3. Collective choice arrangements: individuals affected by the operational rules and principles can participate in the modification of these rules and principles;
4. Monitoring: reporting on meeting the rules and principles and assessment of the extent to which the rules and principles are followed;
5. Sanctions and rewards: how to punish violations by members or to reward those members that comply; and
6. Conflict resolution mechanism: members and their officials have rapid access to low-cost local arenas to resolve conflicts between members or between members and officials.

Table 4: 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 responsibility 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

Coalition	Coverage (in %)	Sustainable finance typology	Collective-choice arrangement	Monitoring	Graduated sanctions or rewards	Conflict- resolution mechanisms
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, cease of membership in case of non-adherence	Partly, crisis management

Source: Bruegel. 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 2) 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 percent of global AUM; FCLT Global members' assets 9 percent; and GIIN members' assets 0.07 percent.

2) 89 banks have officially adopted the Equator Principles, covering over 70 percent of international Project Finance debt in emerging markets.

Table 4 shows that the larger coalitions – covering 20 to 40 percent of the relevant reference group – are somewhere between Sustainable Finance 1.0 and 2.0. These coalitions include social and environmental factors in their decision-making, alongside the financial factor. It is interesting to note that members progressively tighten the principles in subsequent versions, providing a dynamic component to these coalitions – some sort of virtuous cycle. However, not all coalitions have clear principles guiding the behaviour of their members. PRI and WBCSD have well-defined sustainability principles, which are also monitored and are closer to Sustainable Finance 2.0 than the other coalitions (FCLT Global, the Equator Principles and WEF). Next, the coalitions adopting Sustainable Finance 3.0 put social and environmental factors first and the financial factor second. The coverage of these advanced coalitions is very small with less than 1 percent of the relevant group covered. We classify GABV in between Sustainable Finance 2.0 and 3.0 as GABV stresses the triple bottom line (2.0) – people, planet and prosperity – as well as social and environmental challenges (3.0). There is clearly an inverse relationship between the degree of sustainability and the size of the coalition.

A key aspect is monitoring of the coalition members. On this feature, the picture is very diffuse. Some coalitions leave monitoring and reporting explicitly to the members (eg the Equator Principles Association), while the WBCSD explicitly reviews and benchmarks its members' annual sustainability reports. The WBCSD even threatens to expel members that do not meet the 'membership conditions'. Most of the coalitions have a conflict resolution mechanism. Only the WBCSD has a mechanism for conflicts of interests and can form a crisis management team.

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

6 CONCLUSIONS

Sustainable finance looks at how finance (investing and lending) interacts with economic, social, and environmental issues. This essay 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 essay 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 only be approved if

the test indicates a positive total value – based on financial, social and environmental values – for society.

This essay also examines obstacles to the adoption of sustainable finance. To address insufficient corporate efforts, governments should adopt appropriate regulation and taxation (eg appropriate carbon taxes). Finance is about anticipating such policies and incorporating expectations into today's valuations for the purposes of investment decisions. 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.

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Dirk Schoenmaker is a Senior Fellow at Bruegel. He is also a Professor of Banking and Finance at Rotterdam School of Management, Erasmus University Rotterdam. He is a member of the Advisory Scientific Committee of the European Systemic Risk Board at the European Central Bank and a Research Fellow at the Centre for European Policy Research. He has published in the areas of central banking, financial supervision and stability, European financial integration and climate change.

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Bruegel, Rue de la Charité 33,
B-1210 Brussels
(+32) 2 227 4210
info@bruegel.org
www.bruegel.org
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