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Sustainable Finance: Financing, Impact and Value Creation

Edited by:
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Preface

Sustainable development is required to make the world an environmentally and socially better place for current and future generations. Sustainable finance is a crucial enabler of sustainable development, facilitating fund-raising for sustainable projects and helping investors mitigate sustainability risks while creating environmental and social impact. This edited book should serve as an essential reference on a range of topics related to sustainable finance.

The book's first three chapters provide a valuable background to sustainable finance. The first chapter introduces sustainable finance's key definitions, concepts and theoretical underpinnings. The second chapter explains climate risk, its causes and consequences, public policy measures, business and financial risks and mitigation measures. The third chapter introduces the regulatory frameworks related to sustainable investments and reporting.

Chapters four and five address financing aspects. Chapter four focuses on green finance, while chapter five deals with sustainable banking. There is a significant gap in funding large global investments required to address climate change and other environmental and social development projects, which the resources of governments cannot meet. Consequently, financial markets have a significant opportunity to help bridge this funding gap.

Chapter six covers impact investing, which predominantly lies in the private space, given that impact investors find it easier to manage and measure impact when dealing with smaller unlisted players, typically at the lifecycle's startup or early growth stage.

Chapter seven discusses the effect of sustainability on firm valuation. The value-drivers framework comes in handy in assessing the channels by which sustainability can affect company value. The chapter also discusses the case for estimating integrated value, combining social and environmental values with financial value.

Chapters eight and nine discuss public investments for creating impact and managing portfolio returns. Chapter eight covers ESG investing strategies and empirical evidence on their performance. Chapter nine discusses ESG data, ratings, indices and funds.

Chapters number ten to twelve deal with evolving areas in sustainable finance. Chapter ten covers sustainable insurance, chapter eleven discusses the role of catastrophe bonds in managing climate risks, and chapter twelve explains the role of fintech as an enabler of sustainability.

The twelve topics provide a comprehensive understanding of the state of the sustainable finance market and its future outlook. I hope that the readers will find the book both insightful and interesting.

Sachin Mathur
Editor

Content

Chapter 1

INTRODUCTION TO SUSTAINABLE FINANCE

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Introduction

Sustainable finance has evolved from a niche ethical concern to a central factor in investment decision-making, aiming to achieve long-term environmental sustainability and social equity. It plays a crucial role in directing capital toward projects that support the United Nations' Sustainable Development Goals (SDGs), thereby addressing global challenges such as climate change, inequality, and poverty (United Nations, 2015). The scope of sustainable finance is broad, encompassing various sectors like renewable energy, sustainable agriculture, and green infrastructure. Financial instruments such as green bonds and sustainability-linked loans are critical in this integration (Climate Bonds Initiative, 2021). Approaches to sustainable investing, including ESG integration, socially responsible investing (SRI), and impact investing, reflect the diversity of investor motivations and objectives (Friede, Busch, & Bassen, 2015).

The current chapter tries to cover this broader area. The chapter starts with Section 1 of the chapter, giving a brief about sustainability, Section 2 covers the role of finance in sustainability, next sections cover the evolution of sustainable finance with a timeline, the scope of sustainable finance in the

industries, and the instruments and regulations covered under it. Section 5 deals with the UN sustainable goals and the linkage of Sustainable finance with these goals, Section 6, the last section of the chapter briefs about various approaches to sustainable finance followed by the conclusion.

1. Sustainability: A Holistic Approach

Sustainability is the pursuit of a balanced existence that ensures the well-being of the current generation and enables future generations to thrive. The concept of sustainability is underpinned by three primary pillars: environmental, social, and economic (Brundtland, 1987).

Environmental Sustainability: Environmental Sustainability involves the preservation and restoration of the natural world. It encompasses efforts to reduce carbon emissions, conserve biodiversity, and responsibly manage natural resources (Caradonna, 2014). The aim is to address climate change, reduce pollution, and maintain ecological balance.

Social Sustainability: Social Sustainability focuses on building equitable societies that respect human rights, cultural diversity, and social cohesion. It covers areas such as health, education, and social justice, with the goal of creating strong, inclusive communities (Sen, 1999).

Economic Sustainability: Economic Sustainability is about maintaining economic health, which is essential for societal stability. This pillar emphasizes the need for resilient and equitable economic systems that can adapt to changes without compromising environmental and social pillars (Stiglitz, 2010).

These pillars are interrelated; neglecting one can lead to issues that impact the others. The decisions made today will influence the sustainability of future generations (Brundtland, 1987).

Sustainable development aims to ensure that current and future generations have access to necessary resources like food, water, healthcare, and energy without overburdening the Earth's systems (World Bank, 2002).

2. Role of Finance in Sustainability

The finance sector plays a crucial role in responding to climate stress and environmental degradation, as well as social challenges such as overpopulation and urbanization. It can drive positive change by allocating capital towards sustainable outcomes and supporting the transition to a sustainable economy (UNEP Finance Initiative, 2021). This includes exerting influence on company management of social and environmental issues, aiding governments, and setting an example for sustainable practices.

Financial institutions have been advancing their sustainability approaches through funding positive impact initiatives and encouraging better social and environmental management. Collaborative efforts like the Principles for Responsible Investment and new financial instruments such as green and social bonds are noteworthy steps (PRI, 2021).

Despite progress, the finance sector still has significant work to do in fully integrating sustainability into decision-making and moving away from supporting harmful activities. Challenges include a focus on short-term gains, a lack of green consensus, regulatory shortcomings, and limited demand from clients (Sullivan & Mackenzie, 2017).

Key aspects where the financial sector is evolving include:

- Risk Management: There is a shift towards incorporating environmental and social risks into traditional risk assessments to safeguard investments (Schoenmaker & Schramade, 2019).

- Transparency and Disclosure: With regulatory pressure, there is a movement towards greater transparency in sustainability performance, encouraging companies to disclose environmental, social, and governance (ESG) metrics (Global Reporting Initiative, 2021).

- Innovation in Financial Products: The finance industry is developing new products to meet the demand for sustainable investment

opportunities, such as green mortgages and sustainability-linked loans (Climate Bonds Initiative, 2020).

- Public-Private Partnerships: Collaborations between public and private financial entities are important for scaling up sustainable infrastructure and innovations (World Economic Forum, 2019).

Finance is a powerful tool that can shape global priorities and act as a catalyst for sustainable change, especially as the world confronts pressing sustainability challenges.

3. Evolution of Sustainable Finance

Sustainable finance emphasizes a long-term strategy in both finance and investment, prioritizing value creation through a holistic approach. This approach not only focuses on the economic aspects but also deeply considers the interplay between environmental, social, and governance (ESG) factors and various financial decisions (Friede, Busch, & Bassen, 2015). The European Commission (EC) provides clarity on this concept through its official website. They define sustainable finance as an approach where environmental and social aspects are carefully weighed during the decision-making process in investments. This often leads to heightened emphasis on sustainable and long-term initiatives. From the EC's perspective, environmental factors encompass a broad spectrum, including efforts towards climate change mitigation, adaptation, and understanding the wider environmental risks such as natural calamities. On the social front, it's about addressing concerns like societal inequalities, fostering inclusivity, promoting positive labor relations, human capital investment, and community engagement. Moreover, the governance structures in both public and private sectors, encompassing management patterns, workforce relations, and compensation models for executives, are pivotal for integrating these ESG factors into core decision-making (European Commission, 2018).

In practical terms, this involves integrating these elements into both risk evaluation and financial decisions, with the goal of supporting initiatives and projects that are economically, socially, and environmentally viable. Both the

private sector and its stakeholders, and the public sector are important sources of the capital needed to address the social and environmental challenges that we face. There are compelling reasons why financial organizations such as banks, insurers, and investors should take account of environmental, social, and governance factors in their decisions. These factors can affect cash flows and profits. They can be a source of opportunity and growth. If not managed well, they can damage the brand and reputation. Consumers and governments expect the finance sector to act in a socially and environmentally responsible manner. The compelling need for societal intervention is evident. Sole reliance on governments cannot effectively address the reduction of global greenhouse gas emissions, mitigate the tangible consequences of climate change, or promote socio-economic upliftment. The financial industry holds significant influence in this regard. By being the primary source of capital and investments, it has the potential to introduce products that direct funds to critical sectors. Additionally, this sector can motivate affiliated businesses and entities to adopt proactive measures (Buchner et al., 2011).

How has sustainable finance evolved?

During the 1980s and 1990s, the concept of Corporate Social Responsibility (CSR) began to emerge. Yet, for many entities, CSR was more of an ancillary activity rather than foundational to their mission (Carroll, 1999). With the evolution of regulations and increasing societal and media scrutiny, businesses began to integrate sustainability into their core strategies, recognizing its potential for competitive differentiation (Porter & Kramer, 2006). Starting in the early 2000s, the sustainable finance arena saw transformative shifts. Influenced by policy directives, regulatory guidelines, and the industry's own initiatives, significant milestones were achieved, such as the introduction of the UN-supported Principles for Responsible Investment in 2006 (UNPRI, 2006). Further advancements included the European Investment Bank's debut of the first climate awareness bond in 2007 and the World Bank's inaugural green bond in 2008 (World Bank, 2008). The decade-spanning 2010 to 2020 witnessed rapid progress in sustainable finance. Notably, 2015 marked the initiation of three key global directives: the Addis Ababa Action Agenda on Financing for Development, the Sustainable Development Goals (SDGs), and the Paris Climate Agreement (United

Nations, 2015). Post this landmark year, there has been a renewed focus by both local and global regulators on sustainable finance, aiming to embed long-standing principles into actionable policies that prioritize sustainability in financial decision-making (Schroeder, 2017).

The concept of sustainable finance has evolved considerably over the decades (Richardson, 2008). Its roots can be traced back to ethical and socially responsible investments (Sparkes & Cowton, 2004). This landscape has expanded and refined its focus in response to global challenges and the increasing acknowledgment of the interdependence between finance and sustainable development. The timeline-wise evolution is listed below.

- **Ethical Beginnings (1970s-1980s):** The inception of sustainable finance is often linked to ethical investments. Initially, this took the form of negative screening, wherein investors would exclude companies involved in controversial activities, such as tobacco or weapons. The apartheid regime in South Africa, for instance, saw significant divestment campaigns.

- **Emergence of Positive Screening (1990s):** Instead of just excluding certain sectors, there was a shift towards positively selecting companies based on their ESG performance. Mutual funds began offering "green" or "ethical" portfolios (Sparkes & Cowton, 2004).

- **Mainstreaming ESG (2000s):** The new millennium saw a surge in the integration of ESG factors into mainstream investment practices. Notable initiatives include the launch of the United Nations Principles for Responsible Investment (UN PRI) in 2006, which provided a global standard for responsible investing (United Nations Principles for Responsible Investment, 2006).
- **Climate Finance (2010s):** With the intensification of global climate change discourse, especially following agreements like the Paris Agreement in 2015, there was a heightened emphasis on directing

finances towards climate-resilient projects and reducing carbon footprints (Buchner et al., 2019).

- **Regulatory and Policy Push (Late 2010s-2020s):** Governments and regulators began acknowledging the role of the financial sector in achieving sustainability objectives (European Commission, 2020). Consequently, a range of regulations, guidelines, and standards have emerged globally to guide and monitor the sustainability of financial flows.

- **Innovative Financial Instruments:** Green bonds, sustainability-linked loans, and impact investment funds have become increasingly prevalent, offering investors and financial institutions tools to direct capital towards sustainable ventures.

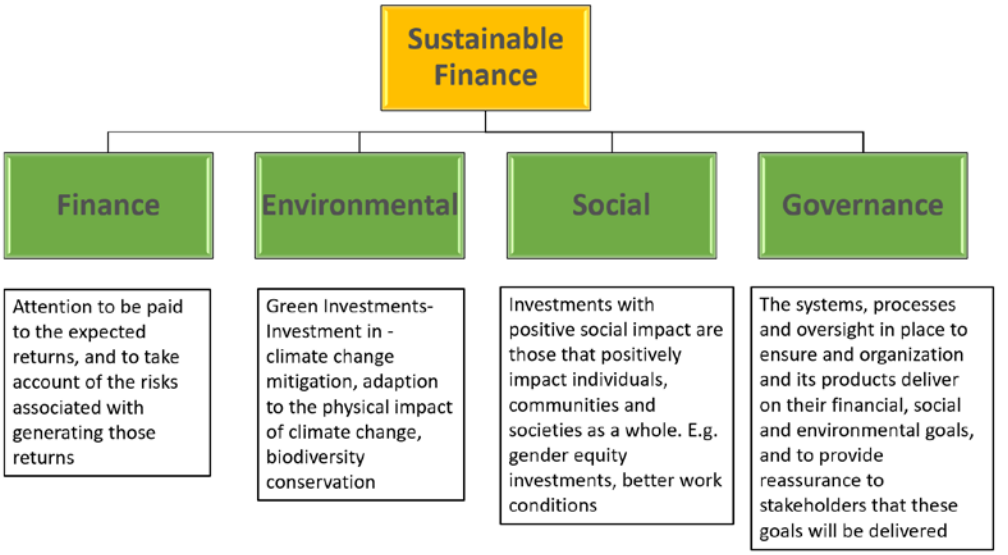
- **Stakeholder Activism and Transparency:** The rise of shareholder activism and increased demand for corporate transparency has pushed companies to disclose ESG metrics and align with sustainable finance principles.

In summary, sustainable finance has evolved from niche, ethically-driven decisions to a robust, mainstream movement deeply intertwined with global sustainability goals (Richardson, 2008). Its trajectory reflects the financial sector's growing responsibility and potential to steer the world towards a sustainable future.

4. Scope of Sustainable Finance

Sustainable finance represents a paradigm shift in the financial world, emphasizing the profound connection between economic systems and the long-term well-being of society and the planet. Its scope is vast, spanning various sectors, instruments, and strategies, all aimed at fostering positive environmental, social, and governance (ESG) outcomes.

Exhibit 1. Sustainable Finance – Balancing Financial and ESG Outcomes



Source: Author

4.1 Sectors and Industries:

- Renewable Energy: Financing renewable projects like solar, wind, and hydropower to promote clean energy transition.
- Agriculture: Supporting sustainable farming techniques that enhance food security and minimize environmental degradation.
- Infrastructure: Funding sustainable urban development and transport systems, ensuring they are resilient and environmentally friendly.
- Healthcare: Investing in health systems that are accessible and can withstand challenges, such as pandemics.

4.2 Financial Instruments:

- Green Bonds: Debt securities that fund environmental projects, ensuring the capital is directed towards green initiatives (Ehlers & Packer, 2017).
- Social Bonds: These are meant for projects with positive social outcomes, such as affordable housing or education.

- Sustainability-linked Loans: Loans with terms that may change based on the borrower's achievement of predefined sustainability objectives.
- Impact Investing: Investments made to generate measurable environmental and social impacts alongside financial returns.

4.3 Risk Management:

- ESG Risk Assessment: Analyzing potential risks related to environmental, social, and governance factors that might affect investment returns.
- Climate Risk Analysis: Evaluating financial products and portfolios for risks associated with climate change, such as potential stranded assets in fossil fuels.

4.4 Corporate Governance:

- Promoting ethical leadership, anti-corruption measures, and overall good governance practices within organizations to ensure sustainability in operations and strategies.

4.5 Transparency and Reporting:

- Emphasizing the importance of disclosing ESG metrics and achievements, ensuring stakeholders are well-informed and companies are held accountable.

4.6 Stakeholder Engagement:

- Engaging with investors, consumers, and communities to ensure that financial strategies align with broader societal values and expectations.

4.7 Regulatory Compliance:

- Adhering to emerging global and local regulations and guidelines that emphasize sustainable practices within the financial sector.

In essence, sustainable finance widens the lens through which financial success is viewed, incorporating long-term environmental and social prosperity. Its broad scope underscores the myriad ways in which finance can be a powerful tool in shaping a sustainable future.

5. UN Sustainable Development Goals

Sustainable finance plays a pivotal role in realizing the United Nations' 2030 Agenda for Sustainable Development. The 17 Sustainable Development Goals (SDGs) set out by the United Nations in 2015 serve as a blueprint for achieving a more sustainable future for all. These goals tackle critical global challenges, including poverty, inequality, climate change, and environmental degradation. Sustainable finance is intimately connected with the realization of these objectives.

The SDG agenda means that one needs to transition from business as usual to sustainable business models that use sustainable finance and use SDGs as a guideline while designing business models. SDGs help as a target and measurement criteria for ESG scores, ratings, and screening.

Exhibit 2. The Sustainable Development Goals

Source: THE 17 GOALS | Sustainable Development (un.org), SDG_Guidelines_AUG_2019_Final.pdf (un.org)

5.1 Distribution of SDG's

Exhibit 3. The distribution of SDGs

Economic goals	Societal goals	Environmental 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 industrialization and foster innovation Goal 10. Reduce inequality within and among countries Goal 12. Ensure sustainable consumption and production patterns	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	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, halt and reverse land degradation and halt biodiversity loss Overall goal Goal 17. Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development

Source: Author

Linkage between Sustainable Finance and SDGs:

- Resource Mobilization: Achieving the SDGs requires an estimated $5-7 trillion per year until 2030. Given the scale of financing needed, it's imperative to steer private capital towards projects and investments that align with these goals. Financial instruments, such as green bonds and impact investments, can mobilize the necessary funds (UNCTAD, 2014).

- Risk Management: Financial institutions and investors increasingly recognize that risks associated with environmental and social issues can jeopardize investments. By integrating SDG-related targets into their risk assessment frameworks, these entities can promote resilience and long-term value creation.

- Innovation in Financial Products: The demand for SDG-aligned investment opportunities has spurred the creation of innovative financial products. Funds and indices that align with specific SDGs offer investors a chance to contribute directly to these global goals.

- Transparency and Reporting: The push for sustainable finance has led to enhanced disclosure of ESG metrics, enabling stakeholders to gauge how financial activities align with the SDGs. Several reporting

standards, including the Global Reporting Initiative (GRI) and the Sustainability Accounting Standards Board (SASB), guide companies in communicating their SDG contributions (KPMG, 2017).

- Public-Private Collaborations: Achieving the SDGs necessitates collaboration across sectors. Public-private partnerships in the financial realm can pool resources, share risks, and amplify the impact of SDG-related projects (World Bank, 2016).

In conclusion, sustainable finance is not just a trend but a necessity in the context of global sustainability challenges. Its alignment with the UN SDGs underscores the financial sector's responsibility and potential to drive meaningful change.

Integration of sustainability in financial instruments and sectors:
Sustainable Investing: Sustainable investing, sometimes termed socially responsible investing (SRI), involves the incorporation of environmental, social, and governance (ESG) factors into investment decision-making. Over the years, multiple approaches have emerged within the umbrella of sustainable investing. Here's a closer look at some of these approaches:

5.2 Features and Categorization of Sustainable Finance

- ESG Integration: This involves the systematic inclusion of ESG factors into traditional financial analysis. The aim is to enhance long-term returns and risk management. Companies with sound sustainability practices are better positioned for long-term success.

- Socially Responsible Investing (SRI): SRI is an investment approach that integrates ESG factors into the decision-making process. SRI investors aim to support companies and projects that promote positive social and environmental impacts, while also seeking competitive financial returns.

- Impact Investing: This approach targets investments that are designed to achieve a specific environmental or social outcome alongside some

financial return. The main goal is to create tangible positive impacts, such as improved access to education or clean water.

6. Approaches to Sustainable Investing

"Sustainable Finance 1.0," "Sustainable Finance 2.0," and "Sustainable Finance 3.0" are conceptual phases that describe the evolution of sustainable finance practices. These terms signify the progression of environmental, social, and governance (ESG) factors integration within the financial sector and investment strategies. They are not attributed to a specific author but are commonly used to represent the development in the field of sustainable finance over time.

Exhibit 4. Approaches to Sustainable Investing

Sustainable Finance Typology	Equity	Bonds	Banking	Insurance
Sustainable Finance 1.0	Exclusion			
Sustainable Finance 2.0	ESG Integration			
Sustainable Finance 3.0	Impact Investing	Green Bonds, Social Bonds	Impact Lending, Microfinance	Micro insurance

Source: Author

Sustainable Finance 1.0: The Foundation (Pre-2000s) This phase characterizes the initial stages of incorporating sustainability considerations into financial decision-making processes. The primary focus during this era was on ethical investing, where investors avoided companies engaged in industries considered harmful, such as tobacco or weapons. Sustainable Finance 1.0 was largely confined to a niche market and had limited adoption within mainstream finance.

Key features of Sustainable Finance 1.0 included negative screening and the use of exclusionary criteria. Ethical investment strategies were developed to avoid detrimental investments, rather than actively seeking sustainable opportunities.

Sustainable Finance 2.0: ESG Integration (2000s to Early 2010s) Sustainable Finance 2.0 marked a pivotal shift towards the integration of ESG factors into investment analysis and decision-making processes. This stage saw the rise of ESG data providers, the creation of sustainability indices, and an increased emphasis on corporate sustainability reporting.

The systematic integration of ESG factors into investment strategies characterized this phase, including the establishment of ESG ratings and rankings and the proliferation of responsible investment products like ESG-themed mutual funds and exchange-traded funds (ETFs).

Sustainable Finance 3.0: Impact and Sustainable Development (2010s and Beyond) This phase signifies the present and future orientations of sustainable finance, focusing on risk management and promoting positive environmental and social impacts. There is an increasing trend towards investments that align with sustainable development goals, climate action, and societal well-being.

