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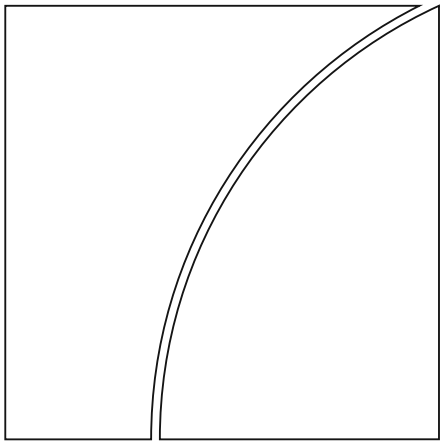

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A taxonomy of sustainable finance taxonomies

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A taxonomy of sustainable finance taxonomies[1]

Principles for effective taxonomies and proposed policy actions

Torsten Ehlers*, Diwen (Nicole) Gao**, Frank Packer*

Abstract

Sustainable finance taxonomies can play an important role in scaling up sustainable finance and, in turn, in supporting the achievement of high-level goals such as the Paris Accord and the UN sustainable development goals. This paper develops a framework to classify and compare existing taxonomies. Several weaknesses emerge from this classification and comparison, including the lack of usage of relevant and measurable sustainability performance indicators, a lack of granularity and lack of verification of achieved sustainability benefits. On this basis, the paper proposes key principles for the design of effective taxonomies. The principles are then employed to develop a simple framework for transition taxonomies. The key policy messages of the analysis are: (i) Endeavor that taxonomies correspond to specific sustainability objectives; (ii) Encourage the development of transition taxonomies and focus alignment with the objectives of the Paris Agreement; (iii) Monitor and supervise the evolution of certification and verification processes; and (iv) Shift to mandatory impact reporting for green bonds.

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Executive summary

Scaling up sustainable finance is a key element in raising private financing to support the transition to a sustainable economy. **How should taxonomies be designed to encourage financial flows to sustainable investments and support this transition in the most effective way?**

Before delineating the crucial design features of taxonomies, it is important to establish **what taxonomies are and what they are for**:

A taxonomy for sustainable finance is a set of criteria which can form the basis for an evaluation of whether and to what extent a financial asset can support given sustainability goals. Its purpose is to provide a strong signal to investors, and other stakeholders, and assist their decision making – by identifying the type of information investors need to assess the sustainability benefits of an asset and to classify an asset based on its support for given sustainability goals.

Taxonomies can be classified along four key defining characteristics:

Objective. Which sustainability goals are supported?

Scope. Which activities/industries/entities are included?

Target. How is the purpose translated into a measurable target?

Output. What types of information are provided?

Comparing some major taxonomies across key markets for sustainable finance, the paper finds that existing taxonomies often mix several sustainability goals and provide output that could be more transparent and decision-useful for investors. Key issues are the need for more use of relevant and measurable sustainability performance indicators, a lack of granularity and lack of verification of achieved sustainability benefits.

Based on the above findings, the paper develops **five principles for designing effective taxonomies** and employs those principles to develop a basic design for transition taxonomies – taxonomies that are in line with a transition to reduced carbon emissions consistent with the Paris accord. The principles anticipate a rapidly increasing amount of available sustainability-related data going forward – enabled by increasing sustainability disclosures, collection of data from third parties, and technological innovation in collecting these data.

Our five core principles for designing effective taxonomies are:

- Alignment with high-level policy objectives and measurable interim targets
- Focus on one single objective ("One taxonomy, one objective")
- Outcome-based using simple and disclosed key performance indicators (KPIs)
- Incorporation of entity-based information whenever possible
- Sufficient granularity, covering both high and low sustainability performance

As an example of a granular transition taxonomy, a box based on data collected by the environmental disclosure system CDP assesses the alignment of mutual funds with the Paris goal of limiting post-industrial temperature increases to 1.5 degrees (or even 2 degrees).

In addition to providing clarity to investors and other stakeholders about the sustainability benefits of a given asset, taxonomies following the above principles can **greatly facilitate their comparability and interoperability across different firms and markets – including emerging markets.**

The concluding section lists a number of policy actions that could be taken to increase the information value and the effectiveness of existing taxonomies in channelling financial flows to more sustainable investments:

- Ensure that taxonomies correspond to specific sustainability objectives;
- Encourage the development of transition taxonomies and focus on Paris alignment;
- Monitor and supervise the evolution of certification and verification processes; and
- Shift to mandatory impact reporting for green bonds.

1 The definition and purpose of sustainable finance[2] taxonomies

There is broad consensus that sustainable finance is a key element in supporting the transition to a more sustainable economy. Arguably, less attention has been paid to how taxonomies have to be designed to achieve this goal in the most effective way. In this G20 input paper, we therefore focus on the following key questions:

> *What is a taxonomy and what is its purpose? What are the key dimensions to consider when designing a sustainable finance taxonomy? More generally, what are guiding principles for an effective design?*

In answering these questions, we start with the following definition for a sustainable finance taxonomy:

> *A taxonomy for sustainable finance is a set of criteria that provide the basis for an evaluation of whether and to what extent a financial asset will support given sustainability goals. Its purpose is to provide a strong signal to investors, and other stakeholders, and assist their decision making – by identifying the type of information needed to assess the sustainability benefits of an asset and to classify an asset based on its support for given sustainability goals.*

Our definition implies that the starting point of a taxonomy are sustainability goals (Graph 1). By aligning the sustainability goals with high-level policy objectives (eg carbon emission reduction in line with the Paris agreement), sustainable finance taxonomies can be important instruments for achieving these objectives. In this paper, we take the existence of multiple goals - such as carbon emissions reductions, social objectives etc – as given. Many governments have committed to achieving various sustainability goals such as the carbon emission reduction goals of Paris. Arguably, investors have strongly embraced a number of non-financial benefits in their decision-making as well, as the very rapid growth of green and social bonds as well as ESG-style investment funds suggests.

Our definition is also intended to enhance understanding of what a taxonomy should (and should not) be expected to deliver. A good taxonomy provides a strong signal to investors and other stakeholders and assists their decision making by identifying the non-financial benefits of a given asset. It should mitigate so-called "greenwashing" – the generation of apparent sustainability benefits that are non-existent in practice.[3]

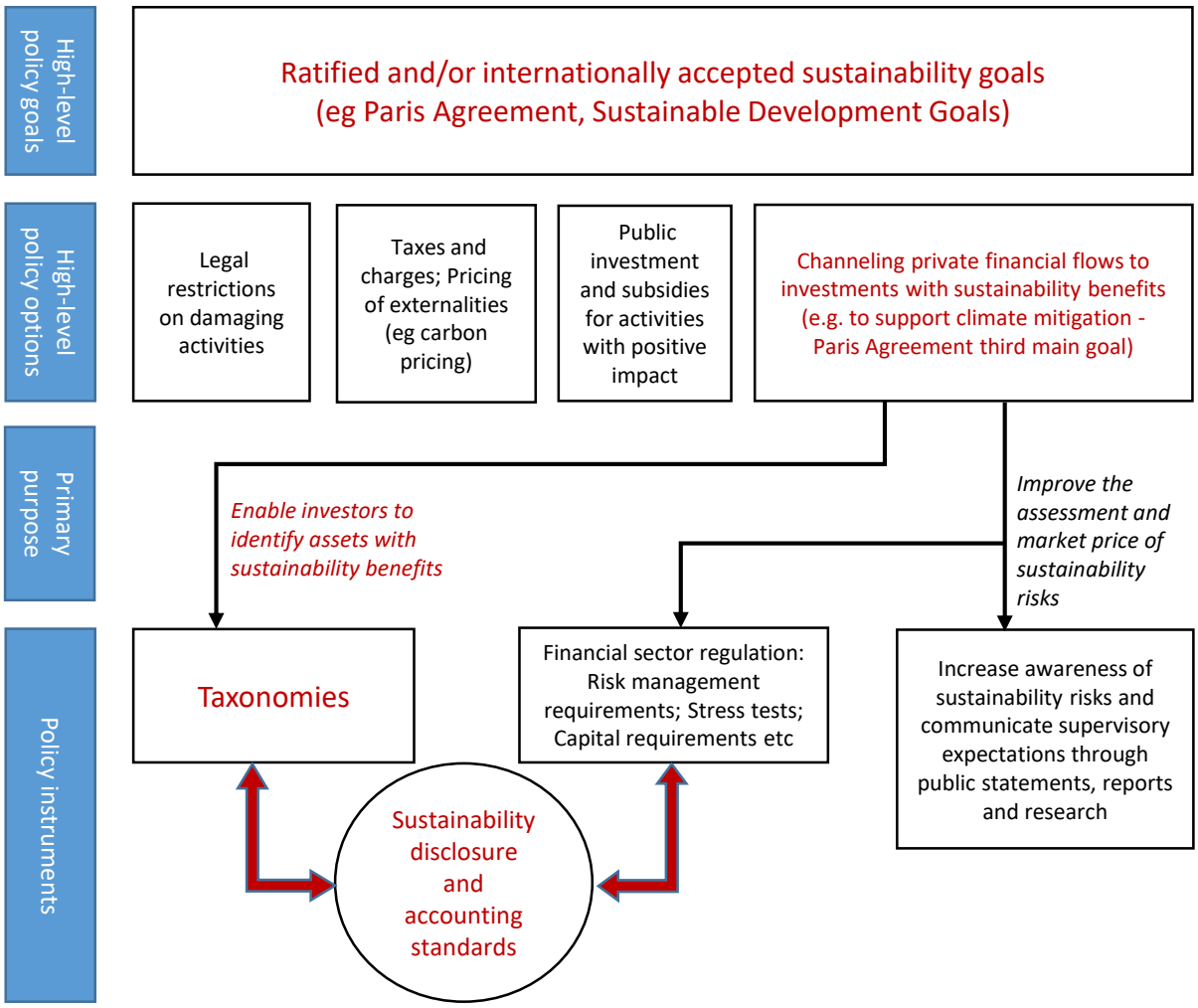
By contrast, taxonomies are not designed for risk management purposes. For instance, to provide a comprehensive assessment of exposures to climate-related risks, would require taking into account interdependencies with investors' and entities' other portfolio holdings, as well as a deeper analysis of the financial impact of possible future shocks. Taxonomies classify a single asset and therefore cannot take into account interdependencies with other assets. Rather, risk management tools such as scenario analysis and stress tests should be integrated into the standard financial risk measures widely in used by both central banks and financial market

[2] While we refer to sustainable finance taxonomies more generally, most of the examples we describe are related to green finance, and in particular to finance aimed at climate change mitigation. We view this focus as consistent with the near-term objectives of the SFWG in 2021.

[3] While "green" is typically used in reference to climate-related issues, the term "greenwashing" is often used in the broader sustainability context.

practitioners. Examples of such tools include the NGFS Climate Scenarios generated by Integrated Assessment Models (IAMs), intended to better monitor and mitigate climate risks before they materialise.[4]

Taxonomies as one policy instrument to achieve high-level sustainability goals Graph 1



Source: Authors' illustration.

Taxonomies are also not necessarily an instrument to implement disclosure requirements, though ideally taxonomies should be based on disclosed data. Disclosure of non-financial data is a prerequisite for an efficient assessment of how an asset complies with the criteria set out in a taxonomy.[5] Taxonomies then use and potentially process this information to classify an asset according to its sustainability benefits. Well-designed taxonomies will of course have positive externalities on other sustainability-related policies and investor needs – for instance in helping to

[4] The Task Force on Climate-Related Risks (TFCR) of the Basel Committee on Bank Supervision (BCBS) focuses on, inter alia, understanding methodologies for measuring and assessing climate related risks.

[5] The Task Force on Climate-related Financial Disclosures (TCFD) established by the Financial Stability Board (FSB) endeavors to develop recommendations for more effective climate-related disclosures.

determine non-financial disclosure requirements. Their primary objective, however, is to provide a strong signal to investors about non-financial benefits of a given asset.

The effectiveness of taxonomies in contributing to sustainability objectives ultimately depends on sustained investor interest in assets that receive a taxonomy-based label. Well-designed taxonomies can not only increase investor interest, but also help to raise market transparency, by reassuring investors that their funding is effectively contributing to defined sustainability goals. As a result, well-designed taxonomies safeguard market integrity by ensuring that those assets that cannot achieve the sustainability benefits required for the label are clearly identifiable by investors. Market integrity, in turn, helps to sustain longer-term investor interest in sustainable finance markets, as well as prod firms that are not so sustainable to improve their performance.

Taxonomies are an important element of sustainability policies, yet they alone are not sufficient to promote expeditious scaling up of climate action and sustainable finance. A coherent and effective system of policy incentives, which can key off of taxonomies, is required to mobilise the full capacity of private sector capital towards sustainable investments. This includes fiscal policy (such as a carbon tax), financial regulatory policy (taking into account climate-related financial risks), as well as central banking operations (including higher haircuts on carbon-intensive assets).

In the next section, we analyse the key dimensions of taxonomies and develop a "taxonomy of sustainable finance taxonomies". This provides a conceptual framework for the purpose of assessing and comparing taxonomies. We will use our taxonomy of taxonomies to contrast the most prominent existing taxonomies—of the EU, China and the Climate Bonds Initiative. In the third section, we develop a basic framework of effective taxonomies and apply it to the development of "transition taxonomies" – a class of taxonomies with the purpose of signalling that assets are aligned with climate transition goals. In this light, we also discuss net-zero alignment measures for asset managers, which have become increasingly popular. The conclusion lists a number of near-term policy actions with a focus on easily implementable measures that could help to make existing taxonomies more effective in supporting the transition to a sustainable economy. As green bonds are currently the most important sustainable finance debt instrument by volume, we argue that impact reports could be an effective measure to increase transparency around green bonds. We also sketch how such impact reports should be designed.

2 A taxonomy of sustainable finance taxonomies

This section delineates four main characteristics of sustainable finance taxonomies by which they may be classified: i) objective; ii) scope; iii) target; and iv) output. These four dimensions allow for a streamlined comparison of sustainable finance taxonomies. With this "taxonomy of taxonomies" in mind, we discuss the official taxonomies in the EU[6] and China[7], together with the market-based taxonomy of the Climate Bond Initiative (CBI)[8] to shed light on gaps amongst existing frameworks as well as the degree of comparability between them. The identified gaps and

[6] Sustainable Finance Taxonomy – Regulation (EU) 2020/852.

[7] Green Bond Endorsed Projects Catalogue (2021 Edition).

[8] Climate Bonds Taxonomy (January 2021)

inconsistencies in turn motivate the proposal of the core principles of effective taxonomy design in section 3.

2.1 Objective

Alignment with high-level policy goals. An effective taxonomy helps investors to channel money into assets that support the national long-term sustainable development agenda. These can include, for example, the transition to a climate-resilient economy, the protection of natural resources and the ecosystem, and the promotion of sustainable cities and communities. Taxonomy objectives that are consistent with those of existing national standards and regulations allow those standards to be easily integrated into the taxonomy framework.