Key features of Sustainable Finance 3.0 include impact investing, green finance initiatives, the issuance of sustainable bonds such as green bonds and social bonds, the integration of the United Nations Sustainable Development Goals (SDGs), and a broader understanding of sustainability that extends beyond ESG factors.

Sustainable Finance 3.0 also emphasizes corporate engagement, shareholder activism, and efforts to encourage companies to enhance their sustainability practices.
This evolution reflects the shifting awareness and priorities of investors and the financial industry in addressing global sustainability challenges through responsible investing practices. Each stage builds upon the preceding one,

with Sustainable Finance 3.0 representing a more comprehensive and proactive approach to integrating sustainability into finance.

In conclusion, sustainable investing isn't monolithic. Different approaches cater to diverse goals, risk appetites, and ethical considerations. As global challenges intensify, these strategies gain prominence, showcasing the financial sector's capability to drive positive change.

Conclusion

Sustainable finance has matured from ethical investing to mainstream financial practice, with ESG factors becoming critical to risk management and investment strategies. It underpins economic growth while addressing urgent environmental and social issues, directly supporting the achievement of the UN Sustainable Development Goals (United Nations, 2015). Its scope now spans multiple sectors, leveraging instruments like green bonds and impact investments to encourage sustainable practices (Climate Bonds Initiative, 2021). With varied approaches, including ESG integration and impact investing, sustainable finance is reshaping the financial landscape, balancing profit with planetary and societal welfare (Friede, Busch, & Bassen, 2015). As challenges escalate, sustainable finance stands as a testament to the financial industry's evolving responsibility and potential for driving significant global change.

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Chapter-2

CLIMATE RISK

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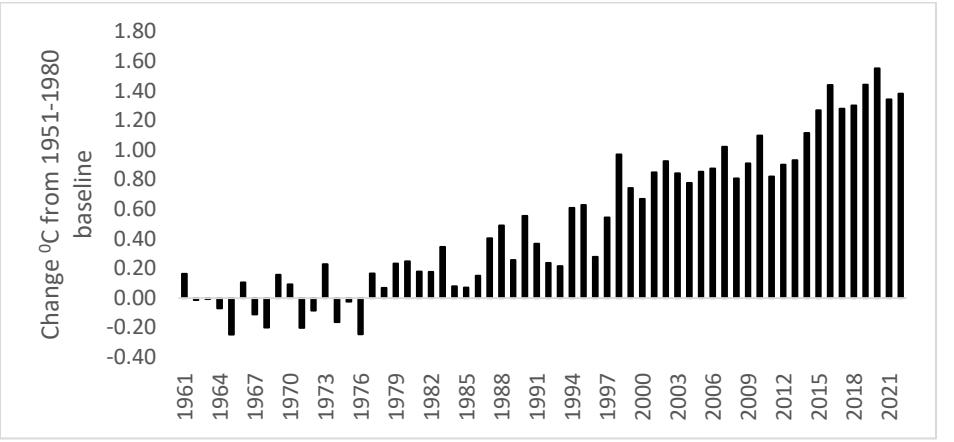
1. Introduction

Climate refers to long-term patterns in weather. Climate change, therefore, refers to the long-term changes in temperature and other climate features. The most important climate change observed over the past 150 years has been a rise in temperature by around 1.1 degrees Celsius. This trend accelerated since the late 1980s which can be seen from Figure 1 below.

Figure 1. Mean Surface Temperature Change



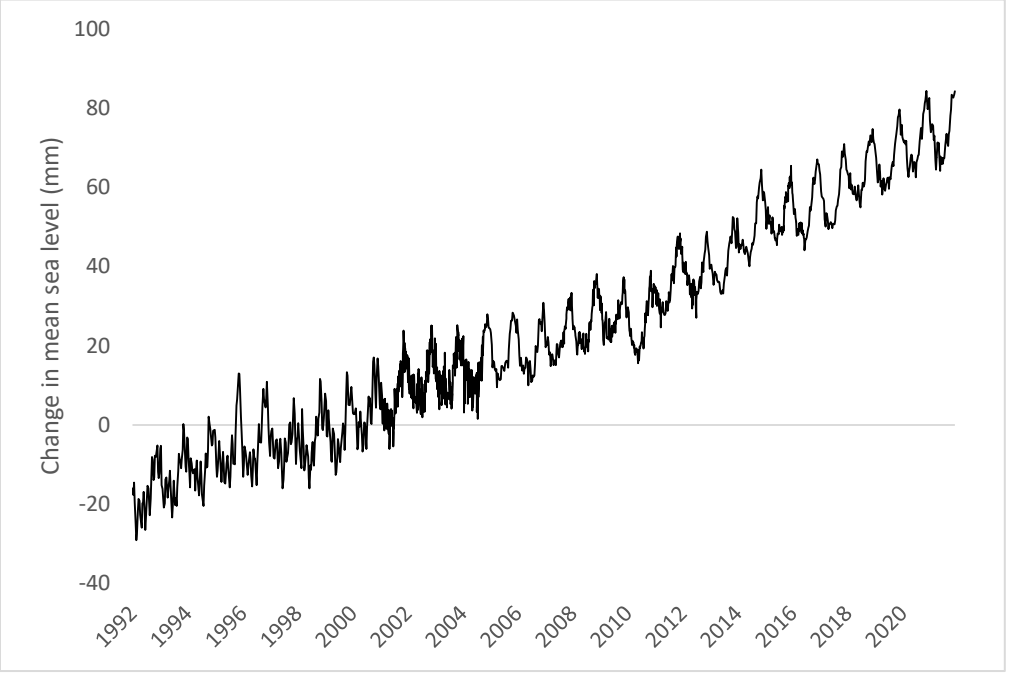
Source: Based on data from Food and Agriculture Organization Corporate Statistical Database as reported at IMF Climate Change Dashboard, https://climatedata.imf.org/pages/climatechange-data#cc1

The rise in earth's surface temperature is also corroborated by the increase in temperature measured by satellites as also by an increase in the ocean heat content. Land has warmed more than the ocean, while the northern hemisphere has warmed more than the southern hemisphere.

There is also evidence of melting of ice due to the increase in temperature, which can be measured as loss of arctic sea ice extent (in million sq km) and glacier ice (in tonnes per sq m). Further, as ice melts it reveals the darker ocean below which has lower reflectivity and absorbs more heat (albedo effect). This feedback loop causes further increase in temperature and more ice to melt.

The sea level has also risen on an average due both to the melting of ice and expansion consequent to the temperature increase. The increase in mean sea level has been approximately 20 cm over the past hundred years, and 10 cm over the past 30 years (see Figure 2).

Figure 2. Change in Mean Sea Levels



Source: Based on Sea Level Rise data from NOAA Laboratory for Satellite Altimetry, as reported at IMF Climate Change Dashboard, https://climatedata.imf.org/pages/climatechange-data#cc3

2. Physical Impact of Climate Change

The consequences of climate change are expected to be severe. Extreme temperatures can reduce agricultural yields, reduce work productivity, and extreme hot and cold weather conditions may even lead to fatalities.

Precipitation (rain) is expected to increase but also become more uneven. As a result, dry regions may become even drier while regions with high precipitation may witness even more excessive rainfall. Extreme weather events may become more intense as well as more frequent.

As a consequence of the climate change, infrastructure that has been built under current climate assumptions would need to be rebuilt. For instance, agriculture may become unviable in certain regions and hence the associated irrigation systems may no longer be useful. As another example, increasing sea levels may bring coastal areas under water, affecting existing urban infrastructure.

In the worst case, we may risk reaching a 'climate tipping point', meaning a large and rapid shift to a new state of climate, which would be catastrophic, since adapting to the same would be extremely challenging.

3. Cause of climate change: The Greenhouse Effect

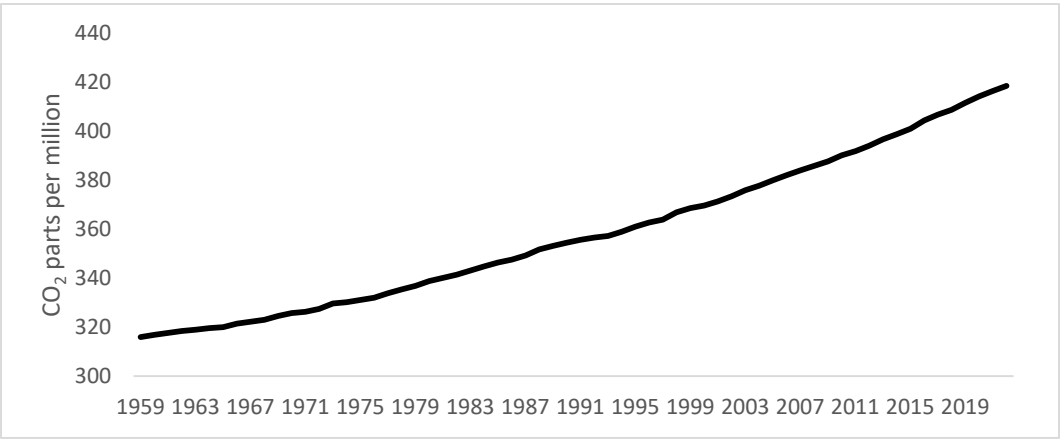
The earth and its atmosphere absorb part of the energy received from sun, but radiate most of it back to space. The radiant heat is absorbed by greenhouse gases in the atmosphere. The energy balance between the received, absorbed and radiated energy determines the average global temperature.

As the mass of greenhouse gases increases, the atmosphere traps more heat, leading to higher temperatures. This is known as the greenhouse effect. The significant constituents of the earth's atmosphere, nitrogen (78%), oxygen (21%), or argon (<1%), do not contribute to the greenhouse effect. Greenhouse effect is attributed mainly to water vapour (4%) and trace gases, like carbon dioxide and methane.

The water vapour becomes the largest contributor to the greenhouse effect purely because of its relative prevalence. Its prevalence, however, is part of the constant water cycle, as water evaporates from the earth's surface, rises with warm updrafts into the atmosphere, then condenses as clouds, is blown by the wind and falls back to the ground as rain or snow. Though increase in earth's temperature does lead to higher creation of water vapour which then increases global warming, water vapour prevalence does not by itself increase due to human activity and hence is not considered a relevant factor for policy response to climate change.

The major cause of concern for global warming is carbon dioxide (CO_2). Despite low prevalence of 419 parts per million (ppm) in air, it contributes significantly to global warming. Further, since late 18th century, CO_2 in the atmosphere has increased by an alarming 135 ppm due to burning of fossil fuels, industrial combustion and other human activity. In the past 50 years, 44 per cent of the CO_2 released has been added to the atmosphere. Out of the remaining 56%, half is absorbed by oceans, contributing to ocean acidification, with adverse consequences for marine life. The other half is used by plants on the land (along with water from soil and air) to create oxygen and glucose. A factor that adds to the concern about CO_2 is its long lifetime in the atmosphere, meaning that it contributes to long-term climate change.

Figure 3. Atmospheric Carbon Dioxide Concentrations



Source: Dr. Pieter Tans, NOAA/GML (gml.noaa.gov/ccgg/trends/) and Dr. Ralph Keeling, Scripps Institution of Oceanography (scrippsco2.ucsd.edu/)

Methane (CH_4), is the next largest contributor to global warming. Despite its much lower prevalence (1.9 ppm), its global warming potential is manifold that of CO_2, implying an impact that is disproportionate to its prevalence (IPCC, 2014). Over half of the methane is created by human activities including fossil fuels (oil and gas – 23%, coal mining – 12%), waste (20%) and agriculture (manure and enteric fermentation – 32%, rice cultivation – 8%). Methane also contributes indirectly to global warming by releasing water vapour in the stratosphere through oxidation and ozone in the troposphere and stratosphere. Methane is relatively short-lived in the atmosphere and hence its removal would help to combat near-term climate change.

Figure 4. Global Warming Potential of Greenhouse Gases

		GWP		**GTP**	
	Lifetime (yr)	**Cumulative forcing over 20 years**	**Cumulative forcing over 100 years**	**Temperature change after 20 years**	**Temperature change after 100 years**
CO_2	a	1	1	1	1
CH_4	12.4	84	28	67	4
N_2O	121.0	264	265	277	234
CF_4	50,000.0	4880	6630	5270	8040
HFC-152a	1.5	506	138	174	19

GWP: Global Warming Potential (related to CO_2); GTP: Global Temperature Change Potential (relative to CO_2); Radiative forcing: Radiative forcing is the strength of a driver of climate change, measured as the change in energy flux in watts per square meter

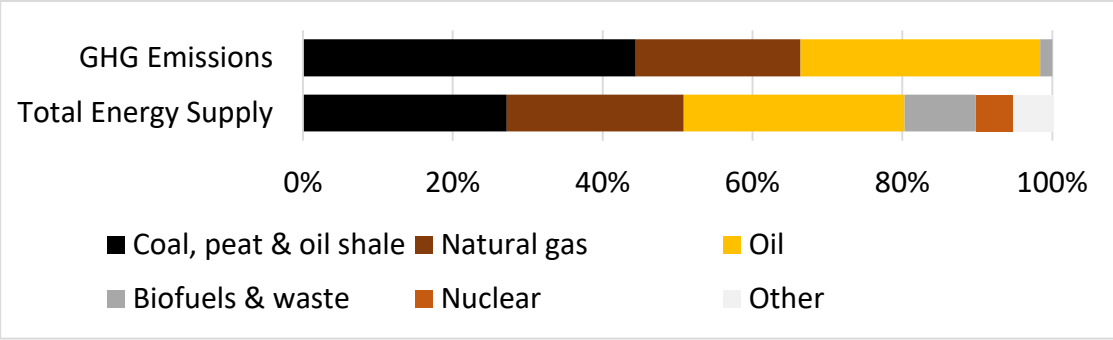
a: No single lifetime can be given for CO_2
Source: IPCC, AR5 Synthesis Report, 2014

Other significant greenhouse gases include nitrous oxide, halocarbons and ozone. The relative contribution to greenhouse radiative forcing in decreasing

order is as follows: CO_2 (56%), methane (15%), nitrous oxide (5%), halocarbons (11%) and ozone (12%).

Fossil fuels are a major source of GHG emissions. Coal is the largest contributor to GHG emissions, followed by petroleum, and natural gas.

Figure 5. GHG Emissions



Source: Based on data from IEA Greenhouse Gas Emissions from Energy Data Explorer, https://www.iea.org/data-and-statistics/data-tools/greenhouse-gas-emissions-from-energy-data-explorer

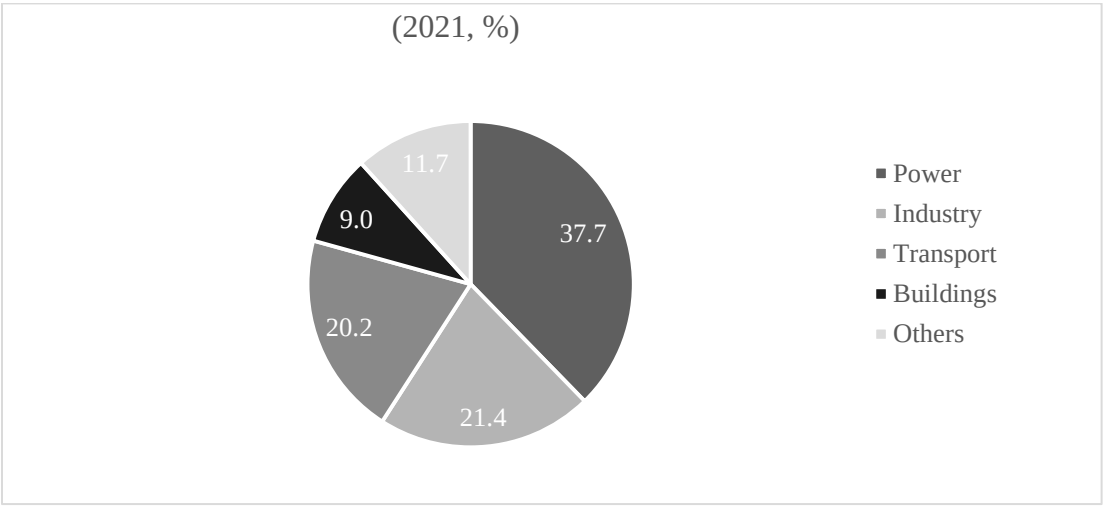
Figure 6. Emission by fuel type

Fuel	**kg CO_2/MMBtu**	**g CH_4/MMBtu**	**g N_2O/MMBtu**
Coal	93-104	11	1.6
Natural gas	53	1	0.10
Petroleum products	61-76	3	0.60

Source: Based on data from US EPA GHG Emission Factors Hub, https://www.epa.gov/climateleadership/ghg-emission-factors-hub

The largest contributors to CO_2 emissions by sector include power, followed by industrial combustion, transport and buildings.

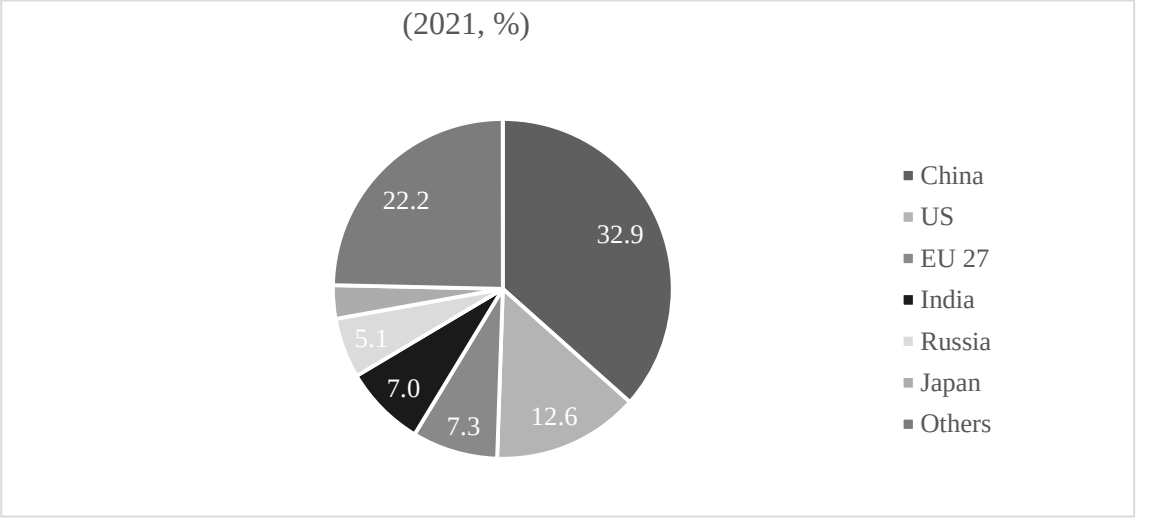
Figure 7. Share of CO_2 Emissions by Sector



Source: IEA-Edgar CO2, https://edgar.jrc.ec.europa.eu/report_2022

Among countries, China is the largest contributor to CO_2 emissions, followed by the US.

Figure 8. Share of CO_2 Emissions by Country



Source: IEA-Edgar CO2, https://edgar.jrc.ec.europa.eu/report_2022

4.

5. Scientific Consensus about Climate Change

Today there is a broader consensus about climate change than which existing three decades ago. The Intergovernmental Panel on Climate Change (IPCC) may be credited with evolving and nurturing this consensus. The World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) established IPCC in 1988 to provide governments with scientific information to develop climate policies. Today IPCC is an internationally accepted authority on climate change.

The IPCC does not do original research. Rather it examines all relevant scientific literature. It informs governments about the state of knowledge of climate change and possible response options. It periodically releases Assessment Reports (ARs) about climate change, which play a key role in annual climate negotiations. The IPCC has prepared six assessment reports till date, the latest AR6 was finished in March 2023. The fifth Assessment Report (AR5) of IPCCC was an important influence on the Paris Agreement, 2015.

Though the Paris Agreement set a goal to hold "the increase in global temperature to well below 2^0C above pre-industrial levels" (United Nations, 2015), per the IPCC, crossing the 1.5°C threshold can cause severe climate change effects, including more frequent and severe droughts, heatwaves and rainfall. To limit global warming to 1.5°C, greenhouse gas emissions must peak before 2025 at the latest and decline 43% by 2030 (IPCC 2023).

IPCC's path has not been without challenges. In the past it has been criticized for its peer review and editorial processes, especially after an error was highlighted in its AR4 report. There have also been criticisms regarding the influence of governments and their industry lobbies. Some environmental scientists consider IPCC to be too conservative in their assessments of climate risks, consistently underestimating the pace and extent of climate change.

The IPCC's efforts have resulted in evolving a consensus. Today there is broad agreement about the extent of climate change, the role of human activity in causing climate change and future climate scenarios. It is also well-accepted

that some of the ongoing changes, such as the rise in sea levels, are irreversible over at least the lifetime of the humans alive today.

6. Policy Responses

Mitigation and adaptation are two main forms of government policy responses that have been envisaged. Mitigation involves minimizing climate change in the first place, largely by reducing GHG emissions. Adaptation refers to responding to the negative effects of climate change. For example, in response to increasing sea levels, the adaptative response will be to build sea walls, or relocate the vulnerable communities.

Mitigation

Reducing energy consumption is the most obvious mitigation response. One alternative is to encourage circular economy, urging producers and consumers to share, reuse, repair, refurbish and recycle existing materials and products. It applies to resource-intensive sectors such as electronics, plastics, textiles, and construction. An example would be to reduce packaging waste by clear labelling to promote reuse and recycling.

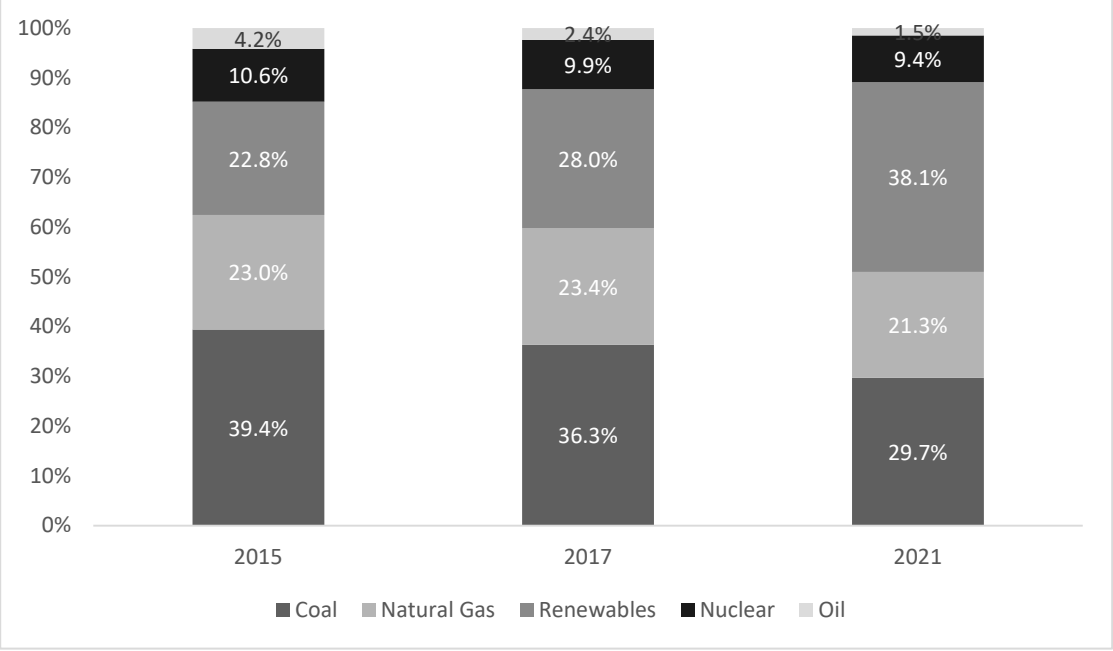
Energy consumption can also be reduced by mandating improvements in energy efficiency. Across industries, governments may mandate minimum energy performance standards for motors and driven equipment, as well as energy audit programs. In transport sector, governments may specify fuel efficiency standards for vehicles. Buildings can be made near-zero energy by improving energy efficiency of lighting, heating, cooling and insulation.

Another mitigation response is to mandate a shift to cleaner energy. There are renewable energy alternatives to fossil fuels such as wind and energy as well as conventional alternatives such as hydroelectric power and nuclear energy. Solar and wind energy have become cost competitive. However, they have the disadvantage of being intermittent sources, implying the need to balance their use with other sources. Hydroelectric power is widespread, but cannot be scaled up further due to local environmental risks associated with the risk of flooding, with negative effects on local communities, native plants and

animals. Nuclear energy, though a mature technology, is associated with high capital cost and risk of nuclear radiation.

The share of renewable energy alternatives has been steadily increasing across the world. A key challenge is to integrate the variable energy with the power system, which has traditionally developed based on permanent energy sources.

Figure 9. Global Electricity Generation by Source



Source: IEA, Global electricity generation by technology, 2015, 2021 and 2027, IEA, Paris https://www.iea.org/data-and-statistics/charts/global-electricity-generation-by-technology-2015-2021-and-2027

Adaptation

Policy responses for adaptation may be divided into vulnerability and exposure reduction, structural measures and institutional measures.

Vulnerability can be improved through access to education, nutrition, health facilities, energy, safe housing, as well as by diversifying sources of income and livelihood. Alternatively, vulnerability can be reduced by establishing

early warning systems. Another vulnerability reduction measure can be to maintain wetlands, and urban green spaces.

Structural measures can range from building sea-walls and coastal protection structures to developing new crop varieties. Ecological restoration, soil conservation, afforestation and reforestation also constitute structural measures. Other measures would include social safety nets and food banks.

There can be several institutional measures for adaptation include financial incentives, insurance and catastrophe bonds. (Catastrophe bonds are high-risk, high-yield bonds issued by insurers, which would forgo repayment of principal if catastrophe occurs and instead use it to settle claims). Land-zoning laws and building standards, are other forms of institutional measures, as are disaster planning and preparedness measures.

Geo-engineering

Geoengineering, a third form of response, would involve attempts to manipulate the climate system for example, attempting to reduce the solar energy absorbed by earth by reflecting solar radiation back into space. This can be done by increasing earth's albedo (surface reflectivity). However, it is today considered a premature response given limited understanding, raising scientific and technical questions, as also ethical and legal issues.

7. Multilateral Environmental Agreements

Since the earth's climate is a system that cuts across national boundaries, policy measures should not be undertaken in silos. The United Nations Framework Convention on Climate Change (UNFCCC), set up an environmental treaty, signed by 154 countries, at Rio De Janeiro, Brazil, in 1992.

Under the UNFCCC framework, annual climate change conferences were held to serve as formal meetings of UNFCCC parties. These were called UNFCCC Conference of the Parties, or COPs. So far 27 COPs have been held under the UNFCCC framework till 2022. Two of the important COPs were COP3 and

COP21. The COP3 held at Kyoto, Japan, in 1997, adopted the Kyoto Protocol for GHG reduction. The COP 21 held at Paris, France, in 2015, adopted the Paris Agreement for GHG reduction.

Kyoto Protocol, 1997

Despite being adopted in 1997, the Kyoto Protocol came into force only in 2005, after a complex ratification process by each country. It aimed to commit countries to decrease greenhouse gas (GHG) emissions by agreed targets. (These targets excluded the industrial gases, chlorofluorocarbons or CFCs. The 1987 Montreal Protocol dealt with ozone depleting substances like the CFCs).

It only bound developed countries under the principle of "common but differentiated responsibility and respective capabilities" (United Nations 1998) because it recognized that developed countries are primarily responsible for the present high GHG emission levels.

During the first commitment period of 2008-2012, 37 industrialized countries and the European Community (then consisting of 15 members) committed to reducing GHG emissions to an average of five per cent against 1990 levels. In this period, 36 developed countries reduced their emissions. However, nine countries used the flexibility mechanism under the protocol, allowing emissions trading and other means instead of directly reducing their emissions. Despite the cutbacks from the participating countries, global emissions increased by 32% from 1990 to 2010.

In 2012, participating countries agreed to extend the agreement to a second commitment period ending in 2020 as per the Doha Amendment to the Kyoto Protocol. In the Doha amendment 37 countries had binding targets (34 ratified). The parties committed to reduce GHG emissions by at least 18 per cent below 1990 levels during the 2013 to 2020 period.

However, Canada withdrew from the protocol, while Japan, New Zealand and Russia did not take on new targets. The US has never ratified the Kyoto Protocol.

Many have criticized the Kyoto Protocol for having a modest effect on curtailing emissions growth. Some developed countries were unhappy with the emerging economies' lack of quantitative emission commitments. While some viewed the flexibility mechanisms, such as emissions trading, as helping reduce costs, others saw them as ineffective in reducing emissions.

The Paris Agreement, 2015, emerged as a successor to the Kyoto Protocol.

Paris Agreement, 2015

The Paris Agreement was adopted in 2015 as a legally binding treaty on climate change by 196 Parties at the UN Climate Change Conference (COP21) in Paris, France. It became effective in November 2016. Of the UNFCCC members, only Iran, Libya and Yemen have not ratified the agreement. In 2020, the United States withdrew from the treaty. However, it rejoined in 2021.

The goal of the Paris Agreement is to hold "the increase in the global average temperature to well below 2°C above pre-industrial levels" and make efforts "to limit the temperature increase to 1.5°C above pre-industrial levels" (United Nations, 2015). However, experts today emphasize the need to cap the global warming to 1.5°C by the turn of this century, particularly following IPCC's current assessments, which indicate more severe consequences of global warming than were previously estimated.

Under the Paris Agreement, each country had to submit a 'Nationally Determined Contribution' (NDC) – a climate action plan. Unlike the Kyoto Protocol, the Paris Agreement blurs the distinction between developing and developed countries in cutting emissions. The sharing of the burden by developing countries enabled acceptance by several developed countries who had indicated their disagreement with remission for emerging economies.

The Paris Agreement requires countries to commit to increasingly ambitious climate action in five-year cycles. Since 2020, governments have been submitting their NDCs. Each successive NDC must reflect a higher degree of ambition than the previous version. In their NDCs, countries commit to steps

they will take to reduce their greenhouse gas emissions to achieve the Paris Agreement goals. Governments also share in their NDCs steps they will take to build resilience to adapt to the impacts of climate change. A 'Global Stocktake' assesses the progress, with the first evaluation due in 2023. Governments should use the outcomes as inputs for new NDCs.

The procedures surrounding the NDCs are binding, though not the NDCs themselves. These procedures include the preparation, communication and maintenance of successive NDCs, submission of a new version every five years, and information regarding the implementation. However, there is no enforcement mechanism to ensure that a country will establish an NDC target by a specific date or meet its targets.

As per the latest NDC synthesis report (UNFCCC, 2023), 94% of the parties have stated numerical mitigation targets, 80% have mentioned economy-wide targets. All the NDCs cover carbon dioxide emissions, while 91% cover methane.

Some examples of NDCs include:

- EU: Cut emissions by 55% below 1990 by 2030, reach net-zero by 2050
- US: Cut GHG emissions by 50% below 2005 by 2030, reach net-zero by 2050
- China: Level-off emissions by 2030, reach net-zero by 2060
- India: Cut emissions by 45% below 2005 by 2030 (updated in Aug 22 from the earlier 33-35% target); net zero by 2070; 50% of power capacity will be based on non-fossil fuels by 2030 (updated in Aug 22, from the earlier 40% target).

(Net-zero refers to carbon emissions net of carbon sinks (ocean, soil and forests) reaching zero. According to IPCC estimates, net zero must be achieved by 2050 to limit global warming to 1.5^{o}C.)

To better frame the efforts towards the long-term goal, the Paris Agreement invited countries to formulate and submit "Long-Term Low Emission Development Strategies" (LT-LEDS), which are not mandatory. The Paris Agreement also provided a framework for financial, technical and capacity-building support to those countries who need it.

While many have lauded the Paris Agreement for bringing together countries, others have criticized it for being less effective in climate change mitigation since it focuses on aims and not firm commitments. Based on the current NDCs, we may exceed the targeted 1.5-2^{o}C global warming by 2100.

Climate finance in UNFCCC negotiations

Climate finance has been a key issue in UN climate negotiations. At COP16 in 2010, developed countries committed to a goal of jointly mobilizing USD 100 billion per year by 2020 to address the needs of the developing countries. As part of the Paris Agreement, 2015, the developed countries committed to continue this goal till 2025, and to set a new goal before the COP to be held in 2025, which will start from a floor of USD 100 billion per year, taking into account the needs and priorities of the developing countries. Though there have been issues with measuring the exact amounts mobilized, it is clear that the actual climate finance support to developing countries has been significantly short of USD 100 billion per year. Climate finance is likely to remain an important issue in UNFCCC negotiations going ahead.

8. Climate Related Business Risks

Climate related business risks may be divided into physical risks and transition risks. Physical risks arise due to hazards from changing climate. They may be acute (ex. floods, hurricanes, wildfires) or chronic (related to rising temperatures or sea level). They may be direct, related to the manufacturing or use of the products, or indirect. Indirect risks could be related to supply chain, legal liability or systemic (ex. affecting employee productivity).

Transition risks may be structural or policy-related. Structural risks include technological (such as substitution of conventional automobiles by electrical vehicles), those arising due to consumer pressures for sustainable products, reputational risks or market risks. Policy-related risks may range from outright prohibition to disincentives such as carbon taxes.
Climate-related risks can result in stranded assets & stranded human capital. Stranded assets are those that are no longer usable, for instance a manufacturing plant that is shut down due to either sea encroachment or due to zoning laws.

Business risks may vary by region (typically in the case of physical risks) or sector (typically for transition risks). Business risks would affect all the stakeholders of the business including investors, lenders, suppliers and the customers.

For instance, consider a real estate developer with properties in a coastal city. The real estate developer faces the physical risks caused by sea-level rise and more frequent storms. The increased risk of flooding of coastal real estate properties can result in lower property values. This would affect the lenders of residential and commercial property mortgages as well as the investors of mortgage-backed securities based on such properties.

Similarly, coal-based power plants face transition risks from government mandated shut downs, disincentives or competition from renewable energy. This can result in loss of revenues as well as write-off of stranded assets for the power generators, affecting the investors and lenders. Reduced production or shut down in turn would also affect the suppliers of coal and capital good and maintenance services, as well as customers, if power tariffs increase due to reduction in power availability.

An automobile manufacturer must be mindful of transition risks emanating from requirements to meet fuel efficiency standards, cut tailpipe emissions, use alternative fuels, as well as decarbonize the vehicle manufacturing process including purchased electricity.

In order to manage business risks, a corporate must firstly assess it vulnerability to climate risks. For physical risks, this will involve collecting data on local weather and climate at key manufacturing and storage locations. It will also require building scenarios assessing the likelihood and impact of climate changes and events.

For physical risks, the corporate may buy insurance if available. Alternatively, it may choose build adaptive infrastructure (such as early warning systems, coastal protection) for which it may partner with government or other local bodies for sharing costs and benefits.

For transitional risks, the corporate must assess the relevant structural trends (technology, customer preferences, competition) as well as policy changes that can impact the business. The corporate may proactively invest in new technologies and sustainable business models. Alternatively, it may ensure timely closure & divestment of potential stranded assets and businesses.

For lenders and institutional investors, it has become important to assess climate risk while making lending or investing decisions. For each asset, they must assess vulnerability to financial risks, reputational risk and legal liability. They must also periodically undertake portfolio level assessment to consider the total exposure to climate risk, including the impact of climate risk on the return correlations among the constituent loans or investments.

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Chapter-3

REGULATORY FRAMEWORKS FOR SUSTAINABLE FINANCE

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Introduction

Over the past two decades, there has been an increasing call for action from institutional investors, investment managers and lenders to support governments in meeting sustainable development goals. Starting with initiatives of investor forums and support from the United Nations, increasingly the governments and regulators are encouraging, enabling and in some cases even mandating consideration of sustainability in financial investments.

The trigger for policy actions has been the recognition of climate urgency by the governments resulting in intergovernmental initiatives to address the change through various measures including enabling environmental investments. According to the Task Force on Climate-Related Financial Disclosures (TCFD), the transition to a low-carbon economy alone is forecasted to need as much as USD one trillion of yearly investments (TCFD, 2017). The significant investment requirement is both a challenge and an opportunity for investors.

The physical risks resulting from climate change and the transition risks resulting from climate policy and technology change can significantly impact the returns and risks of invested assets. Hence, investors and their portfolio companies should consider sustainability in their long-term strategies and capital allocation. Investors are yet to determine whether the current asset valuations are considering the full implications of sustainability risks.

There have been several initiatives by financial stakeholders, including forums to discuss, agree jointly on commitments, and engage with policymakers and other relevant bodies. The United Nations (UN) has supported initiatives, such as the "Principles for Responsible Investment", "Principles for Responsible Banking", and "Principles for Sustainable Insurance", by the world's leading investment managers, banks and insurers, respectively. These initiatives require the signatories to incorporate sustainability in their decisions and to report regularly on their adherence to these principles. Despite growing membership and efforts to increase the reporting on commitments, the voluntary nature of these initiatives, limit their impact.

Responsible investment and lending require a significant increase in the extent, quality and standardisation of corporate disclosures. There are multiple disclosure frameworks by global non-governmental organisations and standard-setting bodies worldwide, in addition to the disclosure requirements set by governments and exchanges.

The most common global disclosure frameworks include the "Global Reporting Initiative" (GRI) standards and the "SASB standards" (which will be ultimately replaced by the "IFRS Sustainability Disclosure Standards" (IFRS-S)). In addition, European Commission is developing its own draft "EU Sustainability Reporting Standards" (ESRS). In several countries, the security regulators and exchanges have developed their own guidelines. In India, BRSR is the SEBI-mandated sustainability reporting framework.

The Task Force on Climate-related disclosures (TCFD), promoted by the Financial Stability Board, has provided recommendations for relevant

disclosures to investors. In the future, disclosure frameworks are likely to ensure interoperability and align with TCFD. The GRI and IFRS Foundation have signed a memorandum to coordinate their standard-setting activities. The ESRS has incorporated the features of the new IFRS-S standards as a subset of its standards.

However, there are some fundamental differences in the approaches among the recommending bodies and standard-setters, which may prevent complete harmonisation. Some (including TCFD and IFRS) define material issues from the viewpoint of investors and lenders, with greater emphasis on climate. In contrast, others (such as ESRS and GRI) consider double materiality from the perspective of both investors/lenders and other stakeholders, and place emphasis on environment and social development.

Institutional investors, investment managers and banks may conduct assessments internally or use third-party ratings. Globally, there are more than 100 providers of ESG ratings, the prominent names being MSCI, ISS ESG, Sustainalytics (owned by Morningstar), Refinitiv (owned by LSEG), Bloomberg, S&P Global and V.E. (part of Moody's ESG Solutions). Divergence in ESG ratings between the multiple rating providers is a key concern for the users of third-party ratings.

This note provides a background of investor initiatives and regulations, the disclosure standards and ESG ratings in three sections.

1. Investor Initiatives and Regulations for Sustainable Finance

1.1 Principles for Responsible Investment (PRI)

The "Principles for Responsible Investment" (PRI) were conceived in 2005 in a meeting of large global institutional investors with the Secretary General of the United Nations (UN).

PRI describes itself as "the world's leading proponent of responsible investment". It lists two aims: "to understand the investment implications of

environmental, social and governance (ESG) factors" and "to support its international network of investor signatories in incorporating these factors into their investment and ownership decisions" (PRI).

PRI operates as a non-profit organisation. Though it engages with policymakers, and the UN supports it, it is not associated with any government or a part of the UN. At the end of June 2023, PRI had 5,372 signatories across 90 countries. The total assets under management (AUM) of the signatories was US$121 trillion by March 2021 (based on 3,826 signatories). While most signatories are professional asset management companies, the list includes 732 asset owners (public pension funds, endowments, foundations, corporate pension and insurance companies). PRI has recorded a consistently high growth in the signatory base, which grew at an annual rate of 20.5% in numbers and 14.4% in AUM between March 2016 and March 2021.

Listed below are the six principles developed by the PRI for investors (https://www.unpri.org/about-us/about-the-pri).

1. "We will incorporate ESG issues into investment analysis and decision-making processes."
2. "We will be active owners and incorporate ESG issues into our ownership policies and practices."
3. "We will seek appropriate disclosure on ESG issues by the entities in which we invest."
4. "We will promote acceptance and implementation of the Principles within the investment industry."
5. "We will work together to enhance our effectiveness in implementing the Principles."
6. "We will each report on our activities and progress towards implementing the Principles."

Investor signatories must meet specific minimum requirements, including a written responsible investment policy covering at least 50% of the AUM, senior-level oversight, and internal/external staff implementing responsible investments (need not be dedicated resources).

Signatories must also provide a yearly report on responsible investment activities. The reporting framework includes both qualitative and quantitative indicators for applicable modules. For example, the applicable modules for internally managed investment managers who incorporate ESG include an organisational overview, PGS (policy, governance and strategy related to sustainability), relevant asset class modules (for example, listed equity or fixed income) and confidence-building measures. In the 2023 reporting framework, asset managers had 257 applicable indicators (189 mandatory and rest voluntary), while asset owners had 146 applicable indicators (105 mandatory and rest voluntary).

Based on the submissions, the signatories receive a public transparency report, which the PRI publishes on its website, a private transparency report, and a confidential assessment report.

The signatory based on PRIs is significant, covering a majority of large investment managers and asset owners across the world, though it is difficult to state an exact share since figures for total AUMs are not comparable due to differences in reporting and coverage across sources.

Despite the improvement in reporting frameworks over time, the engagement with member investment managers and asset owners, the UN and the policymakers, as well as the rising influence of the growing signatory base, some have raised concerns about the effectiveness of the PRI in achieving its aim of helping signatories incorporate ESG factors into their investment and ownership decisions.

Gibson Brandon et al. (2022) found that US signatories did not have better portfolio-level ESG scores than non-signatories, though signatories outside the US had superior ESG scores. Further, while the signatories outside the US improved their portfolio ESG scores after joining the PRI, the US signatories did not (raising concerns about greenwashing by the US signatories). The authors attributed the US-specific results to "commercial motives, uncertainty about fiduciary duties, and lower ESG market maturity" in the US.

1.2 Principles for Responsible Banking

The United Nations Environment Programme Finance Initiative (UNEPFI) formulated the Principles for Responsible Banking. According to the UNEPFI, "through the principles, banks take action to align their core strategy, decision-making, lending and investment with the UN Sustainable Development Goals, and international agreements such as the Paris Climate Agreement". The principles of responsible banking are implemented through impact analysis, target-setting and implementation, and reporting. According to UNEPFI, the principles have "over 300 signatory banks representing almost half of the global banking industry". The initiative also covers the Net-Zero Banking Alliance, a climate-focused banking initiative supported by banks mainly operating in developed countries.