To translate the high-policy goals as stated in, for example, the ecological civilisation plan in China, the Paris Agreement and the Sustainable Development Goals into concrete targets, a science-based approach can be utilised. This allows high-level sustainability objectives to be translated into measurable outcomes such as a benchmark reduction of GHG emissions, a lower rate of deforestation, or a desired level of species diversity.

Table 1's overview of these dimensions among the three taxonomies show alignment with high-level goals is feasible, but not always a feature of major taxonomies. As examples of embedded high-level policy objectives, both the EU taxonomy and the CBI Standards have aligned their activity-level criteria closely to the commitment of emission reductions required to achieve climate neutrality by 2050. Such specificity seems to be missing from the Chinese taxonomy, however.

Independence vs. co-dependence. Taxonomies usually incorporate multiple objectives, range from climate change mitigation to climate change adaptation, as well as the sustainable use and protection of water and marine resources, transition to a circular economy, waste prevention and recycling, pollution prevention and control, and protection of healthy ecosystems.

When multiple, the objectives of taxonomies may be independent or co-dependent. For instance, in the EU taxonomy, in addition to contributing substantially to one or more of six environmental targets, an eligible activity must also do no significant harm to any of the others. While the principle of Do No Significant Harm (DNSH) helps to alleviate possible conflicts among different objectives in the technical screening process, there is no explicit mention of the DNSH principle in the design and wording of the Chinese taxonomy.

Nonetheless, this co-dependent approach may not be optimal for developing countries which start from different initial conditions. For instance, some of these countries still rely heavily on fossil fuels. The fact that DNSH excludes carbon-intensive activities a priori (due to the negative impact on a co-dependent objective) could pose a major barrier to a swift "brown-to-green" transition for such jurisdictions, as it hampers investment in greener technologies in the fossil fuel industry that is non-compliant but irreplaceable at the current phase of economic development.

More generally, establishing a comprehensive framework of definitions and reporting standards that serves multiple, co-dependent environmental objectives, as in both the EU and Chinese taxonomies, has costs in terms of diminishing the signalling value of a taxonomy with a single independent objective. For one, the

higher level of complexity of a taxonomy with multiple objectives will increase the costs of implementation and supervision, and ultimately the degree of compliance by financial markets.[9] For instance, while the screening criteria for climate change mitigation have a single metric, namely CO_2 emissions, those for other objectives, such as biodiversity, are bound to be more complicated as it is difficult to break them down to one single measure. The increased cost of compliance has the potential to discourage voluntary adoption of non-financial, sustainability-related disclosures.

The problems of multiple co-dependent environmental objectives are further aggravated in the case of developing countries with weaker institutions and market infrastructure. For such countries that are considering the development of national taxonomies, it may be beneficial to focus on one objective at a time for which local regulations are well-established and technologies have been tested. The approach of "one-label-for-one-objective", for example, as reflected in the CBI Standards GHG emission screening criteria to achieve climate mitigation, could be a more effective and compatible alternative.

2.2 Scope

Static vs. Transition. To date, the vast majority of capital flows related to green finance have been directed towards economic activities which are already low-carbon, while there has been substantially less investment in transition and enabling activities in carbon-intensive industries like oil & gas, mining and heavy industry. As defined in the EU taxonomy, transition activities are activities that contribute to the transition to the net-zero emission by 2050, but are not "green" at the moment, including passenger cars or electricity generation from gaseous fuels. Enabling activities are those—which themselves may be carbon-intensive—that generate goods and services that enable decarbonisation of other activities. For example, the manufacture of solar panels or carbon capture and storage tools result in GHG emissions, yet these products help to reduce emissions over the long term. Given that only a minority of sectors operate at zero or near zero emissions, the transition to a resilient, sustainable economy requires fundamental and grass-roots level transformation across all sectors, including those businesses with the highest carbon emissions. For such businesses, taxonomies ideally help to redirect capital toward solutions for which the pathway to zero emission is available, or towards low-carbon alternatives that exist or are in development. Most existing taxonomies are based on backward-looking data, however.

The European Commission is taking early steps to incorporate transition activities in its taxonomy, and thus encourage investments that stimulate green technological innovations in carbon-intensive industries (Table 1). Such activities or entities must demonstrate their ability to outperform the industry average by meeting certain thresholds of emission reduction. In the absence of such taxonomies, it will be difficult to distinguish such activities from those that are simply stranded or show little promise to reduce emissions. A lack of transition taxonomies can lead to higher costs of capital or even unavailability of funding for firms to move to less harmful activities.

[9] In addition, the EU taxonomy has attempted to incorporate social dimensions by applying a "minimum safeguards" doctrine. As a result, the extensive amount of data required to be produced become onerous, especially for small firms.

Table 1. Overview of Sustainable Finance Taxonomies[10]

		EU Taxonomy	China Taxonomy	CBI Taxonomy
Objective	Alignment with high-level policy goals	• Activity level criteria are aligned with the target of net-zero GHG emissions by 2050.	• The translation of targets set by China's Integrated Reform Plan for Promoting Ecological Progress to activity level criteria is unclear.	• Project level criteria are aligned with the levels of emission reductions required to meet the 2°C target set by Paris Agreement.
	Independence vs. co-dependency	• An economic activity must meet principles of "Substantial Contribution" and "Do No Significant Harm", and the minimum social safeguards.	• Six environmental objectives are interlinked by honouring "Do No Significant Harm" principle[11].	• GHG emission screening criteria aiming to achieve climate mitigation.
Scope	Transition & enabling Activities	• Transition and enabling components are included and are subject to review every three years. • But it is not clear how the thresholds of compliance are adjusted over time to accommodate the latest development of climate science and technology innovations.	• No transition activities are included.	• No transition activities are included (separate framework for identifying transition activities published in 2020).
	Industrial classification	• Two-level NACE codes.	• Four-level Chinese Standard Industrial Classification (CSIC).	• No reference to industrial classification code. Instead, assets are categorised into generation facilities, supply chain facilities and infrastructure.

[10] Green indicates taxonomy is fully aligned with the core principles we set out in Section 3; yellow indicates taxonomy is partially aligned with our core principles; and red indicates taxonomy is not compatible with our core principles.

[11] http://www.pbc.gov.cn/goutongjiaoliu/113456/113469/4236381/index.html.

Target	Unit of measurement	• Activity-based metrics with thresholds in line with existing EU regulations and the net-zero target.	• Activity-based metrics with thresholds in line with existing national standards.	• Asset-based metrics with thresholds in line with the 2°C target.
Output	Data availability and disclosure	• Further legislative guidance is required to address data disclosure for different types of financial products.	• Issuers are required to report use of proceeds while environmental impact reporting is encouraged.	• Issuers are required to report use of proceeds and the environmental objectives of the projects.
	Verification	• Further legislative guidance is required to address data verification for different types of financial products.	• Independent review of green credentials is encouraged, but there is not yet a standardised procedure for providing external review.	• Climate Bonds Standard & Certification Scheme is the only international third-party certification of green bonds.
	Granularity	• Binary	• Binary	• Traffic light system • Five distinct categories of transition activities identified in a separate framework.

To recognise and promote transition activities, taxonomies can also utilise forward-looking measures, which are expected impacts inferred from firms' past performance. These measures assess whether the characteristics of the activity and the trajectory of emission reduction are sufficient to achieve pledged environmental benefits. As an example, the Science Based Targets initiative (SBTi) promotes a science-based standard for net-zero target setting, to guide companies in how to translate the objective of a carbon-neutral economy by 2050 into tangible actions.