1.3 ESG Regulations for Investment Managers and Asset Owners in Key Markets

There are two considerations for regulators to issue guidelines for Investment Managers and Asset Owners. The first is a desire to stimulate sustainable finance. The second is a concern regarding greenwashing. The guidelines may cover adherence to responsible financing and financial disclosure requirements, but there are differences in scope (with emphasis on climate or both climate and social metrics), requirements (mandatory vs voluntary) and the process by which the guidelines are framed (consultative or top-down).

In 2021, the International Organisation of Securities Commissions (IOSCO), which includes regulators across several countries, published recommendations to the members to address issues relating to risk mismanagement and greenwashing by asset managers.

US

The Securities Exchange Commission (SEC) has been developing regulations to increase ESG disclosures and prevent greenwashing by investment managers. In May 2022, the SEC proposed to extend the Names Rule to include ESG funds, to prevent funds from using misleading and deceptive

language to suggest that a fund is more ESG-conscious than it actually is. SEC also proposed to enhance several disclosures to explain how an investment company's or advisor's ESG strategy is being deployed. The SEC also charged and penalised BNY Mellon Investment Advisor for "misstatements and omissions related to ESG considerations in making investment decisions".

In the case of pension funds, fund managers and elected officials have taken opposing ideological stands, on whether it is legally permissible and appropriate for the funds to consider ESG factors in their investment decisions (Cifrino, 2023). In December 2020, the DOL issued a regulation (2020 DOL ESG Rule) requiring pension plan investment decisions to be based solely on financial considerations. However, after a subsequent change in political administration, the rule has not been enforced.

EU

The European regulators have been the early movers in issuing disclosure requirements for investment managers. The Sustainable Finance Disclosure Regulation (SFDR) is a transparency framework developed by the EU to enable investors to assess how sustainability risks are integrated in the investment decision process by the investment managers (European Commission, 2023).

The SFDR remains a work in process. A public consultation on implementation started in September 2023.

UK

In UK, the Financial Conduct Authority (UK) has introduced new rules and guidelines for asset managers and asset owners in a handbook titled 'Environmental, Social and Governance sourcebook', for disclosure of climate related financial information consistent with the TCFD Recommendations and Recommended Disclosures (FCA, 2023).

China

In 2018, the Asset Management Association of China (AMAC) announced a self-regulation standard for asset managers on green investment, the Green Investment Guidelines. The guidelines encouraged fund managers to focus on environmental sustainability and risks and promote green and sustainable economic growth.

Additionally, a large number investment management firms from China have become signatories to the PRI.

India

The Securities and Exchange Board of India (SEBI) introduced measures "to facilitate green financing and mitigate the risk of greenwashing" in July 2023 (SEBI, 2023). These measures included a new category of mutual fund schemes for ESG investing and related disclosures by mutual funds.

As part of its new measures SEBI introduced a separate sub-category of ESG Investments under the broad category of Equity schemes. Any ESG scheme can be launched with one of the following strategies – exclusion, integration, best-in-class/positive screening, impact investing, sustainable objectives, and transition or transition related investments (SEBI, 2023).

Minimum 80% of the total AUM of the ESG equity scheme should be invested in the stated strategy and the remaining 20% must not be in contrast with the strategy. In case the asset management company launches multiple ESG equity schemes, they should have different investment strategy and asset allocation. Prior to the new measures, each mutual funds could launch only one ESG equity scheme.

Earlier, the ESG equity schemes were mandated to invest only in companies which had comprehensive Business Responsibility and Sustainability Report (BRSR) disclosures. The new measures added a requirement to invest at least

65% of the AUM in companies which are also providing assurance on BRSR core disclosures, effective from October 2024.

The new measures also added disclosure requirements for ESG equity schemes. These include the following.

- Disclosing the name of ESG strategy within the name of the ESG scheme (example, XYZ Exclusionary Strategy Fund, ABC Best-in-class Strategy Fund).
- Security-wise BRSR scores and BRSR core scores by a SEBI registered ESG Rating Provider (ERP), and the name of the ERP, in the monthly portfolio statements.
- In the case of voting decisions by ESG schemes, the AMC should disclose if a resolution has or has not been supported due to ESG reasons.
- Examples or case studies and details in annual fund manager's commentary on how ESG strategy was applied for the fund and how fund managers engaged with the portfolio companies.

From India, several but not all investment management companies and some insurers have become PRI signatories. Among mutual funds, ESG investing is a new trend; out of ten operational equity ESG funds, seven started in 2021. However, ESG asset growth in India is expected to accelerate in line with global trends (CRISIL, 2022).

2. Sustainability Disclosures by Investee Companies and Borrowers

2.1 Task Force on Climate-Related Financial Disclosures (TCFD)

The Financial Stability Board (FSB) created the TCFD in 2015 to develop recommendations on information that companies should disclose to support investors, lenders and insurance underwriters in assessing risks related to climate change. The FSB is a multilateral institution set up in 2009 to monitor and make recommendations related to the global financial system. (The FSB is funded and hosted by the Bank for International Settlements, BIS, owned by member central banks).

In 2017, the TCFD published a set of recommendations "to help businesses disclose risks and opportunities arising from climate change" that would be relevant to their investors.

The core elements of the recommended disclosures constitute four areas: "governance, strategy, risk management, and metrics and targets". One of the recommended disclosures focuses on how the organisation's strategies might change based on different climate-related scenarios. TCFD further provides guidance to support all organisations in preparing such disclosures.

TCFD recommends that organisations make climate-related financial disclosures per their national disclosure requirements in their public annual filings. Those elements of TCFD-recommended disclosures, incompatible with national disclosure requirements, can be disclosed in other official company reports, at least annually, and widely distributed. Such disclosures should be subject to internal governance processes similar to regulation-mandated financial disclosures.

The TCFD's recommendations provide a foundation to improve the ability of investors and other stakeholders to assess and price climate-related risks and opportunities.

Standard-setting bodies and financial market regulators across the world are incorporating and aligning with the TCFD recommendations.

2.2 Greenhouse Gas Protocol

Though there are several standards and guidelines for accounting for greenhouse gas (GHG) emissions, the most well-established framework is the Greenhouse Gas Protocol, developed by the World Resources Institute and the World Business Council for Sustainable Development. It divides an organisation's GHG emissions into three categories:

Scope 1: Direct emissions from sources owned or controlled by the organisation (including facilities and vehicles)

Scope 2: Emissions from generating electricity consumed by the organisation

Scope 3: Indirect emissions resulting from value chain activities. Value chain activities may be upstream or downstream.

(Upstream activities include purchased goods and services, capital goods, fuel, transport and distribution, waste generated, business travel, employee commuting and leased assets. Downstream activities include transportation and distribution, processing, use and end-of-life treatment of sold products, leased assets, franchises and investments.)

Scope 3 emissions can represent the largest source of emissions for most companies and present the most significant opportunities to reduce GHG emissions.

Policymakers may choose to make Scope 1 and Scope 2 reporting mandatory (known as GHG Protocol Corporate Standard) and Scope 3 reporting optional (usually) or compulsory (as GHG Protocol Scope 3 Standard).

The Carbon Disclosure Project (CDP), a non-profit, supports companies in measuring and disclosing GHG emissions using the GHG protocol.

Though the GHG Protocol and CDP disclosures are meant for multiple stakeholders, the GHG emissions data is an essential component of sustainability-related disclosures related to environment for financial stakeholders as well. Hence, this data is covered by all the major sustainability disclosure standards and guidelines.

2.3 Taxonomies

A taxonomy is a classification scheme. In the context of sustainability, taxonomies are required to define sustainable activities. Such definitions can reducing delays in decision making by financiers, and reduce the chances of greenwashing by investees or borrowers. One of the earliest and most well-established green taxonomy has been developed by the EU.

EU Taxonomy

The European Union (EU) Taxonomy is a classification system defining economic activity criteria aligned with environmental goals. The EU officially published the EU Taxonomy Regulation in June 2020. The objective of the framework is to "create security for investors, protect private investors from greenwashing, help companies to become more climate-friendly, mitigate market fragmentation and help shift investments where they are most needed" (European Commission).

The EU Taxonomy Regulation states six EU environmental objectives – "climate change mitigation, climate change adaption, sustainable use and protection of water and marine resources, transition to a circular economy, pollution prevention and control, and protection and restoration of biodiversity and ecosystems" (European Commission).

It also sets four conditions that economic activity must meet to be Taxonomy-aligned

1. "Making a substantial contribution to at least one environmental objective"
2. "Doing no significant harm to any other environmental objective"
3. "Complying with minimum social safeguards"
4. "Complying with the technical screening criteria"

The EU taxonomy is helpful to categorise capital expenditures, revenues, and operational expenses as green. Companies and project promoters can choose to meet the criteria laid out by the EU taxonomy to attract investors interested in green opportunities. Specific to the EU, the EU Taxonomy Regulation sets mandatory requirements for disclosure for large financial and non-financial companies that fall under the Non-Financial Reporting Directive.

2.4 Global Sustainability Financial Disclosure Standards

The ability of institutional investors and creditors to adhere to the principles depends in part on the usefulness of data. Data availability and quality require regulations and standards for reporting, particularly on ESG-related issues

that are financially material. A number of disclosure standards and guidelines have developed across the world. These include global standards and region-specific or country-specific local standards. Among the global standards, two are dominant – the GRI Standards and the SASB Standards (to be replaced by IFRS Sustainability Disclosure Standards).

GRI Standards

The Global Reporting Initiative was established in 1997 by Ceres, a non-profit and Tellus Institute, a consulting agency. The initiative gained the support of the United Nations Environment Programme (UNEP). The GRI standards are the oldest sustainability reporting standards.

According to a survey conducted by KPMG in 2022, the GRI was the most dominant standard used by 250 largest companies by revenues in 2021 Fortune 500 ranking, though based on a sample of 100 companies across the world, there were differences across countries in preference between GRI, SASB and stock exchange guidelines (KPMG Survey of Sustainability Reporting 2022).

The GRI standards are used by companies to report their impacts on the economy, the environment and people in a comparable way for the benefit of multiple stakeholders including investors, lenders, policymakers, and civil society.

Materiality under the GRI includes not only financial-materiality, but materiality for people and environment in ways that do not directly impact the organisation. The standard-setting process under the GRI is consultative with representatives of multiple stakeholders, and aligned with international norms for responsible business as laid out by authorities such as the United Nations (UN), the International Labour Organisation (ILO) and the Organisation for Economic Co-operation and Development (OECD).

GRI standards contain disclosures, some which are requirements (that is, mandatory) and some which are recommendations (voluntary).

The latest GRI standards were published in October 2021, and became effective in January 2023. As per "A Short Introduction to GRI Standards" (GRI), the standards are structured as a modular system comprising the following:

1. GRI Universal Standards which apply to all organisations. These cover
   - Foundation 2021 (GR1) which outlines the purpose, clarifies critical concepts, and explains the standards.
   - General disclosures 2021 (GR2) contains disclosures related to organisation structure and reporting practices, activities and workers, governance, strategies, policies, practices, and stakeholder engagement.
   - Material topics 2021 (GR3) explains the steps by which an organization can determine the topics most relevant to its impacts, its material topics, and describes how the Sector Standards are used in this process.
2. GRI Sector Standards (for 40 sectors) which list topics that are likely to be material for most organizations in a given sector, and indicate relevant disclosures to report on these topics.
3. GRI Topic Standards which contain disclosures for providing information on 34 topics (example, waste, occupational health, tax). The topic standards include both qualitative and quantitative information.

The multiple stakeholder orientation differentiates GRI standards from standards such as SASB that are mainly financial stakeholder-oriented. Hence, materiality in GRI includes not only financial-materiality, but materiality for people and environment in ways that do not directly impact the organisation.

SASB Standards and IFRS Sustainability Disclosure Standards

The Sustainability Accounting Standards Board (SASB) was set up as a non-profit in 2011 to develop sustainability accounting standards.

Using the SASB standards, companies provide disclosures relevant to industry-specific (for 77 industries) sustainability-related risks and

opportunities that could affect either the cash flows, access to finance, cost of capital over the short, medium or long term (https://sasb.org/standards/).

The SASB standards contain industry descriptions, disclosure topics, metrics for disclosure topics, technical protocols, and activity metrics. (Activity metrics quantify the scale of activities or operations, to normalise the disclosure metrics.)

SASB's standard-setting process includes "evidence-based research, broad participation from companies, investors, subject-experts and oversight and approval from an independent SASB Standards Board".

In August 2022, the International Sustainability Standards Board (ISSB), part of the IFRS Foundation assumed responsibility of the SASB standards. The ISSB was created to consolidate the work of investor-led initiatives, including the SASB standards, the Climate Disclosure Standards Board (CDSB), the International Integrated Reporting Committee (IIRC), and the TCFD Recommendations.

The IFRS Foundation recommends that users continue to use SASB standards until they are replaced by the IFRS Sustainability Disclosure Standards. In 2023, the IFRS Foundation issued two base sustainability standards IFRS S1 and IFRS S2.

IFRS S1 are titled 'General Requirements for Disclosure of Sustainability-related Financial Information'. The objective of IFRS S1 is "to require an entity to disclose information about its sustainability-related risks and opportunities that is useful to primary users of general purpose financial reports in making decisions relating to providing resources to the entity" (IFRS S1, 2023). Primary users include investors, lenders and other creditors. For applying IFRS S1, companies must refer to the disclosure topics in the SASB standards in identifying material sustainability risks and opportunities and report on the associated metrics. For identifying certain sustainability-related risks and

opportunities, such as those related to water and biodiversity, companies may refer to CDSB framework application guidance.

IFRS S2 are titled 'Climate-related Disclosures'. The objective of IFRS S2 is "to require an entity to disclose information about its climate-related risks and opportunities that is useful to primary users of general purpose financial reports in making decisions relating to providing resources to the entity" (IFRS S2, 2023). Climate related risks are classified as physical risks and transition risks. IFRS S2 covers the financial disclosures under four headings recommended by the TCFD – "Governance, Strategy, Risk management, and Metrics and targets".

2.5 Regional and country-level disclosure guidelines

Several regions and countries have introduced their own disclosure guidelines. Realising the burden that companies will face in complying with local as well as global disclosure requirements, some (like EU and India) have attempted to ensure inter-operability or incorporation of the requirements by the global standards.

European Commission

Following the Paris Agreement, 2015, the European Commission launched a set of initiatives that were approved in 2020 as the European Green Deal, the main objective of which is to make European Union (EU) climate neutral in 2050. An intermediate goal is to cut GHG emissions by at least 55% by 2030 compared to 1990 levels. As part of the green deal, it becomes essential to enable stakeholders evaluate the sustainability performance of companies, by ensuring sufficient reporting, reliability and comparability of sustainability information. Given below are a set of reporting initiatives that were started parallel to or as a consequence of the European green deal.

Non-Financial Reporting Directive (NFRD) and Corporate Sustainability Reporting Directive (CSRD)

The NFRD came into effect in 2014 "to provide stakeholders and investors with non-financial information for assessing value creation and risks". The areas to report include "human rights, environmental protection, anti-corruption and bribery, gender, education, profession, age diversity, social responsibility and the treatment of employees". The coverage of NFRD is limited to large organisations having at least 500 employees. Enforcement includes significant penalties for non-adherence.

In 2021, the EU proposed extending the non-financial reporting requirements to all large companies and listed companies (except listed micro-enterprises) to disclose information related to social and environmental risks and their impact on people and the environment. In Jan 2023, the new CSRD became effective. Companies subject to the CSRD must report according to European Sustainability Reporting Standards (ESRS), in a phased manner (depending upon company size) starting from 2024.

European Sustainability Reporting Standards (ESRS)
The ESRS standards were developed with close involvement and public consultation with investors, companies, auditors, civil society, trade unions, academics and national standard-setters. They were approved in July 2023.

The ESRS takes a 'double materiality' perspective, which obliges companies to report on their impacts on the people and the environment. They also have to report how the social and environmental issues create financial risks and opportunities for the company.

The ESRS is aligned with the standards of the International Sustainability Standards Board (ISSB) and the Global Reporting Initiative (GRI). But there may be differences between the IFRS-S and ESRS given the former's emphasis on financial materiality for investors and the latter's emphasis on double materiality.

India

The Securities and Exchange Board of India (SEBI) introduced the Business Responsibility and Sustainability Reporting (BRSR) guidelines in May 2021 (SEBI, 2021). The new guidelines replaced the Business Responsibility Report (BRR) guidelines prescribed by SEBI in 2015.

As per the BRSR, listed companies must report on performance under nine principles. The performance indicators cover environmental, social and governance parameters and are classified as essential (mandatory) and leadership (voluntary). The disclosures are quantitative and standardised per the BRSR format prescribed by SEBI. The format covers the following nine attributes – GHG emissions, water footprint, energy footprint, circularity, employee well-being and safety, gender diversity in business, inclusive development, fairness in dealing with customers and suppliers, and openness of business (SEBI, 2021).

The companies can cross-reference their disclosures under frameworks like GRI, SASB and TCFD. BRSR filings became mandatory for the top 1000 listed companies by market capitalisation from 2022-23.

In July 2023, the SEBI prescribed a framework for assurance (for BRSR Core), updated the BRSR format, and included ESG disclosures and limited assurance for the value chain (SEBI 2023). The BRSR Core covers a subset of the ESG performance indicators under the nine-attributes of the BRSR. In the updated format, companies have to disclose the name of the assurance provider, report on additional essential indicators, some which are new and others that were earlier leadership indicators (i.e., voluntary). The assurance provider must have the required expertise and must be independent.

Top 1000 listed entities have to prepare BRSR Core disclosures as part of their annual reports, starting with top 150 companies from 2023-24. The ESG disclosures for value chain are required under 'comply or explain' approach for the top 250 companies from 2025-26.

3. ESG Data and Ratings Providers

Institutional investors, investment managers and banks may conduct internal assessments or use third-party ratings. Globally, there are more than 100 providers of ESG data and ratings, the prominent names being MSCI, ISS ESG, Sustainalytics (owned by Morningstar), Refinitiv (owned by LSEG), Bloomberg, S&P Global and V.E. (part of Moody's ESG Solutions).

Providers like Bloomberg and Refinitiv collect and aggregate publicly available data from company filings, websites, and non-profit organisations. Providers such as MSCI, Sustainalytics, V.E. and S&P Global combine publicly available information, including information collated by analysts from public websites and media, with data collected through company questionnaires/interviews. Other ESG data providers may automate their processes instead of relying on analysts to create company scores.

Another area of differentiation is the rating methodology. Raters differ in the extent to which their rating methodology has evolved to incorporate the data's materiality (relative importance). Increasingly, most ESG rating providers use materiality in their rating methodology to provide different weights to criteria for different industries (or even countries in case of governance).

Divergence in ESG ratings between the multiple rating providers is a key concern area for third-party ratings. Empirical research shows that the correlation between ESG ratings from different providers is moderate and can vary depending on what the raters choose to measure and whether it is measured consistently (Chatterji et al., 2016). Correlations between ESG ratings are higher in the case of E but lower in the case of S and G.

ESG ratings may differ because of divergence in scope (sets of attributes measured), measurement (the same attribute is measured using different indicators), and weight (relative importance of attributes). Measurement is the critical driver of divergence, followed by scope and weight (Berg et al., 2022).

These differences can have significant consequences, making evaluating the ESG performance of companies and funds challenging. Further, it can

decrease the incentive for companies to improve performance and change their focus to manage the ratings rather than ESG outcomes.

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Chapter-4

GREEN FINANCE

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1. Sustainable finance

The long-term economic development of a society is constantly reliant on the financial choices made by both public and private entities. However, for inclusive growth of society, consideration of environmental as well as social aspects of investment opportunities has become indispensable and hence the need for understanding Sustainable Development through sustainable finance.

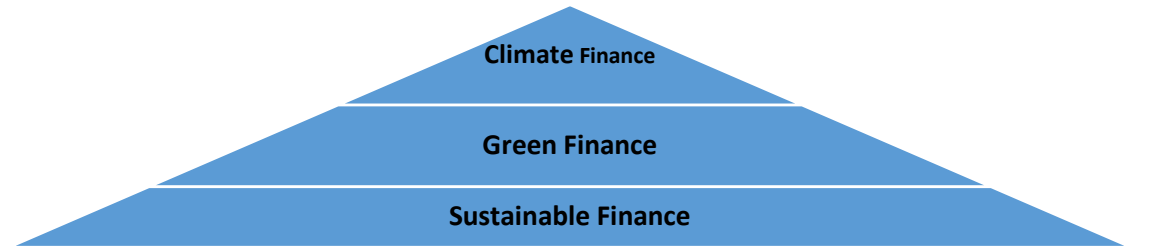
The word sustainable finance encompasses the entire spectrum of taking into consideration all environmental, social & governance aspects of the projects while taking the financing decisions. It encourages more investment in environmentally viable projects. Sustainable finance boosts development of the sustainable economy by incorporating the ESG considerations in the risk management aspects of the projects.

Sustainable finance policies complements the public funding by channelizing the investment from the private sector into projects which are carbon neutral or climate resilient.

Environmental factors plays significant role in implementation of financial decisions. Along with pollution prevention, Climate change and biodiversity preservation are an important environmental factors to be considered before taking financial decisions. Measures undertaken to mitigate the impact of climate change along with procedures followed for adaptation of climate change are primarily covered under the environmental factors. Social factors affecting financial decision making includes human right issues, social inequality, community problems with labor, etc. Incorporation of environmental and social aspects in checking the viability of the project is essentially dependent upon the governance structure. It covers not only the public institutions but also the private institutions. The governance decisions contains inter alia, the structure or hierarchy of the management, the relation of employees and the remuneration payable to different executives.