National vs internationally interoperable. A sustainable finance taxonomy includes an extensive scheme of classifications, more often than not quite ambitious in scope. Such classifications can be based on purely national standards and definitions or can attempt to ensure some level of international consistency. One prominent example of the former are the existing industry classifications used by national statistical agencies like the NACE codes in the EU taxonomy or the Classification of Strategic Emerging Industry (based on the Chinese Standard Industrial Classification (CSIC)[12]) in the Chinese taxonomy. In such existing taxonomies, these are often used to identify environmentally beneficial activities or projects in a single jurisdiction. Industry-specific targets, which are often advisable in the establishment of broader environmental targets, must depend on such industry classifications.

That said, industrial classification systems that differ across jurisdiction pose impediments to the harmonisation of taxonomies. While the NACE or CSIC classifications in the EU and China, respectively, are consistent with national statistical data and official regulatory frameworks, they are not directly compatible with classification systems widely used elsewhere, such as the Global Industrial Classification System (GICS). Economic activities that are potentially sustainable can be included in one but not another taxonomy. Such a lack of interoperability can raise transaction costs for issuers and investors who are active in international financial markets. One step towards harmonisation of taxonomies would be for all taxonomies to adopt the same industrial classification system, with the GICS or the International Standard Industrial Classification (ISIC) being logical front runners. Another plausible solution would be to set up a commonly approved mapping between NACE, CSIC, GICS and ISIC codes for the purpose of sustainable taxonomies.

2.3 Target

Activity vs. Entity vs. Asset. The major existing and currently most widely used taxonomies define sustainability from the perspective of the activity or project itself, rather than the entire entity (usually a corporation) undertaking the activity. In some cases, the target of the taxonomy is the asset on the entity's balance sheet. Such taxonomies aid investors and regulators by enhancing project-related sustainability disclosure, enabling them together with issuers to identify opportunities that contribute to the overall sustainable development agenda. The EU and Chinese taxonomies examined in Table 1 both incorporate activity-based metrics with thresholds in line with jurisdictional regulations. The CBI taxonomy incorporate asset-based metrics.

However, it is vitally important for investors to gauge the aggregate impact on sustainability of a corporation's full range of economic activities, for example, as

[12] The newest version is GB 4754-2017, http://www.stats.gov.cn/tjsj/tjbz/hyflbz/201710/t20171012_1541679.html.

addressed in the Sustainability Linked Bond Principles (SLBP) of the International Capital Market Association (ICMA). The screening criteria of sustainability-linked bonds are defined on the basis of Key Performance Indicators (KPIs) and Sustainability Performance Targets (SPTs) at the entity level, and hold the promise of expanding the scope of financing to support the transition of an entity's entire business model.

Signalling environmental benefits of business activities at the project level does not necessarily imply a similar signal at the entity level. For instance, the construction of infrastructure for renewable energy production can be labelled green under an activity-based taxonomy, but when the project is undertaken by a energy company that is heavily involved in building new oil refining facilities not aligned with the environmental objectives, the entity-level label may differ. The signalling value of this green certification may be overstated when the reduction of emission from the green project is relatively small compared to the overall emission from other carbon-intensive activities of the firm.

To preclude the possibility of greenwashing a firm's entire profile from an insignificant project, activity-based taxonomies can be supplemented by reporting of the materiality of sustainable activities from the entity perspective. Such metrics could include the share of its debt balance, capital expenditure, or sales revenue attributable to sustainable economic activities. Similar metrics are popular already for investment funds. Box A presents a sophisticated example of this, based on a method of mapping investee firm targeted carbon reductions into century-end global temperature increases.

2.4 Output

Data Availability and Disclosure. Well-defined taxonomies provide a clear signal to investors about the non-financial benefits of an asset. Investors need to be assured that their sustainable investments will genuinely generate the promised environmental and social benefits. Ex-ante estimation and ex-post review may significantly increase the demand for data, especially performance indicators from issuers (corporates) or asset managers. Despite the EU's Non-Financial Reporting Directive as well as the growing momentum around the adoption of non-financial reporting standards like the EU Sustainable Finance Disclosure Regulation (SFDR), the Sustainability Accounting Standards Board (SASB), the Global Reporting Initiative (GRI) and the IFRS foundation's work on sustainability-related disclosure standards, sustainability disclosure at the issuer level is still limited. In this context, taxonomies can endorse harmonised mandatory disclosure of financially material sustainability data to ensure the integrity, transparency, consistency and comparability of green labels across financial markets.

The design of the taxonomy is important in this respect. For instance, to complement the current version of the EU taxonomy, the European Commission will specify how the taxonomy-compliant disclosure obligations are to be applied in practice. In China, the People's Bank of China's (PBoC) approach on disclosure requirements is consistent with international practices such as the CBI Standards and Green Bond Principles (GBP). At the same time, given the greater burden of reporting for small and medium enterprises (SMEs), a strong argument can be made for allowing them to follow a simplified set of protocols.

Box A

A granular transition taxonomy for investment funds based on carbon emissions

Transition taxonomies can define a common understanding of which economic activities are conducive to the economic transition and, therefore, they will constitute an essential pillar of climate-related reporting and market transparency more generally. An example of a granular transition taxonomy for investment funds that provides a simple understanding of the funds "greenness" based on the objective of the reduction of green-house gases consistent with the Paris accord are the temperature ratings of funds provided by Climate Disclosure Project (CDP).

The temperature ratings are based on the carbon targets disclosed by listed companies that comprise the funds. But assessing the ambition of corporate emissions reduction targets has to date been complex, as targets can use different units, vary across timeframes, and cover a range of emissions scopes. The CDP-World Wide Fund for Nature (WWF) temperature rating methodology is an open-source methodology which translates these targets into a single, intuitive metric. This allows the global temperature rise associated with corporate ambition to be compared across companies and funds.

More specifically, the methodology converts the emissions targets provided by corporations into temperatures. Each target corresponds to a linear annual reduction rate of a metric (eg absolute carbon emissions or carbon intensity) from the base year to the target year.① For each individual emissions target, the conversion methodology is based on the scientific climate scenarios currently available from the United Nations' IPCC (The Intergovernmental Panel on Climate Change) Special Report on 1.5°C scenario database. From a large number of climate scenarios that map short, medium and long-terms trends of either absolute carbon emissions or emissions intensities into estimated global warming in 2100, data are obtained for regressions that give a point temperature estimate for any trend implied by the target.

Since companies often have multiple targets, the target level temperature ratings are aggregated into company-level temperature scores. That said, not all targets provided by the companies are included, as there are minimum quality criteria for inclusion of a target into a company's overall temperature score. Subsequently, to assess an index or portfolio of companies, individual company scores are weighted across an investment portfolio. Corporate temperature scores are aggregated at the fund portfolio level using a financed emissions weighting approach, meaning each portfolio constituent's temperature score was weighted by its portfolio share of financed emissions.

Companies that do not have relevant, publicly disclosed emissions targets are assigned a default temperature score which assumes a business as usual temperature pathway. For all companies without CDP disclosed targets or insufficient disclosures, a default temperature score of 3.2°C is applied. This enables company-by-company and portfolio comparisons. From these, financial market participants can derive measures for capital allocation and corporate engagement and ultimately help to align corporate emissions with policy objectives and reduce climate transition risks in their portfolios.

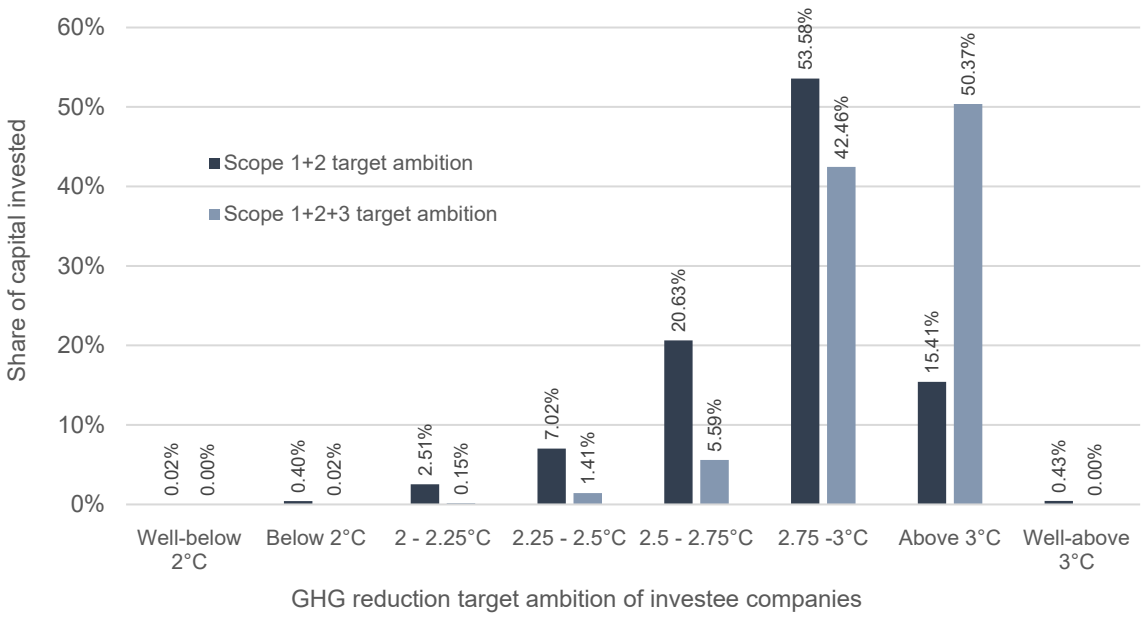
The distribution of funds that results from the CDP methodology is presented in the Graph below, based on an analysis of the assets under management as of April 2021 and the temperature scores of 17,972 investment funds. The fund sample is comprised of open-end funds (incl. ETFs) domiciled in Europe, US and Asia investing in public equities and corporate bonds globally. The total assets managed by these funds was app. US$ 25.7 trillion, or app. 38% of the global market for regulated open-end funds. The source of fund holdings and asset information was Refinitiv/Lipper.

As can be seen in the Graph, based on current data on corporate GHG reduction targets set in 2020, the majority of the global fund industry's financed GHG emissions would be on a temperature pathway above 2.5°C, and thus far above the goals of the Paris Agreement, exposing them to significant transition risk.

Such measures would greatly benefit from more detailed disclosure of GHG reduction targets by companies so as to better gauge whether investment portfolios are aligned with the temperature targets of the Paris Agreement. Indeed, too few companies set and disclose ambitious and detailed GHG reduction targets. This is particularly a problem for scope 3 emissions, with only a tiny fraction of disclosers reporting any target to address value chain emissions. Thus, for taxonomies such as CDP's temperature rating to be most effective, existing and emerging reporting standards for companies should have more detailed requirements for the disclosure of GHG reduction targets, especially regarding the disclosure of interim targets and the emissions of broader scopes.

The capital allocation of global investment funds by the GHG reduction target ambition of investee companies

Graph A1



Source: CDP; the analysis covers 17,972 funds with US$ 25.7 trillion in assets under management representing approximately 38% of the global fund market.

① For a detailed description of the methodology, see https://www.cdp.net/en/investor/temperature-ratings/cdp-wwf-temperature-ratings-methodology.

Note: This box has drawn extensively on analysis and written text provided by CDP.

Verification. A well-defined taxonomy can also mitigate the risk of greenwashing by facilitating verification. While the existence of taxonomies alone will not prevent companies from committing sustainability frauds, well defined taxonomies will make these frauds easier to detect. The use of external review (second-party and third-party) is prevalent in the European bond market, but standardisation of verification processes across different providers can be improved. Verification process are not addressed in the current EU taxonomy legislation, while the Chinese taxonomy advocates the voluntary use of independent reviews. As the size of the sustainable finance market grows, policymakers may explore further policy options to facilitate verification and discourage greenwashing. An approved verifier model (as in the CBI Standards) could be a robust instrument. It allows the regulators to act as a gatekeeper and delegate the role of verification to a range of private providers. This model offers the potential to retain a consistent level of quality in the verification process as only entities with sufficient expertise will be approved and criteria on the services they provide are set uniformly by the gatekeeper.

Granularity. Taxonomies serve as an instrument to identify investment opportunities that are compatible with national sustainable development commitments. The EU and

Chinese taxonomies remain binary in the sense that activities are either taxonomy-compliant or not (Table 1).

While the binary approach to taxonomies has served the development of green finance to date, it runs the risk of being both too strict and too loose in its labelling. A binary approach in which only the greenest of activities is labelled as such could deter certain firms from investment, especially SMEs who have limited access to the capital market to finance the costly adoption of green technology. At the same time, easily achievable thresholds may discourage dedicated attention and efforts from the private sector, and result in the signalling value of the green label being diluted significantly. Thus, it makes sense for taxonomies to incorporate, when possible, greater granularity in the design of screening criteria, e.g., one more akin to credit ratings, so as to incentivise private sector engagement.

Greater granularity also offers another opportunity to focus on the reduction of polluting investments. The emission of carbon at the corporate level is dominated by a relatively small number of large emitters. Hence, a taxonomy that not only defines which activities are sustainable but also differentiates among those that are harmful would be useful for the private market participants desiring to minimise investment in the worst polluters and polluting activities. It also can prod polluting firms to invest in ways to improve their performance. The CBI has adopted traffic light system to indicate the degree to which whether identified assets and projects are compatible with a 2-degree decarbonisation trajectory. While green is automatically compatible. Orange is possibly compatible if more specific criteria are met. Red Light is incompatible, while grey indicates more work is required to determine which colour is appropriate. More recently, the CBI has proposed five distinct categories of activities: Near Zero, Pathway to Zero, No Pathway to Zero, Interim, and Stranded.[13] Granular screening systems such as these helps investors to relocate assets away from "polluting activities".

More granular output, with greater coverage of both good and bad activities, can also accommodate differences by industrial sector and technology, as well as at different levels of national economic development. In the case of Asian developing economies, which have the most significant regional demand for sustainable investments[14], the design of taxonomies can be formulated in the social and economic context of the region. The emerging Singapore and ASEAN taxonomy has also proposed a traffic light system, more as an intermediate step to balance the goal of near-term feasible implementation of a taxonomy with the achievement of sustainable objectives longer-term. It takes into consideration the rising demand of electricity driven by rapid urbanisation and industrialisation that is likely to result in a continued dependency on fossil fuels at least over the medium term. Hence, the inclusion in the granular taxonomy of some activities that are not yet undertaking a transition enables the region to holistically consider a smooth transition pathway while handling their energy needs over the near and medium-term.

[13] See https://www.climatebonds.net/files/reports/transition-summary-note-092020-report-page.pdf

[14] GFMA and BCG report Climate Finance Markets and the Real Economy from 2020, https://www.gfma.org/policies-resources/gfma-and-bcg-report-on-climate-finance-markets-and-the-real-economy/.

3 Principles for the design of effective sustainable finance taxonomies

As discussed above, the primary purpose of a sustainable finance is to provide a strong signal to investors about the sustainability benefits of an asset, activity or overall activities of an entity. This overarching goal can be implemented in many ways. The review of the major existing taxonomies above brought several weaknesses to the fore. We argue that a small set of basic principles can provide constructive guidance on the design of effective sustainable finance taxonomies to achieve their primary purpose and mitigate the weaknesses of currently prevailing taxonomies.[15]

In developing our principles, we anticipate an "age of radical transparency" (Al Gore (2021))[16], characterised by a much greater availability of data – not only for issuers, but for all stakeholders. An effective taxonomy will essentially be a way to distil and summarise the relevant information to arrive at a simple-to-understand and reliable assessments for investors. Design choices for the major existing taxonomies were often made a decade ago and based on the presumption that environmentally-related data is scarce. A data-based approach gives rise to different design choices. This does not constitute a criticism of existing taxonomies. Our principles should rather be seen as a guidance to develop existing taxonomies further as well as a simple conceptual framework for designing new taxonomies.