The aim of sustainable finance is to create a more diverse range of investment opportunities in society with the intention of creating a world that is socially, economically, and environmentally sustainable. Green Finance, as an element of sustainable finance, aims at promoting biodiversity and conservation of natural resources. Climate finance, as a subset of green finance, includes arrangement of financial resources for projects which can help in fighting against climate change. Arrangement of funds can be either locally or nationally, from public, private institutions or from alternative sources for supporting projects which pursues adoption of climate change. Therefore, the phrase "sustainable finance" is the widest term, encompassing all forms of financing that support sustainable development.

Exhibit 1. Sustainable Finance, Green Finance and Climate Finance



Source: Authors

Sustainable finance includes but not limited to:

a) Social impact bonds
b) Investment in sustainable funds
c) Pay for success schemes
d) Social venture capital
e) Equity investment in public institutions

2. Green Finance – meaning and importance

The word "green" as a part of green finance, usually covers a range of varied practices in relation to social, economic, ethical, and environmental customs. However, in the context of sustainability, it is more oriented towards environmentally oriented financial products and services.

Green investment and green financing are frequently used synonymously. But in reality, green finance is more comprehensive concept that encompasses more than just green investments. Operational cost of the green investment is not covered under the studies of green investment. Green finance not just emphasizes the investment part, but more importantly covers the operational part of the investment. Green finance would involve expenses like project planning and acquisition of land, which are not only substantial but might also provide unique financial issues. Because of this, the idea of green finance is more important than the concept of green investing.

According to PriceWaterhouse Coopers Consultants 'Green Finance' covers factors relating to the environment at the time of taking financial decisions relating to project appraisal and related activities. It suggests that at the time of giving loans, the effect on environments needs to be considered, for example, are the projects generating low carbon emissions, less pollution, etc.

Green Finance and its importance

The economic as well as environmental benefits of the green finance are immense and affect the lives of every individual in society. Access to green finance can assist the business community to create a financial product or service which will provide relief in gradual transition from current situation to low carbon economy. Green finance can lead to more socially equitable growth for underdeveloped economies which are facing the problems of climate change. Green finance has the potential to transform the society with "great green multiplier" effect.

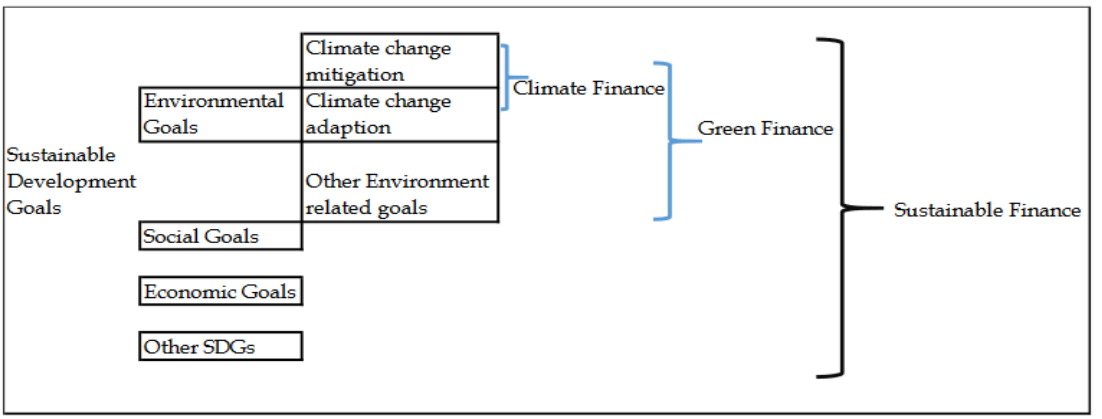
Investment areas covered under green finance can be grouped under following categories:

a) Pollution prevention and control
b) Conservation of biodiversity
c) Waste processing and recycling
d) Initiatives for circular economy
e) Climate change mitigation and adaptation including reforestation
f) Sustainable use of land and natural resources and renewables

3. Difference between Sustainable, Green and Climate Finance

The Sustainable Development Goals having an environmental focus are those that are linked with green financing instruments. The concept of "sustainable finance" denotes a much broader class of financial stocks and instruments that aim to advance all SDGs. On the other hand, green finance is restricted to the promotion of fresh financial goods and services that aid businesses in their shift to energy efficient economies at same or lower cost. Climate Finance, on the other hand, focuses solely on the climate action component. They all are a part of the Sustainable development goals (SDGs)

Exhibit 2. Scope of Sustainable Finance



Source: Authors

4 Green Finance products

The world of green finance products encompasses a broad range of financial services and products that fall into the categories of banking, insurance, and investments. The two main categories of financial instruments are equity and debt. A variety of products have emerged over the course of the year, such as bonds termed as green bonds, instruments relating to carbon trading, green indices, green banks, etc. In the context

of green finance, instruments pertaining to sustainable infrastructure and renewable energy have attracted a lot of interest. From an end-user perspective, products also include energy-saving mortgages, green car loans, eco-saving deposits, and venture capital for alternative energy sources. At the macro and industry level, green products include green bonds, compote green loans, Green debt, green asset under management, etc.

The International Finance Corporations, which is a part of the World Bank are the primary providers of the "green" financial products that are currently in demand.

These include:

(i) Green Bonds: Stakeholders raise money to finance “green business activities”.

(ii) Banking: Among the goods and services offered in the retail sector are cash management services, insurance, traveller’s checks, money orders, debit and credit card services, overdraft protection, and mortgages and loans.

Green incentives include:
Reduction in home loans interest rates for loans meeting green criteria, Commute initiative homes loans for borrowers who buy energy saving homes loans and make use of public transport. Green loans to real estate developers that develop buildings with energy savings over conventional designs, Solar financing, Clear air auto loans, Climate credit cards, Discounts on credits cards for purchases of green products, etc.

(iii) Corporate products:
Project financing for green and clean energy generation using renewable energy sources, such as solar fields or panels. Green bonds, green mortgage-backed securities, eco-securitization plans, etc.

(iv) Green project financing options including venture capital and private equity.

(v) Carbon neutrality and Carbon trading platforms and development of Stock market indices

(vi) Launch of Green Mutual funds

(vii) Green insurance products for non-life products
More novel and inventive products are being created as awareness of the negative effects of climate change grows on a global scale. The discussion of this chapter is primarily based on green bonds.

4.1 Green bonds – worldwide data – growth and trends

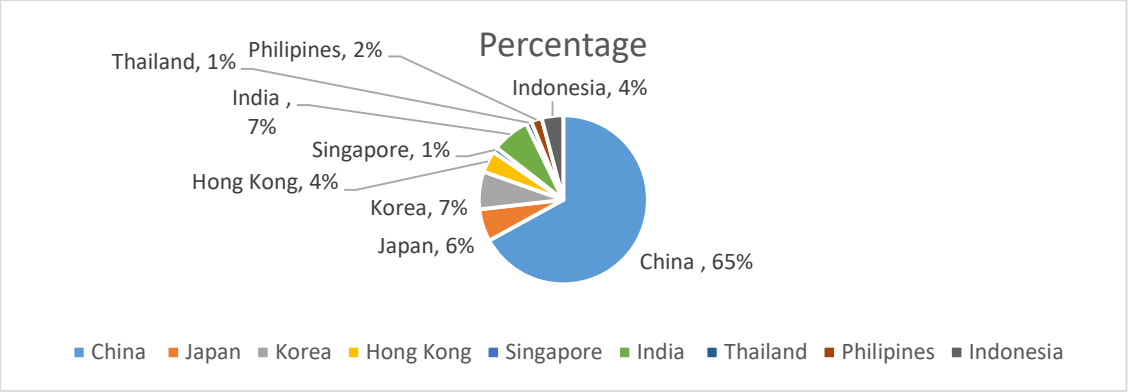
Funds raised through green bonds are usually used to finance 'green' projects (OECD.org). A sustainable fixed or debt income instrument known as a 'green bond' is used by business to finance activities that benefit the climate and the environment, and which include sustainable water management, renewable energies, and eco-friendly transportation. Bonds in the green segment are often issued by multiple stakeholders like government, non-financial corporates, financial corporates, etc.

Posting one of the first issues of green bond by the European Investment Bank in 2007, this source of raising funds has seen an exponential growth of $ 500 billion per annum in recent times. According to Zia et al (2033), Asian countries have seen a major investment growth in the green bonds, the percentage share of the green bond market among the Asian countries is depicted in Exhibit 3 below:

Exhibit 3. Green bonds issued by Asian countries

Green bonds issue by major Asian countries:	
Year	$ millions
2010	3500
2015	40000
2020	256000

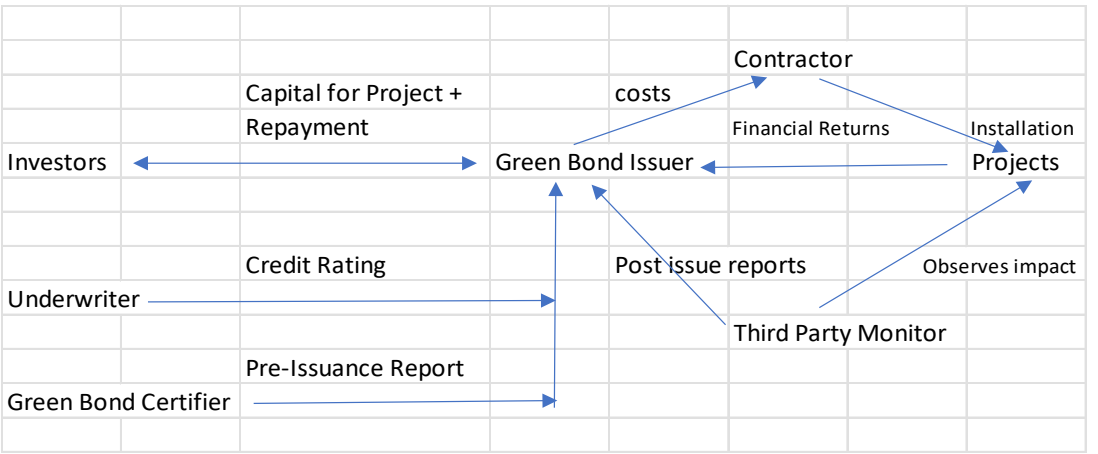
Percentage share of Asian countries (2020)	
Country	Percentage
China	65%
Japan	6%
Korea	7%
Hong Kong	4%
Singapore	1%
India	7%
Thailand	1%
Philipines	2%
Indonesia	4%



Source: Zia et al (2023)

Note: Bonds designated as "green" have all of their net proceeds earmarked for environmentally friendly initiatives. Social bonds are ones in which the proceeds are intended to promote favorable social consequences. Bonds classified as sustainable have proceeds divided between social and environmental business activities.

Exhibit 4: Green Bond Structure



Source: betterbuildingssolutioncenter.energy.gov/

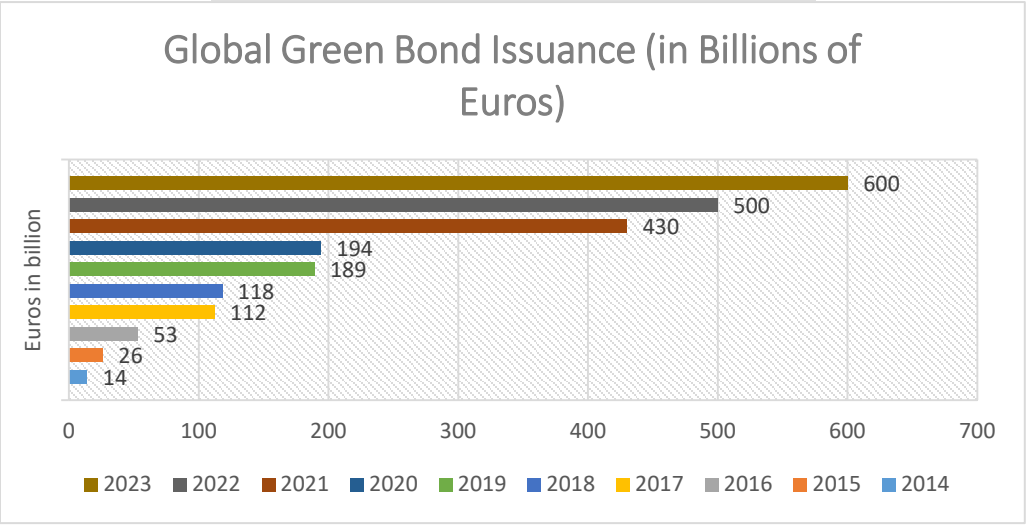
The above is the flow of the green bond cash flows and activities from the pre to post issue stage and depicts the relevant stakeholders.

Inspite of the growth, Goldman Sachs Asset Management (GSAM) estimates that $9.4 trillion in yearly investments will be required to achieve a ‘Net 0’ world economy by the year 2050. The global green bond issues have grown from Euros 14 billion in 2014 to Euros 600 billion by 2023. However, the need is more.

Exhibit 5: Global green bond issuance

Global Green Bond Issuance (in Billions of Euros)

Year	Euros in billion
2014	14
2015	26
2016	53
2017	112
2018	118
2019	189
2020	194
2021	430
2022	500
2023	600



Source: Bloomberg and GMAS.

Global bonds worth billions of dollars have been issued by the world's leading economies. S&P Global reports that worldwide issuers sold $443.72 billion worth of green bonds in 2022, down from $596.30 billion in 2021. Sovereign issuance decreased 38.1% year over year, while nonfinancial corporate supply decreased 35.8%. Nevertheless, in 2023, supply is predicted to rebound this autumn. (spglobal.com/marketintelligence)

The largest increase in the issuance of the bonds which are 'green' were in 2021; however, war between Russia and Ukraine in 2022 caused a decline in capital market activity, which was exacerbated by rising energy, inflation, and interest rates.

A framework known as the Climate Bonds Taxonomy has been established to serve as a roadmap for climate-related projects and assets. Stakeholders like governments and local municipal corporations can use taxonomy, which may assist them to understand what investments are to be considered to deliver a low carbon economy.

For issuers and investors alike, green bonds offer benefits and drawbacks.
Benefits:
(a) Risk-adjusted returns aligned with environment goals
(b) ESG compliances
(c) Use of funds raised through bonds comes more transparent
(d) Businesses not following norms, can be classified as "non-state" actors against climate change.

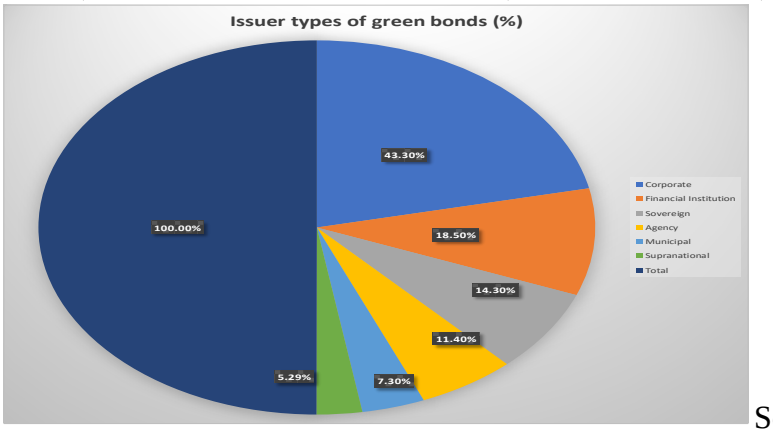
Drawbacks:
(a) The market for climate bonds is currently small in terms of both value and volume, but it is anticipated to grow in the future.
(b) No common framework of standards to look into fund raising, monitoring and use of such funds.
(c) Thers is a constrained probability for legal enforcement of green integrity
(d) Default of issuer
(e) Variability in Taxation of Debt market
(Source: oecd.org/)

Types of Green Bonds broadly cover: Tax Exempt Bonds, Fixed income instruments and Bonds using money to issue capital for environmentally focused projects.

The World Bank, regional development banks, financial institutions, governments, and other businesses typically issue green bonds. Green bons (secured by green assets), Green Revenue Bonds (secured by income-producing projects), Green Project Bonds (secured by a project asset), and Green Securitized Bonds (ABS) (secured by an asset pool) are additional classifications for green bonds (go-yubi.com).

Exhibit 6: Categories of green bonds issuers worldwide 2021.

Category	Percentage
Corporate	43.30%
Financial Institution	18.50%
Sovereign	14.30%
Agency	11.40%
Municipal	7.30%
Supranational	5.30%
Total	1.001



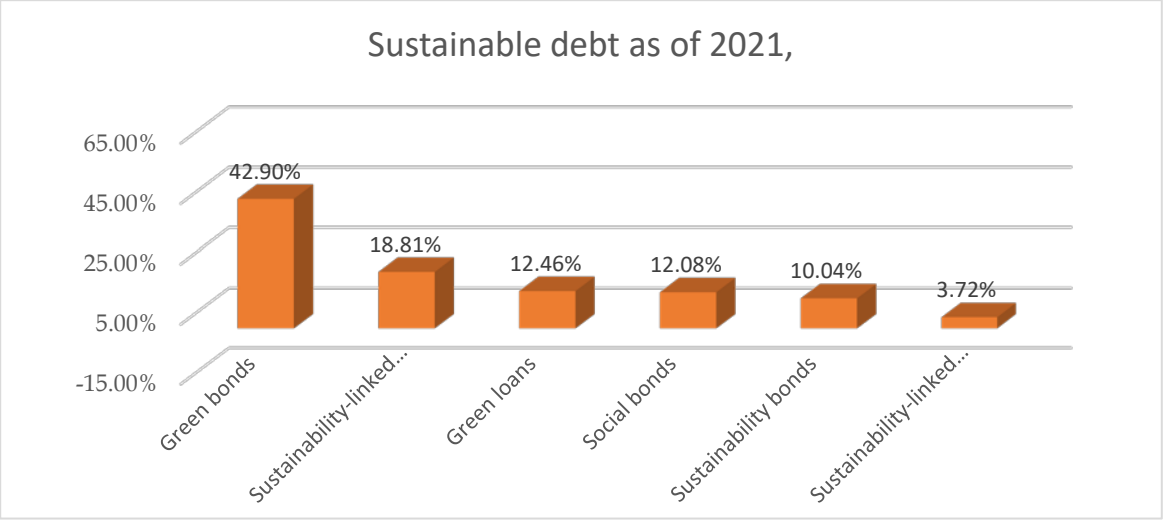
Source: researchandmarkets.com/reports/5414959

4.2 Green Loans – outstanding debt

We are currently in the premature stage of green loans evolution in order to gage its effectiveness. Understanding the feasibility of these loans is a critical task. By instrument (measured in billions of US dollars), green bonds accounted for 42.90% of the world's Sustainable debt in 2021.

Exhibit 7: Outstanding world Sustainable debt (by 2021)

Source	(in billion U.S. dollars)	Percentage
Green bonds	1,453	42.90%
Sustainability-linked loans	637	18.81%
Green loans	422	12.46%
Social bonds	409	12.08%
Sustainability bonds	340	10.04%
Sustainability-linked bonds	126	3.72%



Source: https://www.statista.com/statistics/1288820/global-outstanding-sustainable-debt-by-instrument/

A World Bank report (worldbank.org/en) states that over $2.50 trillion has been raised worldwide to fund environmentally friendly and sustainable projects. Of this, $74 billion, or 2% of all green, social, and sustainability bonds issued worldwide, have been raised in emerging markets. There is a lot of room for expansion. In 2008, the World Bank was, in fact, the first organization to issue these bonds. Their procedures and policies, which allowed them to issue over 200 green bonds in 25 different currencies as of right now, are now recognized as global best practices by the financial markets and are referred to as the Green Bond Principles.

4.3 Green Asset under management

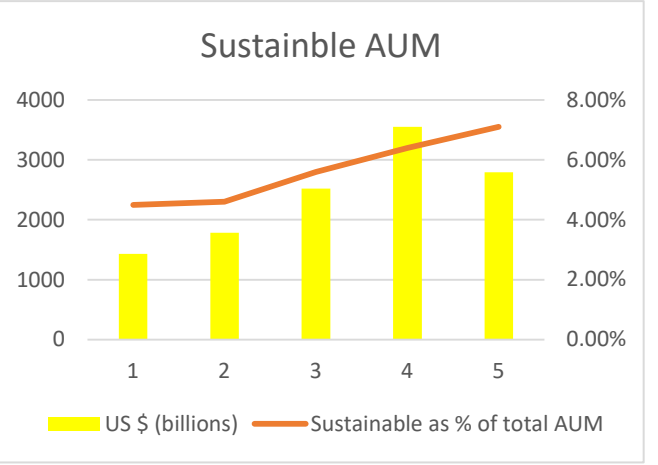
Companies are being encouraged to behave responsibly in addition to generating financial returns by an increasing number of different types of investors. The words, environmental, social, and governance (ESG), socially responsible investing (SRI), and Impact investing are frequently used interchangeably, they have different meanings. ESG considers a corporates practices relating to the environment, social, and governance. Impact investing seeks to assist companies or organizations in generating social benefits, while socially responsible investing selects or rejects investments in accordance with predetermined moral standards.

Investors looks at SRI as areas not to invest in, for example, business relating to Alcohol, human rights violation, etc.

The term sustainable investing is now common knowledge in the institutional and retail investors in current times. Sustainable investments provide greater stability to investors. Investments in Global Assets under Management (AUM), stood at $1.9 billion by December 2022 (economictimes.indiatimes.com/). A key characteristic of Green AUMs is investing in Environment, Social and Government (ESG) areas to meet the Sustainable Development Goals (SDGs). Further according to Bloomberg, the ESG-AUMs are aimed to reach $53 trillion by 2025, more than 33.33% of projected $140.5 trillion global AUM.
(Bloomberg.com/professional).

The Sustainable AUM as a percentage of total AUM has been on an increase, as depicted in the Exhibit 8 below:
Exhibit 8. Sustainable AUM

Sustainable AUM		
Year	**US $ (billions)**	**Sustainable as % of total AUM**
2018	1433	4.50%
2019	1781	4.60%
2020	2523	5.60%
2021	3554	6.40%
2022	2791	7.10%



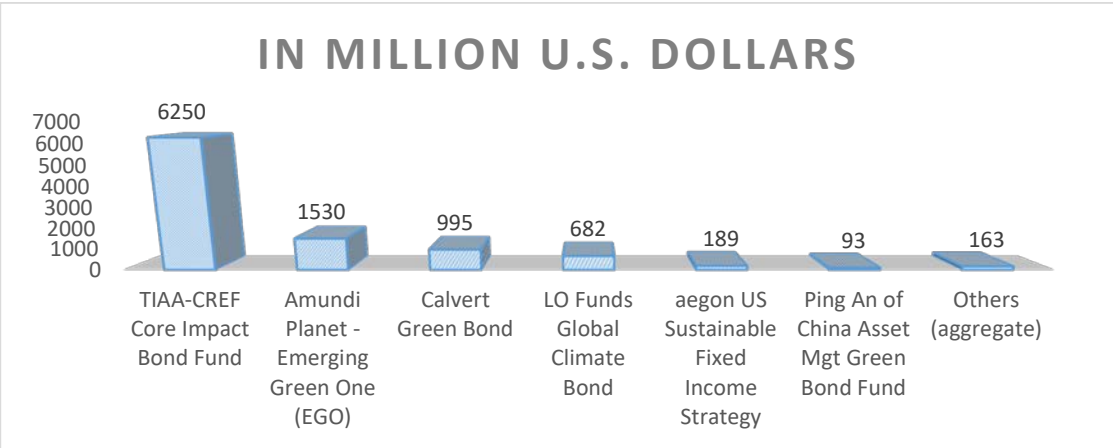
Source: morganstanley.com/ideas/sustainable funds

As per a Morgan Stanley report, sustainable funds continue to outperform the conventional funds in the first two quarters of 2023, as assets under management rose and ESG investors increased their use of restriction screening. The median return for sustainable funds was 6.9%, while the return for traditional funds was 3.8%. AUM (assets under management) for sustainable funds hit all-time highs, which further fueled investor demand. (Morganstanley.com-2023). The major players in the US Green Fund investing are depicted in Exhibit 9 below:

The main participants in the largest green bond funds managed by AUM (in $ millions-2021)

Exhibit 9. Major players in US Green Fund investing

Category	In million U.S. dollars
TIAA-CREF Core Impact Bond Fund	6250
Amundi Planet - Emerging Green One (EGO)	1530
Calvert Green Bond	995
LO Funds Global Climate Bond	682
aegon US Sustainable Fixed Income Strategy	189
Ping An of China Asset Mgt Green Bond Fund	93
Others (aggregate)	163

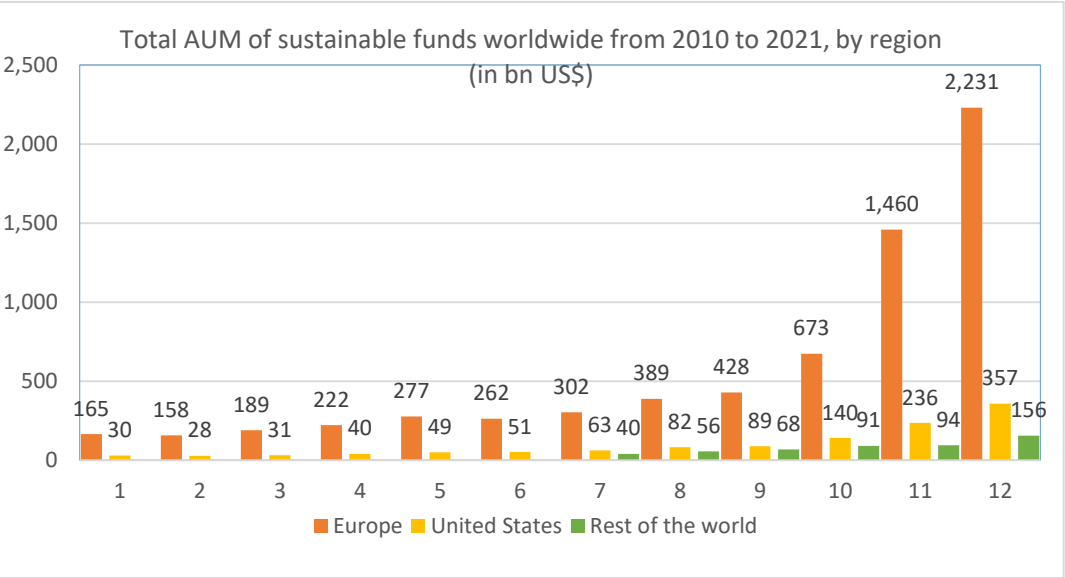


Source:https://www-statista-com.svkm.mapmyaccess.com/statistics/1289715/largest-us-dollar-denominated-green-bond-funds/

Exhibit 10 depicts the total AUM of sustainable funds worldwide from 2010 to 2021, by region (in bn US$).

Exhibit 10. Total AUM of sustainable funds

Year	Europe	United States	Rest of the world
2010	165	30	0
2011	158	28	0
2012	189	31	0
2013	222	40	0
2014	277	49	0
2015	262	51	0
2016	302	63	40
2017	389	82	56
2018	428	89	68
2019	673	140	91
2020	1,460	236	94
2021	2,231	357	156



Source: https://www.statista.com/statistics/1319691/sustainable-funds-aum-global-allocation/

It can be seen that the AUMs have been on a consistent increase.

Way ahead:

A Morgan Stanley report states that equity funds (sustainable) may now lean towards value in the future as sustainable solutions, such as clean and green technology and renewable energy, become more pertinent and crucial for business corporate earnings

in the near term. Renewable energy is predicted to overtake fossil fuels like coal as the world's first source of electricity production by 2025, making it a short-term clean energy investment opportunity. Furthermore, sustainable funds are starting to take into account how quickly companies are implementing sustainability goals. (Morganstanley.com/ideas).

Individual retail investors can still obtain indirect exposure through exchange-traded funds (ETFs) and mutual funds in their portfolio, such as the following vehicles, even though accessibility is usually limited to institutional investors through various ETFs. Domini Social Bond Fund (DFBSX), etc. (wallstreetprep.com).

4.4 Green Asset Backed Securities (ABS)

As the name implies, securitization of green financial assets would be referred to as "green securitization." (vinodkothari.com). These financial products are based on the old-fashioned securitization model. They are debt instruments and fall in the group of green bonds. In these kinds of products, illiquid assets are pooled and transferred to a special purpose vehicle (SPV) that convulses into asset back securities via securitization. Through pooled asset resources, the repayment of interest and principal amount on the securities that we issued by the SPV (Affinito and Tagliaferri, 2010). The ABS is conditional to be ‘green’ if they finance environmental projects and the financial instruments issued by the SPV satisfies requirements needed to be defined as a green bond. ABS-Solar, EVs-ABS are a few examples of ABS instruments.

The advantages of "green" and "securitization" are combined in green securitization. As a subset of securitization, green securitization contributes to the incorporation of sustainability into securitization, enabling countries to achieve their environmental and climate change goals. In addition, it facilitates the release of cash by the originator of green finance, so contributing to the liquidity of green finance (vinodkothari.com). Green Securitization can facilitate access to debt capital markets for smaller-scale climate-resilient and low-carbon assets. The public sector plays a crucial role in expanding green asset securitisation markets. (climatebonds.net/files/files). The Global cumulative green issuance has crossed the $1Trillion mark by the end of 2020, of which Asset-Backed Securities (ABS) comprise USD116.2 billion (climatebonds.net/2020/12/). The OECD projects that by 2035, the annual green ABS for energy efficiency, renewable energy, and low-emission vehicles (LEVs) will be at least USD 280–380 billion. (climatebonds.net/files/files/March17).

4.5 Green Indices

From an investment perspective, investing in Green Index Funds assists investors gain competitive financial returns while contributing to positive environmental outcomes and further aids in moving to a low carbon emitting economy (carboncollective.co). Several Green indices exist, as sensitization towards green world continues through various modes. Some of the prominent indices with trading volumes include;

From the house of S&P Global, the major indices are as follows:

(1) Standard and Poor Green Bond Select Index
(2) Standard and Poor U.S. Municipal Green Bond Index
(3) Standard and Poor Green Bond U.S. Dollar Select Index (spglobal.com/spdji).

Other indices include Nasdaq OMX Solar index, Nasdaq OMX Green Economy index, etc. (icmagroup.org/assets/). These indices have instruments listed on the stock market, wherein funds are raised to be utilized for “green” activities (msci.com/documents/)

Some of the other broad categories of indices are:

Sustainability Indices:

The Global Carbon Futures Indices, which act as benchmarks for the global price of carbon, and fixed income sustainable benchmarks that consider environmental, social, and governance (ESG) considerations in addition to other criteria are among them.

Corporate Climate Indices:

To facilitate, ‘net 0’ carbon emissions by 2050, a set of fixed income indices known as the "Climate Index series" (or "Climate Indices") include ESG screening criteria in addition to a carbon reduction methodology.

Corporate ESG Indices:

Corporate ESG Indices are a useful tool for sifting out stocks of companies with specific business interests and favoring those with more enticing ESG risk profiles. Sustainalytics ESG Ratings are also included in corporate ESG indices.

Green, Social and Sustainable Index:

Securities issued for green, social, or sustainable reasons are tracked by the Green, Social, and Sustainable Index.

Sustainability-Linked Bond Index:

The performance of securities issued for eligible sustainability-linked purposes is tracked by the Sustainability-Linked Bond Index.

Global Government Carbon Reduction Indices:

By skewing the weights of the component nations, these indices reduce the weighted average carbon footprint of the overall index while reducing tracking error in comparison to the initial capitalization-weighted Parent Index.

Carbon Futures Family Index

The four carbon markets with the highest volume of trading activity worldwide provide pricing for the Carbon Futures Index Family (ice.com/fixed-income-data-services/index-). Some examples of S&P Green indices include, S&P Green bond Index, S&P Green Bond U.S. Dollar Select Index, S&P/BMV Green Social & Sustainable Target Duration index, etc. (spglobal.com/spdji/en/index-family)

4.6 Green Finance in India

According to United Nations Environment programme (UNEP), a ‘green economy’ is a low carbon emitting economy, is efficient in resource utilization and is has an inclusive society. Within the economy, macro-economic factors like increasing employment and income from economic activities is garneted from assets that provided reduced emissions of carbon, efficient use of energy, etc. (unep.org/regions).

In the Indian economy, green finance is becoming more and more popular as a vital instrument for achieving net zero emissions. Sustainable development requires that environmental factors be taken into account when making financial decisions. The transition of India's economy towards a greener one is being driven by programmes like carbon pricing, green bonds, and sustainable investment techniques.

India is considered as one of the top greenhouse gas emitters and would need a budget $10 trillion to reach its goal of ‘Net 0’ emissions by 2070. The country has launched a number of initiatives both via public and private sectors that have expanded the opportunities for financing and investment. Green finance is one of them; it's sustainable or ethical finance that funds projects that benefit the environment, like

cutting greenhouse gas emissions, increasing energy efficiency, or developing the circular economy (ey.com/en_in).

A policy framework has been developed by the Indian Government:
The Government of India has already started working on the process of creating and implementing policies which would lay the foundation of Indian Sustainable financial markets to grow. They are adapting the best practices which are in tune with the global and national effective practices to ensure standardization. Polices have been in place since late 2020 and a dedicated Sustainable Finance Task Team has been formed by the Ministry of Finance in India. The task force consists of Financial Regulators, Ministries and Workings groups. Each one of them has been assigned a dedicated goal to work independently and then converge together to meet India`s broader Sustainability goals to become carbon neutral.

Exhibit 11. The sustainable finance task force (India)

The Sustainable Finance Task Force		
Financial Regulators	**Ministries**	**Working Groups**
The Central bank in India : Reserve Bank of India (RBI)	Ministry of Finance (MOF)	Taxonomy Development
The regulator: Securities & Exchange Board of India (SEBI)		
Pension Fund Regulatory and Development Authority (PFRDA)	Ministry of Environment, Forest and Climate change (MoEFCC)	Regulation, Resilience and disclosures
Insurance Regulatory and Development of India (IRDAI)		Sustainable Finance Roadmap
International Financial Services Centre Authority (IFSCA)	Ministry of Corporate Affairs (MoCA)	Ecosystem Development

Source: Climate Bonds Initiative.
https://www.climatebonds.net/files/reports/cbi_india_sotm_2021_final.pdf

To ensure a realistic change in India`s sustainable and climate change efforts, the policies are framed on four foundations or pillars. These are titled as:
Pillar 1: Indian Taxonomy of sustainable activities
Pillar 2: Reporting and disclosure
Pillar 3: Financial policy and regulation
Pillar 4: Ecosystem development

Each foundation base or pillar provides their guidelines and action plan based on consultations from different stakeholders and a report was submitted by end of 2022.
Every pillar aims to achieve reduced emission in keeping with the nation's pledges made at the United Nations Climate Change Conference in Glasgow (COP26). The Reserve Bank of India is in the process of ensuring that India`s financial system is 'green' as we go long to meet the International commitments. The ministry of Finance permitted the issue Green bonds in 2022 which are denominated in India currency and the money raised would be diverted to reducing India`s carbon emissions. An Indian sovereign green bond aims to increase India's status as a green finance center, encourage policy and local infrastructure development (such as SPO providers), and attract both public and private money to the market.

4.6.1 Products, Policy, and Regulators

The top one thousand companies listed on stock exchange in India are now required by the financial markets regulator to give the ESG disclosures as part of the Business Responsibility and Sustainability Reporting (BRSR) programme. The banking industry in India is also working to create an ESG framework, which it intends to apply when evaluating credit and making loan offers. ESG investing has therefore become more popular in India in recent years.

To finance environmentally friendly projects, Carbon taxes, green bonds, etc. now exists in India. India, now, is the second-largest emerging market for green bonds, after China.

One of India`s bank, Yes Bank, in 2015 issued the first infrastructure green bond in India. The government announced its intention to issue the first sovereign green bonds in the union budget for the fiscal year 2023. The public sector will use the bond proceeds for projects centered on waste management, low-carbon transportation, renewable energy, and generally lowering the nation's carbon intensity. Currently, green initiatives are drawing foreign investments, which lowers the cost of capital for the companies. But India has a long way to go before fully embracing the green transition. (statista.com/topics/10776). A 100% foreign direct investment (FDI) without government approval has been permitted in renewable energy companies in India.

4.6.2 General types of Green finance instruments in India.

On November 9, 2022, the government introduced a framework for Sovereign Green Bonds, aligning itself with the Green Bond Principles set by the International Capital Market Association. Products relating to green debt securities, priority sector lending and impact investing have been launched in India sine last few years.

4.6.3 Green debt securities-legal aspects

Legal regulations like the SEBI (Issue and Listing of Non-Convertible Securities) Regulations, 2021 (NCS Regulations), and the SEBI (Listing Obligations and Disclosure Requirements) Regulations, 2015 govern the issuance and listing of green debt securities.

4.6.4 Priority sector lending

The RBI has provided priority sector lending (PSL) guidelines for loans to achieve SDGs and socially and inclusivity.

4.6.5 Impact bonds

In India, a small number of impact social bonds and impact development bonds have been issued. However, the issuing of these bonds is not governed by any particular set of laws.

4.6.6 Types of Green Bonds in India

They are broadly divided into three types namely, Asset-backed bonds, Hybrid bond and Sovereign Green Bonds. They are a good source for safe investment and one of the best sources of raising funds for Indian corporates in order to support the environment or climate related projects.

(i) Asset-backed bonds

Asset-backed bonds' creditworthiness is not based on the issuer's other cash flows, but solely on the anticipated income from the solar farm.

(ii) Hybrid bond

These bonds have a two-way structure; under the first, the lender will own the farm in the event that a payment default occurs. If the farm's value is insufficient to cover the lender's costs, he or she may be able to make a claim against other assets. As for the second method, the farm is in a SPE. In case of default, SPE assets are handed over to the lender. The holder of the hybrid bond may also be entitled to other assets if the farm value is insufficient to cover the lender's costs.

The average duration of Sovereign Green Bonds is at least 14 years. Allocate funds from Sovereign Green Bonds to initiatives related to climate adaptation and mitigation (bondsindia.com). The RBI conducted its first auction of Sovereign Green Bonds, amounting to ₹16,000 crores.

4.6.7 Features of Green Bonds in India

(i) To enhance attractiveness of these bonds tax incentives are provided

(ii) Because green bond investments are safe and secure, they are an excellent tool for making investments.

(iii) The money that is raised is put towards environmental and climate change conservation initiatives.

4.7 Challenges of Green finance – brown washing

The biggest challenge is to implement and execute the commitment to a better and sustainable world using green finance across the globe. From individuals to corporations to government, each stakeholder has to take the task of ensuing a safe planet for the existence of humankind.

There is evidence that not everything in the world of green finance is "green." For example, according to a report by the Commonwealth thinktank, some of the largest asset managers in the world are using investment funds branded as green or socially responsible to invest hundreds of millions of pounds in fossil fuel companies. (theguardian.com/business/2023/).

According to the World Resources Institute (wri.org/update), there are five barriers that hinder green financing, namely, (i) Nature-based Solutions (NbS) are a relatively new concept, (ii) The Return on Investment on Nature-based Solutions is not evident, (iii) NbS require long investment times and involve high risks, (iv) Quantifying and disseminating results is complex and (v) Lack of effective and efficient government incentives and an established taxonomy.

4.8 Conclusion

Considering climate change as a major threat, to human existence, there is an urgent need to look at a strong implementation of sustainable finance across the world. An urgent and immediate action has to be taken to implement laws and sensitize the

society towards sustainable and green finance. Though steps have been taken by countries towards green products and legal aspect, there is an urgent need to implement these to slow down 'climate change'.

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Chapter-5

SUSTAINABLE BANKING

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SUSTAINABLE BANKING: THE BACKDROP

Multiple catastrophes are co-occurring on our planet. While demanding our attention, the climate and environmental issue poses the greatest danger to humanity.

In 2015, with the endorsement of the Paris Climate Agreement and the UN 2030 Agenda for Sustainable Development, nations worldwide made a collective commitment to pursue a more sustainable path. At the core of this agenda are the United Nation's Sustainable Development Goals

(SDGs). In this context, both the Paris Agreement on climate change and the SDGs have thrust the financial sector into the forefront of the sustainability discourse.

As banks are the backbone of every economy, how they handle capital flows affects the health and growth of the economy directly and indirectly. Banks serve as an intermediary between savers and seekers. For the goal of lending and investing, they borrow money.

As intermediaries, financial institutions exert their influence on various sectors, making them pivotal in the pursuit of the SDGs. They actively participate in environmental conservation initiatives by allocating funds based on the environmental risk profiles of target companies and advocating for socially responsible products. From this standpoint, they can encourage or deter sustainable behavior among governments, corporations, and individuals and catalyze transformative shifts in societal structures.

SUSTAINABLE BANKING: THE ESG FACTORS

Sustainable banking embodies a strategic approach to banking and investment, prioritising profitability alongside environmental sustainability, social responsibility, and sound corporate governance. These critical elements collectively constitute the core of Environmental, Social and governance (ESG) principles.

Environmental concerns encompass water and waste management, strategies for enhancing energy efficiency, carbon footprint reduction, and effective climate risk management.

Social issues encompass aspects like data privacy and security, efficient supply chain management, fostering diversity and equality, and the management of human capital.

Governance issues include tackling challenges related to board diversity and

promoting corporate transparency.

Sustainable banking, at its core, entails the systematic strategising and effective implementation of banking operations and business activities, all carried out with a mindful consideration of their impacts on the environmental, social, and governance (ESG) landscape.

Sustainable banking involves conducting banking activities with the integration of environmental, social, and ethical considerations into the business strategy, thereby fostering the promotion of sustainable development.

Banks hold a significant role in advancing the SDGs. They can contribute to the pursuit of net-zero emissions by providing financial support, loans, and investment opportunities for environmentally friendly projects, thereby aiding individuals and businesses on the path to sustainable development. Internally, banks can integrate sustainable banking practices into their human resources, operations, and management of physical assets. Banks that exhibit dedication to both internal and external sustainability initiatives gain a competitive advantage. While governance and social responsibility in banking have been established for several years, the commitment to environmental sustainability is a more recent addition that has rapidly gained worldwide recognition.

The Principles of Responsible Banking, introduced in 2019 by signatory banks and the United Nations, aim to promote sustainable finance across all levels of business, including strategic, portfolio, and transactional aspects. In November 2021, the industry-led Net-Zero Banking Alliance was established and convened by the United Nations. This alliance represents 43 per cent of banking assets globally and commits to aligning their lending and investment portfolios with net-zero emissions by 2050, with many top banks aiming for net-zero by 2030. The alliance now boasts over 100 members.