The principles do anticipate greater availability of data going forward, but require only some basic data to start with. Data requirements can be scaled and thresholds and parameters can be adjusted to accommodate small and medium sized firms (SMEs) or issuers from emerging markets (EMEs). Much more important than the current availability of data is to ensure interoperability of taxonomies – the ease of comparability across firms and markets. Naturally, a principles-based approach facilitates interoperability and thereby supports international consistency. Different legal systems and proportionality considerations may require different concrete implementations. Still, a data-driven foundation of taxonomies based on the same principles enables investors to make informed decisions across a wide range of assets – the primary purpose of taxonomies.

3.1 The five principles for designing effective taxonomies

The principles we propose below are complementary and are not necessarily effective in isolation. At the same time they are non-exhaustive, though provide a sense of

[15] The principles we develop here are intended to maximise *effectiveness* in supporting the transition to a more sustainable economy. Efficiency considerations, such as the costs of compliance and related incentives, are not fully addressed in this paper. Our principles are similar in some important respects to the "principles for establishing taxonomies/classifications of sustainable economic activities" of the UNDESA/IPSF draft input paper to the G-20. In particular, our principles of alignment with high-level objectives and measurable targets, adaptation to country circumstances, focus on certification and verification processes as integral complement to taxonomies, find parallels in the UNDESA/IPSF principles. However, these characteristics directly follow from our focus on measureable sustainability outcomes and are based on the expectation of greatly increased data availability and monitoring capabilities. Further, we emphasise granularity and coverage of bad sustainability outcomes.

[16] Speech at the BIS-BdF-IMF-NGFS Green Swan Conference: "Our climate crisis, the financial system and the sustainability revolution", 2 June 2021. https://greencentralbanking.com/2021/06/02/live-blog-green-swan-day1/.

direction for designing effective taxonomies, particularly when anticipating an increasing availability of sustainability-related data.

1. Alignment with high-level policy objectives and measurable interim targets

A sustainable finance taxonomy that is not aligned with high-level policy goals is unlikely to itself be of sustainable value. High-level policy goals determine the direction of policy development. Without such alignment, any labelled asset will face ongoing market or regulatory scrutiny. The interest in assets that do not contribute to policy relevant objectives will eventually wane when investors look under the hood of the green label. In other words, unaligned taxonomies are ultimately subject to "transition risks" and may become unsustainable. Alignment with high-level policy objectives should therefore be the guiding principle of designing effective sustainable finance taxonomies. While high-level sustainable policy goals may change and vary across countries, on key issues there is a common understanding across a wide range of countries on what they should be (191 countries are parties to the Paris Agreement, and the Sustainable Development Goals have been adopted by 193 countries).

In the case that policy objectives extend into the far future, realistic and measurable interim targets should be used that fall into the investment horizon of investors and provide clarity on what exactly the target is and how it can be measured.

2. Focus on one single objective ("One taxonomy, one objective")

The primary purpose of taxonomies is to provide a clear signal to investors. To provide a clear signal there needs to be a direct link with the underlying objective. Mixing several objectives naturally reduces information value (information loss though aggregation). In the area of ESG scoring, for instance, it is widely acknowledged that this has created challenges for investors. A prominent paper dubs this "aggregate confusion".[17] Aggregation also opens doors for greenwashing – poor performance in one area can be underweighted or offset by better performance in other areas, even if sustainability performance is perfectly measured. Providing one signal related to one objective also creates more choice for those investors who may wish to specialise in certain areas within the sustainable universe.

Several current taxonomies are based on the "do-no-significant-harm" principle (DNSH), stating that if a taxonomy supports one objective, it should at the same time not be harmful in terms of other objectives. It is important to note that the full implementation of the DNSH principle requires both the definition and measurement of a full and complete set of high-level sustainability policy objectives. Certifying that the DNSH principle is fulfilled can be challenging in practice. For this reason, an argument can be made for setting the thresholds very high or applying the DNSH principle sparingly, limited to those cases where the measurement of the alternative objectives are less difficult, because otherwise DNSH is likely to diminish the signalling value of more focused taxonomies.

3. Outcome-based using simple and disclosed key performance indicators (KPIs)

A taxonomy based on measurable outcomes provides clarity for investors on the non-financial benefits conveyed by an asset, activity or entity. Measuring outcomes through simple and disclosed key performance indicators can support many of the other principles. It allows investors to verify the sustainability performance of an asset,

[17] Berg, F, Kölbel, J and Rigobon, R (2020): "Aggregate Confusion: The Divergence of ESG Ratings". Available at http://dx.doi.org/10.2139/ssrn.3438533

allows granular assessments and can be directly linked to the underlying sustainability objective. The choice of the right KPI is hence crucial for outcome-based taxonomies, including for avoiding loopholes that a KPI with only an indirect link to the sustainability objective may open up. A focus on sustainability performance is necessarily technology-neutral. New and alternative technologies can be certified based on the same KPIs (eg carbon emissions), allowing investors to quickly invest in them based on their existing sustainability strategies. As disclosures improve and suitable KPIs become more widely available across countries and firms, the range of measurable outcomes and therefore sustainability objectives that can be covered by sustainable finance taxonomies will broaden. For maximum transparency and simplicity, it is desirable to use only one KPI for a given taxonomy. Some sustainability objectives may, however, be complex and require the combination of several KPIs, which requires the taxonomy to specify a priority or weighting.

Two further benefits arise from outcome-based taxonomies. An outcome and principles-based taxonomy can be relatively easily adapted to different circumstances. Threshholds can be adjusted to industry circumstances. Thresholds can be lowered, for instance, in case firms do not have access to the technology required to achieve better sustainability performance. Similarly, as high-level policy goals evolve or if they require faster improvements over time, thresholds can be tightened over time.

Further, outcome-based taxonomies allow for straight-forward certification schemes and potentially low-cost verification. A taxonomy can only provide a decision-useful signal to investors (and other stakeholders) if it is reliable. In practice, specialised firms certify an asset's sustainability benefits based on the set of rules and thresholds defined in the underlying taxonomy. The processes, institutions and their potential regulation should be an integral part of a taxonomy's design. This should include verification of the certification, which can be cost efficient If taxonomies are based on simple and already disclosed KPIs.

4. Incorporation of entity-based information whenever possible

A taxonomy that ignores entity-based information runs the risk of encouraging greenwashing in the mild sense (by which we mean labelling that can be misleading in the absence of fraud). It is important that taxonomies be effective and affect incentives on the level of the entity, at which most investment decisions are made.[18] If a firm is able to label certain activities as green without changing its overall carbon footprint, the extent to which green finance is financing transition comes under question. While much of the infrastructure to date of the green bond market has been focused on certifying and verifying green activities, for the sake of providing incentives to decision-makers to contribute to high-level policy goals, taxonomies should incorporate entity-based information whenever possible.

5. Sufficient granularity, covering both high and low sustainability performance

For a taxonomy to provide a decision-useful signal, investors require a certain level of granularity to determine whether an asset fits into their investment strategy. Binary taxonomy outputs (eg "green" vs not green) greatly limit the range of possible investment strategies based on such a taxonomies.

[18] For more on this point, see Ehlers, T, B Mojon, and F Packer (2020). Green Bonds and Carbon Emissions: Exploring the Case for a Rating System at the firm level, BIS Quarterly Review, September.

An important feature of the sustainability performance of issuers is its highly often skewed distribution. For instance, the 1% of firms with the highest carbon intensity produce close to 40% of global carbon emissions. As a result, the improvement of firms with low environmental performance is essential to achieve sustainability goals on a global level. A taxonomy targeted only at firms with a good environmental performance (eg "green" firms) cannot capture those firms whose sustainability performance is essential for achieving high-level policy goals**.**

3.2 Employing the principles for a basic design of climate transition taxonomies

In the following we examine how the principles of taxonomy design developed above might be employed for a basic design of climate transition taxonomies. We are not the first to consider a taxonomy in the context of climate transition.[19]

Principle 1 (High-level alignment). As all other elements of the taxonomy depend on it, identifying the policy objective is the first and key step. In the case of many national jurisdictions, the longer-term science-based target for the transition would be to achieve net zero emissions by 2050. As this is beyond the horizon of many investors, an interim target should be specified as well. In the case of the EU, for instance, the interim target for emission reductions is currently a 55% reduction in GHG emissions by 2030. As a reduction of about 26% had already been achieved by end-2019, the 2030 interim target implies a reduction of about 40% over the following 10 years, or about 5% per annum.[20]

Principle 2 (Single objective). A taxonomy for climate transition provides a stark example for why mixing objectives blurs the signal intended for investors. For instance, if the taxonomy were to include both a climate mitigation and water security objective—and meeting one or the other would qualify for the label—without drilling down beyond the label, an investor would face considerable uncertainty over what the precise non-financial benefits of the certified asset were to convey. Water security may or may not contribute to the climate transition objective, even if clear and measureable targets were given. While in other cases, different objectives may in theory be complementary or even mutually reinforcing, mixing objectives reduces clarity and simplicity for investors. It also limits the range of sustainable investments and themed investment strategies that can be built around taxonomy-certified assets.

Principle 3 (Outcome-based). In an outcome-based transition taxonomy, the choice of KPIs is crucial and challenging, as KPIs should be directly linked with the high-level policy objective. For transition taxonomies, a natural measure is greenhouse gas emissions. As most policy objectives are forward-looking, but disclosed data are more often than not backward-looking, measurable objectives need to be translated into thresholds for KPIs that may vary over time.

In the case of transition taxonomies, the longer-term targets for carbon emission reductions can be broken down into annual targets, as done above for the EU (GHG reduction of 5% per annum). Future sustainability disclosures may include expected future emissions, which would be a highly useful KPI for transition taxonomies. Using

[19] See IMCA Handbook for Transition Taxonomies (2020). https://www.icmagroup.org/sustainable-finance/the-principles-guidelines-and-handbooks/climate-transition-finance-handbook/

[20] See for instance the EEA greenhouse gases data viewer and the numbers therein. https://www.eea.europa.eu/data-and-maps/data/data-viewers/greenhouse-gases-viewer

backward-looking measures, however, still allows a regular assessment of alignment with climate transition in the most recent year for which data is available. Taking the example of a 5% annual GHG reduction, a natural choice would be both an annual threshold of 5% GHG reduction or, if the annual threshold is missed, a compounded threshold of 5% p.a. over a multi-year horizon. This ensures a certain stability of the resulting assessment, which is important for investment decisions. In case reduction targets for specific industries exist, the target should be tailored to the industry of the issuer.

To prevent loopholes and leakages, GHG emissions should be i) measured at the highest available scope (eg scope 3); and ii) cover all relevant greenhouse gases emitted, which can easily be converted into CO2 equivalents via easily available conversion tables.[21] Scope 3 emissions would also cover indirect emissions from production inputs as well as emissions from product distribution and usage. This prevents so-called emission exporting or leakage, whereby emission-intensive activities are outsourced so that emissions caused by the firm appear low. In absence of measures for other greenhouse gases, a good first start is CO2 emissions. A transition taxonomy could easily be updated, once data availability for other greenhouse gas emissions is sufficient.

In many cases, including the example of transition taxonomies, the KPI is best measured at the entity (ie issuer) level rather than the project level. Analogous to emission-exporting, issuers could shift emission-intensive parts of a project to other projects, creating the appearance of emission reduction for any project that is certified by a transition taxonomy without thorough oversight on the entity level.

An economically sensible measure would be a carbon intensity measure rather than absolute carbon emissions. A firm could reduce its size to reduce absolute emissions. A more economically sensible measure would be GHG emission per unit of revenue or total assets, depending on the industry of the issuer.[22] While the choice of the most sensible normalising factor is important, the reduction target still applies to carbon intensity normalised with any appropriate measure of economic activity.

As mentioned earlier, a benefit of outcome-based taxonomies is that they can readily be adopted to country circumstances. In the case of transition taxonomies, adjustments to country circumstances could be made, for instance, on the basis of their national high-level policy goals or nationally determined contributions related to the Paris Agreement. Technically in this case, the different high-level goals would simply be reflected in adjustments to the thresholds specified in the taxonomy. All other aspects of the taxonomy would remain unchanged to ensure interoperability.

Certifying labels and verifying outcomes takes on an extra degree of importance (and difficulty) in the case of transition taxonomies. Going forward, if a transition taxonomy is based on disclosed forward-looking measures (eg expected emissions over the next 3 years), a key role of the certification providers would be to assess whether such forward looking targets and commitments are plausible and make adjustments to the disclosed forward-looking estimates when necessary.

[21] For instance: https://www.ghgprotocol.org/sites/default/files/ghgp/Global-Warming-Potential-Values%20%28Feb%2016%202016%29_1.pdf

[22] For manufacturing firms, for instance, revenue is a natural normalising factor, as it captures the economic value of products produced. For financial companies, for instance, total assets would be a more sensible normalising factor, as the portfolio of assets better reflects the economic activities a financial firm is involved in.

Principle 4 (Entity-based information). Transition taxonomies must by definition not examine activities in isolation, but recognize progress relative to a legacy of previous activities that fall under a given actor or entity's remit. For this reason, even more than more traditional taxonomies, they must convey entity-specific information to document what the entity is transitioning away from in terms of its activities. Transition taxonomies must cover transition pathways at the entity level.

Principle 5 (Sufficient granularity). Key thresholds for carbon emissions can be aligned with climate transition (ie the 5% annual or compounded multi-year threshold). A transition taxonomy should give a clear signal as to whether an asset is aligned or not. Hence, issuers that achieve emission intensity reduction at a pace or more rapid than the threshold should, for instance, get a "fully aligned", "dark green", "triple-G" or similar label. A category recognising especially rapid reductions could be of value for some investors, but not as crucial for the efficiency of the taxonomy as distinguishing between sub-par rates of reduction. To incentivise issuers with lower performance to improve – which is necessary for a successful climate transition – the output of the taxonomy should be granular among rates than don't meet thresholds. For instance, there could be one category for firms with carbon intensity increases, another for slight decreases (ie 0%-1%) and several additional categories. While there is not necessarily an objective criterion for choosing these thresholds, it is nevertheless important they are clearly stated in the taxonomy to ensure clarity for investors and interoperability across jurisdictions, whereby thresholds can subsequently be adjusted to country or firm circumstances.

All issuers can be assessed against measured GHG emissions and therefore an outcome-based transition taxonomy naturally covers issuers across the entire distribution of emission intensities as well as their corresponding reductions.