The United Nations SDGs advocate for a holistic approach to sustainability, encompassing all aspects—the biosphere, society, and the economy. Achieving a sustainable world requires consideration of each of these dimensions. Customers are increasingly vocal about environmental, social, and governance (ESG) issues and prefer engaging with institutions prioritising sustainability. Banking leaders recognise the profound impact of climate change on the global economy and the necessity of cross-industry global sustainability. Moreover, banks stand to benefit directly from adopting environmentally responsible practices.

THE CHALLENGING ENVIRONMENT OF BANKS

There is currently unprecedented global awareness of sustainability. Investors, consumers, corporations, and policymakers are all directing attention toward addressing Environmental, Social, and Governance (ESG) issues.

ESG matters wield considerable influence over businesses, the economy, and society. They bring forth potential risks and opportunities that demand adept management to uphold enduring economic and social growth and stability. Banks, as vital providers of capital and financial intermediaries, are responsible for addressing these concerns. While emphasising the banking sector's duty to deliver strong returns on investment to its shareholders, it is equally crucial for the sector to ensure that its business operations and collaborations positively contribute to the welfare of the communities and the environment in which it operates.

Resolving these challenges necessitates a profound overhaul of global economic activities, prompting an inquiry into the strategies for instigating this transformation. Moreover, examining how banks facilitate the formulation of robust transition frameworks and expedite decisive actions among their clients is essential. The imperative of sustainability assumes a central role for financial institutions, particularly in the context of the persistent apprehensions surrounding climate change. It is noteworthy that banks hold a pivotal position as the primary capital providers to a diverse

spectrum of businesses, encompassing environmentally responsible renewable energy enterprises and large-scale billion-dollar oil corporations.

NEW STANDARD AND SUSTAINABILITY STRUCTURE: THE ROLE OF GOVERNMENT IN SUSTAINABLE BANKING

The historical operations of the banking sector have been subject to extensive regulations, primarily focused on monetary and market-related matters. Nevertheless, in the ever-evolving landscape of modern banking, the inherent risks associated with environmental and social (E&S) concerns within the industry, the urgent global challenges of environmental pollution and climate change, and the escalating expectations from a diverse range of stakeholders and advocacy groups have expanded the sphere of environmental responsibility and regulatory requisites.

This situation has partly catalysed the early adoption of Environmental, Social, and Governance (ESG) principles, particularly in developed economies across the globe. These standards and codes of conduct have been pivotal in nurturing corporate accountability, transparency, and the conscientious evaluation of environmental and societal impacts. Motivated by various factors, including external pressures from stakeholders, banks have proactively incorporated codes of conduct related to environmental responsibility and sustainability into their practices.

Missing links:

Despite concerted efforts, two critical gaps remain. The first pertains to establishing sector-wide policies to ensure standardised environmental and societal practices. Many of the current voluntary codes of conduct lack enforcement or accountability mechanisms. Consequently, institutions adhering to these financial sector codes of conduct do not face consequences beyond potential reputational damage if they fail to comply with their self-imposed guidelines.

The second gap pertains to the hesitance of developing economies to wholeheartedly embrace this transformation. Notably, in emerging and

developing nations, regulatory authorities increasingly focus on sustainability concerns within the financial sector. This trend leads to the developing of globally applicable green banking principles driven by regulatory initiatives.

To harmonise fundamental banking operations, like credit approval, with the specific social and environmental goals of their respective countries and to mitigate financial risks and adverse environmental effects, a growing number of regulatory agencies and central banks in developing nations are implementing their own set of guidelines and mandates within this evolving framework.

SUSTAINABILITY IN BANKING: THE POLICY AND REGULATIONS IN INDIA

Banks' adoption of sustainable banking practices exhibits significant variability, contingent on factors such as geographical region, socio-economic development level, consumer preferences, and the regulatory landscape within a given country.

Research study framework for assessing sustainable banking performance of the Indian banking sector

In their work on "Developing a framework for evaluating the sustainable banking performance of the Indian banking sector," Kishore Kumar and Ajai Prakash aim to establish a comprehensive framework encompassing all sustainability dimensions in the banking industry. This undertaking holds particular significance in developing countries such as India.

The study's objective is to assess how sustainable banking practices have been embraced in the Indian banking sector by employing the Sustainable Banking Performance Framework (SBPF). The report makes an effort to develop a framework for assessing India's sustainable banking scenario as it stands today. In addition, they have evaluated and categorized every Indian bank, both in the Private and Public Sectors, according to their performance in sustainable banking.

The current regulations or guidelines do not mandate that banks adopt sustainable banking practices on a consistent basis. The study's findings thus highlight how varied and uneven these institutions' sustainable banking practices are. The study emphasizes how India is just now starting to implement sustainable banking practices.

Reserve Bank of India: Initiatives

The study's objective is to assess how sustainable banking practices have been embraced in the Indian banking sector by employing the Sustainable Banking Performance Framework (SBPF). The report makes an effort to develop a framework for assessing India's sustainable banking scenario as it stands today. In addition, they have evaluated and categorized every Indian bank, both in the Private and Public Sectors, according to their performance in sustainable banking.

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A recent RBI research report revealed that only 6% of the top 34 Indian commercial banks currently offer green products or plan to do so soon. Moreover, just 35% of the surveyed banks have a dedicated website page for sustainability, ESG, and climate risk information. Regarding sustainability adoption, the Indian banking sector is part of the "late majority" group globally. Encouragingly, 56% of these banks intend to prioritise sustainable financing in the short to medium term. However, the optimal path forward and a practical roadmap must be clearly defined.

In January 2022, the Sustainable Finance Group (SFG) within the Department of Regulation (DoR) at the RBI surveyed the levels of climate risk and sustainable finance within the top scheduled commercial banks. This study considered board-level involvement and accountability, strategy, risk

management, transitioning banking operations toward a low-carbon environment, capacity building, and data gaps. The responses from the survey indicate that while banks have begun to address climate risk and sustainable finance issues, more coordinated efforts and actions are still needed. The findings from the survey will aid the RBI in refining its regulatory and oversight approach to climate risk and sustainable finance.

In FY2023, the RBI introduced regulatory measures related to climate risk and sustainable finance alongside its crucial policy decisions by the Monetary Policy Committee (MPC). The RBI has committed to crafting a strategy that leverages global best practices to mitigate and alleviate the adverse impacts of climate change. As part of this initiative, the RBI published a discussion paper on the RBI website on July 27, 2022, to solicit public comments and feedback. Following a comprehensive assessment of the received input, the RBI has issued guidelines for Regulated Entities (REs). These guidelines encompass the following key components:

1. A comprehensive framework for the acceptance of Green Deposits.
2. A disclosure framework addressing climate-related financial risks.
3. Guidance regarding climate scenario analysis and stress testing.

The RBI announced that these guidelines will be released in a phased manner.

CONCLUSION

While sustainability in banking is still in its early stages in India, several banks have made significant strides in their sustainability efforts. Research suggests that Indian banks can draw valuable lessons from their global counterparts. The banking industry carries a substantial responsibility to enhance its capabilities and offerings to set an example proactively. The banking sector in India wields a positive influence on the country's socio-economic progress and development. As India aims to achieve net-zero emissions by 2070, players in the banking industry have a crucial role in leading the financial services ecosystem toward

sustainability.

Despite the increasing prominence of ESG (Environmental, Social, and Governance) factors in banking, there is still a long way to go, as standardisation and legislative measures are needed, and these practices primarily rely on industry-driven initiatives. The present imperative is for the banking sector to significantly shift its attitudes and actions to promote more responsible and sustainable business practices.

As the regulator, the Reserve Bank of India (RBI) should align its regulations with those of central banks in other countries. It should establish a strong connection between the financial sector and sustainable development, which is the core objective of embedding sustainability into the financial system.

Therefore, integrating sustainability strategies into the financial sector is essential for managing risks and opportunities within the sector and considering the sector's impact on other industries as a provider of financial capital. The Indian banking sector is pivotal in India's sustainability journey.

ANNEXURE I: THE GERMAN STORY: SUSTAINABLE BANKING

Deutsche Bank
Environmental and Social Policy Framework – Summary August 2023

Environmental and social risk management
Deutsche Bank aims to uphold the highest standards of integrity and responsibility, with a solid commitment to sustainability. This commitment is vital to the bank's Global Hausbank strategy, focusing on sustainable business practices, aligning risk management with industry norms, and enhancing transparency. The bank regularly shares its sustainability strategy, such as during the Sustainability Deep Dive in 2021 and 2023.

Deutsche Bank adheres to international standards and principles, including the OECD Guidelines, UN Global Compact, and UN Guiding Principles on Business and Human Rights, and became a signatory to the Equator Principles in 2020. These initiatives help manage environmental and social risks in project finance.

Recognising the diverse sectors it serves, including those with potential environmental and social impacts, the bank systematically evaluates and manages these risks in line with international commitments. Failure to do so can result in reputational and financial risks and limit business opportunities.

Deutsche Bank follows a risk-based approach, focusing on sectors with inherent potential for negative environmental and social impacts, including metals and mining, oil and gas, utilities, industrial agriculture, chemicals, infrastructure projects, etc. These sectors and due diligence requirements are reviewed periodically.

Specific provisions are in place for the tobacco, defence, gaming, and adult entertainment industries, which carry elevated social and governance risks and fall under the Reputational Risk Framework.

ANNEXURE II: SUSTAINABLE BANKING INITIATIVES TAKEN BY SELECT SCHEDULED COMMERCIAL BANKS IN INDIA

State Bank of India (SBI)

SBI has embarked on multiple sustainable banking initiatives. SBI Chairman Dinesh Khara emphasised the bank's commitment to integrating environmental considerations into its lending framework. In its pursuit of sustainable banking practices, SBI aims to address environmental-induced financial risks in its FY24 risk management strategy.

Dinesh Khara noted that the bank is actively incorporating environmental, social, and governance criteria into lending decisions, contributing to decarbonisation on a significant scale in India while promoting economic

growth. This approach involves reducing funding for fossil fuel projects and increasing support for renewable energy projects. SBI has established a renewable energy portfolio of Rs 36,243 crore and has financed 23,679MW of renewable power generation capacity.

SBI has implemented several noteworthy initiatives for sustainable banking:

1. Wind Power Generation: SBI is a pioneering bank in installing windmills to generate green power, reducing reliance on non-renewable resources and lowering costs.

2. SBI Green Home Loan: The bank offers concessional home loan rates with no processing fees to individuals involved in certified green projects, promoting green housing.

3. Solar Rooftop Financing: SBI supports projects for installing solar rooftops, contributing to the adoption of solar energy.

4. Green Channel Counters: The bank is transitioning from paper-based banking procedures to green channel counters to reduce waste and environmental degradation associated with excess paperwork.

5. Financing Green Projects: SBI provides credit facilities exclusively to projects that incorporate social and environmental considerations in their manufacturing processes.

6. "Run for Green" Marathon: SBI organises an annual marathon, "Run for Green," to promote environmental sustainability and raise awareness about green practices.

7. Green Bonds Investment: SBI invests in green bonds that support energy-efficient products, renewable energy, and low-carbon emission buildings.

8. Digital Banking Promotion: SBI promotes digital banking through services like net banking, mobile banking, SBI INTOUCH (a digital branch), SBI YONO (an omnichannel platform), UPI, and the chatbot SIA.

9. Solar ATMs: SBI is the first bank to install solar-powered ATMs, reducing

carbon footprints and mitigating carbon emissions.

10. Carbon Disclosure Project: SBI participates in the Carbon Disclosure Project, emphasising environmentally friendly products and services, and takes measures to reduce carbon emissions, thereby promoting green banking practices.

Bank of Baroda (BOB)

Bank of Baroda (BOB) has undertaken several sustainable banking initiatives, as outlined below:

1. "Green Ride" Program: BOB has introduced the "Green Ride" program, emphasising health and fitness by promoting eco-friendly vehicles.

2. Support for Green Projects: The bank encourages eco-friendly initiatives, such as solar power projects and windmills, by offering preferential treatment through reduced processing fees.

3. Tree Plantation Drive: BOB has initiated tree plantation drives to enhance the environment and foster a greener ecosystem.

4. Digital Banking Channels: BOB provides a range of digital banking channels, including net banking, M-Connect Plus (mobile banking app), UPI, green PIN, ADI (a chatbot), and more. These services allow customers to conduct transactions without physically visiting the bank, promoting an environmentally friendly approach.

5. Paperwork Reduction: The bank actively encourages customers to transition to digital services, enabling them to quickly deposit and transfer funds, access e-statements, make investments, and more. This move contributes to greener communication practices and reduces carbon footprints.

6. Solar Power Generation: BOB has installed solar power generation systems (SPGS) at various branches, providing alternative energy sources through UPS.

7. Self-Service Machines: The bank has set up five self-service machines

known as "Baroda NonStop lobbies (e-lobbies)," offering 24/7 routine banking services, reducing the need for physical paperwork.

8. Green Finance: BOB promotes green finance by providing funds exclusively for real estate projects incorporating rainwater harvesting and solar energy solutions.

9. Environmental Certification: The bank extends credit funds to projects that have obtained permission and certification from pollution control boards, prioritising green initiatives over hazardous ones.

10. Support for Clean Environment Activities: BOB supports the clean environment activities of NGOs and actively promotes the "Swachh Bharat Abhiyan" campaign, contributing to a cleaner and greener environment.

HDFC Bank

HDFC Bank has undertaken various sustainable banking initiatives, contributing to environmental conservation and eco-friendly practices. Here are some key initiatives:

1. Promotion of Green Practices: HDFC Bank promotes green practices such as efficient lighting solutions, reduced paperwork, and green procurement to minimise its environmental footprint.

2. Digital Banking Promotion: The bank encourages the adoption of digital banking through initiatives like net banking, mobile banking, WhatsApp banking, UPI, and the Ask Eva chatbot. Through the Green Event initiative, these efforts have saved a significant amount of paper, equivalent to around 1.5 million square feet.

3. Solar Power and Energy Storage: HDFC Bank installs solar panels with rechargeable lithium-ion batteries to provide uninterrupted power supply, harnessing renewable energy sources.

4. Green Communication: The bank promotes green communication, encouraging customers to opt for online bill payments, subscribe to e-

statements, and conduct online funds transfers to reduce paperwork.

5. Waste Reduction and Recycling: Besides using reusable cups and plates, HDFC Bank partners with companies to recycle paper and plastic, promoting environmentally friendly products.

6. Sustainable Deposits: HDFC Bank offers fixed deposits in green and sustainable deposits, providing sustainable housing credit solutions and services to support the SDGs and environmental conservation.

7. Green Infrastructure: The bank is changing its infrastructure assets to enhance energy efficiency and promote green building practices.

8. Tree Planting: HDFC Bank has planted many trees, with plans to plant more in the coming years, contributing to a greener environment.

9. Energy Management: The bank has implemented energy management systems (EnMS) to monitor consumption patterns. Initiatives like installing inverter ACs and LED lights help reduce energy consumption.

10. Waste Management: HDFC Bank manages three types of non-hazardous waste, including dry waste, e-waste, and wet waste. E-waste is disposed of through authorised and certified recyclers, aiding in waste management and reducing carbon footprints.

ICICI Bank

ICICI Bank is committed to responsible financing practices focusing on environmental and social risk management. They have a 'Social and Environmental Management Framework' that integrates the assessment of environmental impact and social risks into their credit appraisal process. This includes an exclusion list, borrower confirmation of compliance with national environmental guidelines, and due diligence by a Lender's Independent Engineer for large projects.

The bank has a significant portfolio in renewable projects, including solar, wind, hydropower, and other sustainable sectors, with an outstanding portfolio of approximately ₹31.5 billion as of March 31, 2021. They have also

availed lines of credit from multilateral agencies for financing green and sustainable assets, totalling about USD 70.77 million as of the same date. An internal division of ICICI Bank is committed to funding programs that support environmental sustainability, biodiversity, and improvements in livelihoods, health, and sanitation. They provide funds, offer knowledge, and engage in liaisoning with different external agencies.

Apart from these endeavors, ICICI Bank has implemented the other key measures aimed at achieving excellence in sustainable banking:

1. Promotion of Digital Banking: The bank uses e-services such as IVR, UPI, mobile and internet banking, as well as a chatbot named iPAL, to promote digital banking.

2. Green Vehicle Finance: Incentives to choose eco-friendly cars include a 50% processing fee waiver from ICICI Bank.

3. Paperless Initiatives: To cut down on the amount of paperwork, the bank supports paperless transactions such as e-statements and e-annual reports.

4. Annual Plantation Drive: To promote awareness of the value of a green environment, ICICI Bank organizes an annual sapling planting drive on World Environment Day. Additionally, they spread awareness of environment friendly themes through events like "Reuse Paper Day," "Carpool Day," "Save Energy Day," and "No Plastic Day."

5. "Go Social" Campaign: To raise awareness about green practices, the bank has started the "Go Social" campaign, which encourages staff members to post images and videos on social media.

6. Solar Panels: As part of the Go Green effort to lower energy consumption expenses, ICICI Bank has placed solar panels in its branches.

7. Promotion of Online Culture: The bank aggressively encourages its clients to communicate online by providing online bill payments, e-statement subscriptions, and online financial transfers.

Axis Bank

Axis Bank has undertaken several initiatives to promote sustainable banking and environmental responsibility. Here are some key initiatives:

1. Dual Objectives: Axis Bank focuses on two key objectives - reducing the adverse impact of its operations on the environment and promoting environmentally friendly technologies through its lending business.

2. Paperless and Online Communication: The bank encourages customers to reduce paper consumption and energy usage by subscribing to e-statements and other electronic communication formats, promoting a more environmentally friendly approach.

3. Green Infrastructure: Axis Bank adopts green building concepts for its office spaces, designing and constructing them as Platinum LEED-Certified green buildings, emphasising energy efficiency and sustainability.

4. Tree Plantation Programs: The bank initiates tree planting programs by planting saplings roadside to contribute to a greener environment.

5. Solar-Based UPS: Axis Bank has installed solar-based uninterruptible power supply (UPS) systems in its branches to reduce energy consumption and lower carbon footprints.

6. Green Financing: The bank does not provide credit to projects that contribute to pollution, deal in banned wildlife-related products, handle ozone-depleting substances like chlorofluorocarbons (CFCs), or work with other hazardous substances. This commitment to green finance promotes environmental responsibility.

7. Support for Green Projects: Axis Bank provides finance to green projects in areas such as renewable energy, clean technology, sustainable infrastructure, and energy efficiency. This support helps mitigate the adverse impacts of climate change.

8. Digital Banking Promotion: The bank encourages digital banking through e-services like net banking, Axis OK (mobile banking app), UPI, green

PIN, Axis AHA (a chatbot), and more, fostering a culture of online banking.

9. Remote Managed Service Program: Axis Bank has implemented a "Remote Managed Service" program to monitor and control energy usage at its offices centrally. This program also involves shifting from hard disk storage technology to highly energy-efficient solid-state data storage technology, further promoting energy efficiency.

Kotak Mahindra Bank

Kotak Mahindra Bank has implemented several initiatives to promote sustainable banking and environmental responsibility. Here are some of the key initiatives:

1. Online Culture Promotion: The bank encourages its credit card customers to store and retrieve their information and statements online. In partnership with Grow-Tress.com, Kotak Bank plants a sapling for every customer who opts for an e-credit card statement, promoting a greener environment.

2. Digital Banking Initiatives: Kotak Bank promotes digital banking through initiatives like net banking, Kotal-811 (a virtual savings bank account), mobile banking, UPI, and the Meet Kaya chatbot. These digital solutions reduce energy and resource consumption.

3. Green Finance: The bank has established an Environmental, Social, and governance (ESG) management system plan to assess the social and environmental risks of eligible borrowers, promoting green finance.

4. Green Building Practices: Kotak Bank focuses on building energy efficiency, resource efficiency measures, and data centre efficiency. They use energy-saving technologies like CFL lighting solutions, daylight sensors, and energy-efficient chillers to reduce energy demand.

5. Water Conservation: The bank reduces fresh water intake by recycling and reusing wastewater for gardening and toilet flushing. Additionally, rainwater harvesting through collection tanks is practised.

6. Waste Management: Kitchen waste from bank offices is routed to a trust that converts it into compost for use as manure, effectively managing waste and reducing carbon footprints.

7. "Think-Green Initiative": Kotak Bank launched this initiative to encourage customers to sign up for e-statements and discontinue paper statements, contributing to environmental conservation.

8. Reduction in Paper Usage: Kotak Securities has implemented e-contracts, reducing the number of pages used in opening accounts and integrating multiple client updation forms into one, ultimately reducing paper usage and carbon footprints.

9. Electronic Quarterly Newsletters: Kotak Mutual Funds offers e-versions of their quarterly newsletters to distributors and investors instead of physical copies, promoting eco-friendly practices.

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Chapter-6

IMPACT INVESTING

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Introduction

Impact investing is an advancement in the philanthropic approach of creating environmental and social impact, along with financial returns. It can be considered as a step ahead into the socially responsible investing (SRI). SRI is more of an integration of ESG (Environmental, Social, and Governance) strategies into the investment decision but not at the cost of financial returns. Impact investment may or may not compromise the financial returns. Impact investing, over a period, has grown its wings in both public and private markets. The scope of issues covered in creating impact is not limited to climate change, healthcare, and education but many more. (Schueth, 2003).

"Impact" here can be taken from the definition "Impact is broadly defined as any meaningful change in the economic, social, cultural, environmental, and/or political condition due to specific actions and behavioral changes by individuals, communities, and/or society as a whole. For investors, impact means a deeper accountability for all of the positive and negative impacts of our assets and our intentional use of those assets to make a positive difference

for society and the planet", as defined in 'Impact Investing book' by Godeke, S., and P. Briaud. (2020).