4 Conclusion

Following the principles outlined above can greatly facilitate the comparability and interoperability of taxonomies across different firms and markets – including emerging markets. While some of these principles, both in traditional taxonomies and in the case of climate transition finance, are intended for application over medium to longer term horizons, there are some concrete near-term policy actions that can be recommended. Much of such actions relate to high-level endorsement of aspect of the framework that will eventually be part of a "new normal" as jurisdictions and entities within those jurisdictions contribute towards the mitigation of climate change.

Endeavor that specific taxonomies (or certification processes) correspond to specific sustainability objectives. A single taxonomy that categorizes activities or entities based on the achievement of multiple objectives such as GHG emission reduction and social inclusion runs the risk of increased greenwashing due to reduced market transparency resulting from complex weighting schemes to aggregate the objectives. Narrowly focused taxonomies further benefit from less costly certification and verification processes.

Encourage the development of transition taxonomies to facilitate the channeling of funds to transition activities and increase the focus on Paris alignment. Practices and standards with respect to the reporting of climate transition plans, interim targets,

and their level of alignment with Paris goals need to be harmonised further. Transition taxonomies will play a critical role in this regard. For instance, many institutional investors seeking to align portfolios with low-carbon transitions use ESG ratings. Yet the metrics for the environmental pillar (the "E" of ESG) do not yet capture a forward-looking assessment related to climate transition. Without a globally accepted taxonomy there are a wide range of terminologies and metrics related to transition, resulting in a low level of standardisation across markets and jurisdictions.

Monitor and supervise the evolution of certification and verification processes. To mitigate the risk of greenwashing which falsely asserts favorable placement within a taxonomy, a high-quality and consistent verification process is critical. Supervisors and regulatory authorities should provide uniform standards of conduct for the providers of certification and verification services. Ex post assessment of performance should also be conducted. Viable models for the supervision and regulation of providers of those services include those currently in place for credit rating agencies in the United States and Euro area.

Shift from current voluntary guidelines of post-issuance reporting to mandatory annual impact and use of proceeds reports. The success of outcome-based taxonomies will depend heavily on the availability of more data and analysis related to the impact of the classified assets or activities. One aspect of the green bond market which is gaining increasing attention is the provision of "impact reports". While use of proceeds reports are more common as they are required under common green bond standards, audited impact reports that look to quantify the climate or the environmental benefit of a project are being found with greater frequency as well (see Box B). To the extent that taxonomies move towards incorporating outcome based KPIs (Principle 3), impact reports are likely to be a key supplementary requirement of these taxonomy, with provisions of the report best made available on at least an annual or even a higher frequency basis.

Estimation of the promised impact of the projects financed by green bonds as well as ex post tracking of their achievement is greatly facilitated by mandatory uniform annual impact and use of proceeds reports. Use of proceeds and impact should be reported project by project, specifying environmental impact categories and capable of being aggregated at individual bond level, as well as by category or sector. Standardisation of units and disclosure of computation methodologies should be encouraged, and external auditing should be required. Finally, authorities should aim for harmonisation of practices for calculating and reporting impact metrics.

Box B

Impact reporting: an integral complement to outcome-based taxonomies

Green bond investors finance activities that promise environmental benefits and they generally seek to monitor the usage and impact of the funds they provide, both on a forward- and backward-looking basis. In order to support investors in these endeavours and to provide guidance for green bond issuers, global standards for issuing green bonds, such as from the International Capital Markets Association (ICMA) and the Climate Bonds Initiative (CBI), have emerged. These voluntary guidelines focus on providing a list of indicative categories for green projects, recommending a process for evaluating them, managing the proceeds and reporting on their use. In addition, independent second party verification provides additional assurance about the eligibility of the underlying green projects and the proper use of the funds. Not all standards require green bond issuers to publish reports on the expected impact and use of proceeds, though most issuers provide them.① Use of proceeds reports are more common as they are required under the most commonly used green bond standards, but impact reports that look to quantify the climate or the environmental benefit of a project are gaining greater importance.

Post-issuance reporting on green bonds is currently based on voluntary guidelines. Moving to mandatory interoperable annual impact and use proceeds reports would improve transparency for investors and promote the further development of the green bond market. It would facilitate investors to assess whether the projects are financing projects that are aligned with their investment goals. The annual periodicity will allow investors to regularly assess their investment impact in a timely manner.

Interoperability is a key requirement for investors as they typically hold a portfolio of green bonds from multiple issuers and are often required to provide reporting on the aggregate portfolio level of all their green bond investments. Various attempts have been made to standardize impact reporting. For example, International Financial Institutions (IFIs) published a report② on harmonizing reporting on renewable energy and energy efficiency and Nordic green bond issuers have published a position paper③ on impact reporting. ICMA published a handbook④ on impact reporting and CBI has a template for their mandatory Update Report⑤. These initiatives seek to provide guidance for individual issuers on impact reporting. However, investors have specific needs, in particular the need to be able to compare and aggregate the data. In order to satisfy the needs of the investors, the following adjustments should be made:

- **Use of proceeds** reports have to be granular on a project-by-project basis (E.g. to finance a solar farm). Partial funding of projects should be disclosed to avoid double counting. It should also be disclosed when a project is expected to have an impact. (E.g. showing the overall approved amount as well as the timing of the actual disbursement(s).) The issuer also needs to specify the environmental impact category that is financed by the project.
- Given the rise in **local taxonomies**⑥, the specific local taxonomy objectives should be disclosed and the issuers should provide a mapping to the UN Sustainable Development Goals.
- **Impact data** should be disclosed for the specific year of the report (e.g. actual CO2-equivalent emissions avoided in the particular reporting year). The data needs to be reported by project and should be made available on the aggregate loan portfolio or individual green bond level if the latter is possible. Besides, impact data should be aggregated by green bond category or sector.
- **Impact metrics** have to be meaningful, units have to be standardized (e.g. if a project is targeting reduction of greenhouse gases, the issuer should always report on tons of CO2-equivalent avoided/reduced) and the international standard to calculate metrics need to be disclosed. As no global standard exists for computing impact numbers, the methodology to compute the metrics should be made transparent. We note that there has been a harmonisation effort for computing impact metrics by IFIs⑦, but differences remain. A global initiative for a conversion and reporting standard for the various methodologies of metrics is highly recommended. Mapping from the Nordic position paper cited above, key elements of an impact report would include the environmental impact categories of relevant projects (and entities) and annual impact, mention of the special objectives of the relevant local taxonomy (e.g., climate change mitigation from the EU taxonomy), alignment with UN SDG targets, the international standards used for the metrics (e.g., GHG protocol), and the horizon of the benefits, among others.

Impact and use of proceeds reports should be externally audited as data reported has to be credible. Auditing would also support alignment in case a taxonomy is used to govern the respective green bond issues, thus reducing the risk of greenwashing. Furthermore, incorrect reporting should be corrected and information should be provided accordingly.

① https://www.climatebonds.net/files/reports/cbi_post-issuance-reporting_032019_web.pdf
② Green Bonds: Working Towards a Harmonized Framework for Impact Reporting (adb.org)
③ https://www.kuntarahoitus.fi/app/uploads/sites/2/2020/02/NPSI_Position_paper_2020_final.pdf
④ https://www.icmagroup.org/assets/documents/Sustainable-finance/2021-updates/Handbook-Harmonised-Framework-for-Impact-Reporting-June-2021-100621.pdf
⑤ https://www.climatebonds.net/files/files/Annual%20update-report-template-V3.docx
⑥ ICMA-Overview-and-Recommendations-for-Sustainable-Finance-Taxonomies-May-2021-180521.pdf (icmagroup.org)
⑦ IFI_Framework_for_Harmonized_Approach to_Greenhouse_Gas_Accounting.pdf

Note: This box has drawn extensively on written text provided by the BIS Banking department.

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