Impact investing has gained significance due to the integration of impact on the environment and society into the financial value of the firm. It surely has shown the ability to redirect capital flows towards sustainable and equitable development. (Emerson & Spitzer, 2007).

In private markets the impact investing is more direct in terms of investment, measurement, and integration as private equity investment or direct investment from trusts, family offices, or foundations (Bugg-Levine & Emerson, 2011).

In the case of public markets, It is not so and is more done through integrating ESG factors into the investment decision by the public market players i.e. fund managers, by using various strategies ranging from screening to integration and stewardship. (Riedl & Smeets, 2017).

Another crucial aspect that distinguishes impact investing from SRI investing is measuring the impact to add credibility to impact investing. Many recognized networks have come out with standardized metrics, and these are used by many impact investors as well. The notable contribution in this area is made by the Global Impact Investing Network with IRIS (Impact Reporting Investment Standard) + system (GIIN (Global Impact Investing Network), 2020). Many impact investors believe in creating their own measurement standards for the purpose. The area is yet to achieve full standardisation which looks difficult considering the wide range of impact activities.

With the evolution in the area, new strategies are being introduced and tested to bring and create a positive impact along with achieving financial returns. This evolution signifies a growing recognition of the interconnectedness of financial markets with the broader global ecosystem.

1. Impact Investing: An Overview

The term impact investing can be considered to be a new term in comparison to SRI investing. With the maturity achieved in a short span, is bringing a transformative shift in the investment landscape. The unique strategy of achieving impact along with financial returns is getting acceptance and embrace in private markets, public markets, and all the industries and sectors, with the possibility of creating impact.

As per the Global Impact Investing Network, impact investing has four characteristics distinguishing it from Traditional investment and SRI (GIIN, 2020).

(1) Intention to achieve social and/or environmental impact
(2) Impact measurement and reporting
(3) Expectation of Financial returns or at minimum, the return of principal invested
(4) Target returns (below market of risk-adjusted returns) across asset classes

1.1 Definition of Impact Investing

Impact investing is defined as "investments made with the intention to generate positive, measurable social and environmental impact alongside a financial return" (The Global Impact Investing Network (GIIN, 2020).

1.2 Evolution of Impact Investing

Impact investing can be considered as the integration of two existing investment methods, philanthropy, which does not consider the financial returns and not even the return of capital invested, and Sustainable Responsible Investing (SRI), wherein the market financial returns remain the primary concern by considering the Environmental social and governance factors into investment decision making. The idea has captured the interest of both private and institutional investors. This can be due to the increased awareness of issues like climate change, social inequality, and the need for sustainable development, change in regulations across nations or due to the demand from the stakeholders. Investors have also become the driving factor

for this shift to ensure investment strategies accommodate and contribute positively to the United Nations Sustainable Development Goals (SDGs).

The recognition of impact investing is increasing and is visible with the developments in the areas of innovative impact investment tools, instruments and measurement metrics which can be effectively utilized to address social and environmental issues and still achieving competitive returns. Further there is ample research indicating that companies adapting and transforming itself with sustainability practices may exhibit lower risk profiles and potentially perform better over long term. When it comes to impact on financial returns, the evidence is mixed and not conclusive. (Friede, Busch, & Bassen, 2015).

Impact investing takes a significant step forward to incorporate the power of capital market by opening doors for investments which can deliver tangible benefits to society and the environment. Through impact investing the trajectory of capital markets seems to be redefined for building a more sustainable and fairer world.

2. Impact Investing across the globe

Impact investing has seen a universal shift towards sustainable development and conscious capitalism. It has gone way beyond geographical boundaries and become a global phenomenon. This investment approach, which looks to generate social and environmental impact alongside financial returns, has gained momentum worldwide as stakeholders from various sectors recognize its potential to address pressing global challenges. The global expansion can be seen in renewable energy projects in Sub-Saharan Africa to microfinance in South Asia and affordable housing in Latin America, impact investments are channelling capital to and everywhere it can serve the dual purpose of profit and positive change (Mudaliar, Bass, & Dithrich, 2019).

International Frameworks in Impact Investing:

International frameworks and agreements, such as the United Nations Sustainable Development Goals (SDGs), have provided a blueprint for

aligning impact investing with global development objectives. The SDGs have catalyzed a wave of impact investment by offering a common language and set of targets for measuring and managing impact (United Nations, 2015). Investors are increasingly using the SDGs as a framework to guide their investment strategies and to communicate their impact objectives.

Institutional Involvement and Growth

Institutional investors, including pension funds, insurance companies, and sovereign wealth funds, have begun to incorporate impact investing into their portfolios, signalling a recognition of its importance to long-term value creation (OECD, 2020). The entry of these large-scale investors has the potential to significantly increase the flow of capital towards sustainable investments, amplifying the impact of the sector.

Challenges and Opportunities

Despite its growth, the global impact investing market faces challenges.

- Acceptance by categories of investors
- Need for standardized impact measurement and management practices
- Impact washing

However, these challenges also present opportunities for innovation and collaboration across sectors and borders (GIIN, 2020). The scope and acceptance of impact investing is increasing. The continued evolution of this field will be characterized by greater international cooperation, enhanced transparency, and a deeper integration of impact considerations into investment decisions.

3. Types of Impact Investing

Though a new term, impact investing has gained quite a momentum across the financial markets and industries and still maintains the uniqueness to address specific social or environmental issues with an intention to create impact and generate financial returns as well. The strategic approach adopted by various investors and markets helps us distinguish the practices based on the markets, i.e. Private and Public markets.

3.1 Private Impact Investing

The private equity players, family offices, foundations, and trusts willing to create impact and gain financial returns or at minimum retain the invested capital come under one umbrella of impact investing.

The investments into the impact firms in these cases are direct and are focused towards the desired impact. These investments are mainly characterized by direct and active ownership, where investors actively either participate in the management decisions, by playing a role in company governance or creating specified metrics of impact measurement to steer the investee firm to achieve the impact as well as financial results. (Clarkin & Cangioni, 2016).

With a primary objective to create impact, impact investing strategy is used by many private investors be it private equity players or new age philanthropists as a strategic method to achieve the dual objective of impact and financial returns. The strategy works well for attracting private capital into the investment choices and sectors which earlier were mainly dependant on the trusts for donations or government subsidies. (Freireich & Fulton, 2009).

Evolution and significance:

Impact investing has its routes from the philanthropy specifically directed towards achieving social objectives. These roots have been expanded more in early 2000's by incorporating more than social but impact objectives and aligning these objectives with traditional investing approach of achieving financial returns (Brest & Born, 2013). Though the pure objective cannot be set to be earning financial returns, but it cannot set to be only achievement of social objective through a philanthropy. The basic distinction comes with the requirement of at least protecting the principle. The unique structure helps filling gaps which traditional finance and philanthropy singularly find it difficult to achieve.

The concept has the acceptance and significance due to the contribution it can possibly bring by creating an accountability in the social investment and making the objective not only achieve but measurably achieve. The strategy makes it quantifiably measurable, reducing the opportunities for green or

impact washing and further gives a scope for improvement into the measurable contributions. The other methods like SRI or Philanthropy lack this aspect. The investment approach can be more efficient, promoting innovation in addressing social and environmental issues and leading to scalable and sustainable solutions (Saltuk, Bouri, & Leung, 2011). This shows the investment approach has a lot of potential in the private investing space to bring in the capital required to address the United Nations Sustainable Development Goals (SDGs) and can lead to the development of new markets and the promotion of entrepreneurship. Moreover, it offers the potential for financial returns that are competitive with traditional markets, attracting a broader range of investors (GIIN, 2020).

3.1.2 Types of Investors

Private impact investing attracts a diverse group of investors, including:

1. High-net-worth individuals and family offices are often more inclined to align their values in taking their investment decisions.

2. Institutional investors, which are in to the private funding and venture capital investing consider ESG factors as a major factor in to their financial decision making by using the impact measurement tools.

3. Foundations that use their endowments to further their philanthropic goals through market-based approaches.

4. Development finance institutions that support private sector development in emerging markets with the aim of achieving economic growth and creating social impact by reducing poverty.

Private impact investing stands at the confluence of innovation, finance, and social consciousness. As this field continues to mature, it promises to redefine the boundaries of investment and philanthropy, offering a proactive approach to solving some of the world's most pressing problems while also providing financial rewards to those who invest in change.

4. Public Impact Investing: Catalyzing Change Through Market Participation

4.1.1 Evolution and overview

Investing in public assets, such as stocks and bonds, with the aim of fostering positive social and environmental outcomes in addition to financial gains, is known as public impact investing. This method capitalizes on the breadth of public markets to encourage sustainable corporate practices and tackle pressing global issues (Schueth, 2003).

The public impact investing is more of a socially responsible investing (SRI) which works on the integration of environmental, social, and governance (ESG) factors into investment decisions but not affecting the financial returns much. Heightened public consciousness around issues like climate change and social disparities has prompted investors to pursue avenues through which they can drive change via their investment choices, culminating in the creation of investment funds and indices with an impact orientation (Sparkes & Cowton, 2004). Public impact investing refers to the practice of investing in publicly traded assets, including stocks and bonds, the aim here is to achieve the financial returns as well as the social and environmental impact. This approach allows for the leveraging of the public markets to promote sustainable business practices and address global challenges.

Significance

Public impact investing is significant because it democratizes the ability to engage in impact investing, making it accessible to a broader audience. It allows individual investors to contribute to large-scale change through the public markets and provides liquidity and transparency that can be more challenging to find in private markets (Schueth, 2003).

Characteristics

Public impact investments are characterized by their focus on companies that are listed on stock exchanges and are subject to market regulation and disclosure requirements. These investments often involve screening

companies based on ESG criteria, shareholder advocacy for better corporate practices, and thematic investing in sectors such as clean energy or sustainable agriculture.

Potential

The potential of public impact investing is substantial due to the scale and reach of the public markets. It can drive corporate change by influencing capital allocation, encouraging companies to improve their sustainability practices, and potentially leading to broader systemic change within the market economy (Riedl & Smeets, 2017).

4.1.2 Types of Investors

Public impact investing attracts a variety of investors, including:

1. Retail investors who wish to align their personal values with their investment choices through mutual funds or exchange-traded funds (ETFs).

2. Institutional investors, such as pension funds and university endowments, which have mandates to consider the long-term societal and environmental implications of their investments.

3. Asset managers who create and manage impact-focused investment products for a range of clients.

4. Activist investors who use their stakes in public companies to influence corporate behaviour and policy.

Public impact investing brings the power and scale of the capital markets to integrate, develop, and promote sustainability, by integrating impact considerations into public investment strategies. This can lead to a more responsible and resilient economy.

5. Impact Measurement

One of the key aspects making impact investing differentiate from philanthropy and SRI is impact measurement. The GIIN has changed its

definition of Impact investing over a period by incorporating the measurement part into it understanding the significance of the same.

It has become a critical component of impact investing as it provides investors with the data needed to assess their investment decision with the sense if their investments are yielding the intended social and environmental benefits alongside financial returns. This process involves setting out clear impact objectives, measuring outcomes, and using this information to inform investment decisions and strategies.

Initially impact measurement was more qualitative than quantitative. It was majorly based on anecdotal evidence and case studies which lacked reliability, scalability and quantifiability required by the investors. The need and progress in impact measurement is mainly driven by the demand for accountability and transparency in impact investing. Over a period of time and maturity achieved, the field has moved towards more standardized and quantitative measures, with the development of various frameworks and metrics designed to provide a more rigorous assessment of impact (Clark, Rosenzweig, Long, & Olsen, 2004).
Impact investment gains significance due to the ability of being validated the effectiveness of impact investments. It ensures the capital is directed towards the most effective interventions for continuous improvement, enabling investors to refine their strategies and enhance the impact of their investments (O'Donohoe et al., 2010).

A theory of change usually underpins impact measurement. A theory of change is a strategic framework, which details the causal pathways from inputs to outcomes. It is used to plan and evaluate social interventions. Impact measurement may further use visual or narrative depictions of the processes through which an impact program is intended to create results.

On the other hand social and environmental change being complex, one may find it challenging to attribute outcomes directly to investments. Further different stakeholders may have varying expectations and definitions of

success. Due to this lack of alignment in interests, the stakeholders may not therefore agree on measurement approaches and outcomes.

Collecting high-quality data can be resource-intensive and difficult, particularly in less developed markets. In most cases, investors use custom metrics to capture the unique impact of their specific investments. The lack of standardisation is a challenge, making comparisons difficult across impact investments. Standardized metrics, such as those from the Global Impact Investing Network's IRIS (Impact Reporting Investment Standard) + system, provide a framework for assessing and comparing the social and environmental outcomes of investments

Impact measurement is an evolving practice that is essential for the credibility and growth of impact investing. As the field matures, the development of more sophisticated and standardized measurement tools and methodologies will be crucial in enabling investors to understand and maximize the impact of their investments.

5.2 Strategies in Impact Investing:

Impact investing represents a strategic approach to traditional investing with the intension to generate financial impact which is more of a financial returns, as well as social and environmental impact. The strategies within impact investing are diverse and can be applied across both public and private markets, each with its own set of tools and approaches tailored to different investor profiles and objectives.

Public Impact Investing Strategies

In public markets, impact investing strategies revolve around considering environmental, social, and governance (ESG) aspects in the investment decision-making process. Common strategies include:

- **ESG Integration**: Incorporating ESG factors in addition to traditional system of financial analysis to identify companies with superior practices (Eccles & Viviers, 2011).

- **Socially Responsible Investing (SRI)**: Excluding stocks or industries from investment portfolios based on specific ethical guidelines.
- **Thematic Investing**: Targeting investments in themes or assets specifically related to social or environmental benefits, such as clean energy or sustainable water solutions (Krosinsky & Robins, 2008).
- **Shareholder Advocacy**: Engaging with companies to influence their practices and policies towards more sustainable and ethical outcomes (Logue, 2009).

Private Impact Investing Strategies

Private impact investing strategies often involve direct investments in private enterprises, projects, or funds with explicit impact objectives. These strategies include:

- **Venture Philanthropy**: Providing finance and management ability to social enterprises or non-profits (John, 2006).
- **Private Equity and Debt**: Investing in private companies with a clear impact mission, offering the potential for hands-on engagement in guiding the business strategy (Bugg-Levine & Emerson, 2011).
- **Community Investing**: Directing capital to underserved communities to finance local businesses, affordable housing, and vital community services (Freireich & Fulton, 2009).

Challenges and Considerations

Though with the significance gained impact investing deals with many challenges due to the non-standardisation which seems unachievable with the very nature of impact investing. The challenges can be listed as Difficulty in Measuring and reporting impact: Every investment made with the objective to achieve impact may not necessarily be quantifiably measurable. Those measurable, may be very subjective depending on the objective and the investor.

Lack of standardisation in measurement: The financial impact measurement has achieved lot of standardisations with the time and maturity. The impact investing considerably new, is yet to get the standardised mechanism. Compared to the financial impact measurement it might be difficult to achieve the same level of standardisation.

Ensuring financial viability: The collusion between impact and financial returns might result in supporting financial viability.

Impact washing: The danger of displaying more impact than achieved may or false clamming may end up defeating the very purpose of impact investing.

To overcome these challenges, both public and private impact investing require due diligence and a clear understanding of the interplay between impact objectives and financial returns. Impact investing strategies offer pathways for investors to contribute to societal and environmental solutions while seeking financial returns. As the field grows, the development of robust measurement and management practices will be crucial for ensuring that impact investing can fulfil its promise as a force for positive change.

Conclusion

Impact investing has seen its evolution from mare philanthropy to a combination of achievement of impact and financial objective and redefining the role of capital in building a sustainable future (Schueth, 2003; Emerson & Spitzer, 2007). In both public and private realms, it employs diverse strategies, from ESG integration to direct venture support, all underpinned by rigorous impact measurement frameworks like IRIS+ (GIIN, 2020). As it continues to mature, impact investing stands as a testament to the power of finance as a force for good.

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Chapter-7

SUSTAINABILITY AND FIRM VALUATION

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Introduction

Investors and managers must understand the financial impact of sustainability risks and opportunities. ESG ratings can provide a progress report on sustainability over time and against peers but do not evaluate its final effect on firm value for investment decision-making. This article discusses how to incorporate sustainability in firm valuation.

The firm valuation models are well-established. Among these, the discounted cash flow (DCF) models are instructive in understanding a firm's value drivers. If ESG considerations are essential, one must determine how they impact the firm's value through these drivers. Investors can then compare the intrinsic value calculated with the market price to make an investment decision. Managers can compare the incremental value of alternative actions they may take in response to the ESG risks and opportunities.

These estimations are practically tricky since there are significant challenges in measuring the ESG parameters and evaluating their impact on the value drivers. Some academicians and practitioners have nevertheless proposed approaches to assess the ESG impact on sources of value. Other academicians

and practitioners have interlinked various strands of empirical evidence using the valuation frameworks to draw generalised inferences regarding the impact of ESG on firm value.

Proponents of estimating the financial value of social and environmental externalities have been developing new approaches to determine the same. While attribution of monetary value to externalities remains a work in progress, it is interesting to discuss the latest ideas with the hope that they may develop into viable evaluation tools for managers, sustainability-conscious stakeholders, and policymakers.

This article builds upon the general DCF valuation framework in the first section to explain how sustainability can impact firm value. The second section presents and reviews the approaches proposed for analysing the impact of ESG on the firm's value. The third section examines the empirical evidence on the impact of ESG on financial value. The fourth section offers practical guidance on incorporating ESG into valuation for financial analysts. The fifth section discusses the new approaches to determine the economic value of the firm's externalities. The final section concludes.

1. The DCF Valuation Framework and The Value Drivers of a Firm

The general equation for the value of a firm using the DCF model is as follows.

$$Value = \frac{CF_1}{(1+k)^1} + \frac{CF_2}{(1+k)^2} + \frac{CF_3}{(1+k)^3} + \cdots + \frac{CF_n}{(1+k)^n}$$

(1)

The above equation estimates the firm's value as the cumulative value of its expected cash flows over future periods discounted by a risk-adjusted discount rate.

In the weighted-average cost of capital (WACC) method of estimating the DCF model, the expected cashflows are free, pre-financing after-tax operating cashflows net of investment cashflows. One can estimate these cash flows

based on subjective probabilities, and the expected cash flow in any period is a subjective probability-weighted average based on a cash flow distribution for that period.

The discount rate for any period is the weighted average cost of individual financing sources, such as debt, equity, and preferred stock, where weights are the target proportions of funding at fair value.

In theory, the costs of equity, debt and other sources include a risk premium above a risk-free interest rate, and this risk premium accounts for the systematic, non-diversifiable component of the total risk. The firm-specific, idiosyncratic, or unsystematic component of the risk being diversifiable does not affect the cost of capital in theory. It can, however, affect valuation through an impact on the cash flow distribution.

The practice of valuation is highly subjective, involving multiple assumptions, choices and improvisations on a best-effort, best-available basis. For a conceptual discussion, however, it suffices to explain the firm's valuation in terms of expected cashflows and risk-adjusted discount rates, along with their components, referred to as value drivers.

The discussion in the following paragraphs builds upon the concepts presented in commonly referred books on valuation, including Damodaran (2012) and Koller et al. (2020).

From (1), the DCF model can be developed further by estimating the free cashflows.

$$CF = Operating\ Cash\ Flow - Investing\ Cash\ Flow$$

(2)

On a pre-financing, after tax basis,

$$CF = EBIT(1-t) + Depreciation - \Delta Net\ working\ capital - Capex$$

(3)
Defining EBIT(1-t) as net operating profit after tax (NOPAT) and invested capital as sum of net working capital and net fixed capital,

$$CF = NOPAT - \Delta Invested\ Capital$$

(4)
Under the assumption of constant revenue growth g in perpetuity and stable profit margin, investment efficiency and cost of capital, enterprise value as per the growing perpetuity formula is

$$Value = \frac{CF_1}{k-g} = \frac{NOPAT_1 - \Delta Invested\ Capital}{k-g} = Revenue_1 \times \frac{\frac{NOPAT_1}{Revenue_1} - \frac{\Delta Invested\ Capital}{Revenue_1}}{k-g}$$

(5)
Further, defining value creation in terms of the difference between the enterprise value and invested capital as a percentage of the latter, results in (12). The derivation from (5) to (12) is shown in the annexure.

$$\frac{Value - Invested\ Capital}{Invested\ Capital} = \frac{ROIC - k}{k-g} = \frac{\left[\frac{NOPAT_1}{Revenue_1} \times \frac{Revenue_1}{Invested\ Capital}\right] - k}{k-g}$$

(12)
From (5) and (12) it is apparent that there are four drivers of value as well as value creation.

- Long-term revenue growth (g): supports value creation
- Net operating profit margin (NOPAT/Revenue): supports value creation
- Investment efficiency (Revenue/Invested Capital): supports value creation
- Cost of capital (k): value creation decreases with cost of capital

The first equality of (12), also shows that an essential condition for value creation is that the return on capital must exceed the cost of capital.

Replacing a constant growth model with more realistic multiple-stage growth models would result in stage-wise components on the right-hand side of equations (5) and (12), making them more complex. However, the relationship

of the four value drivers with value and value creation would remain the same as in the constant growth model.

The first three value drivers are related to cash flows, and the fourth to the discount rate. It follows that sustainability should impact firm value through these four value drivers. The following section discusses a few frameworks that interlink sustainability with a firm's value through the value drivers.

2. Incorporating Sustainability through Value Drivers

Henisz, Koller and Nuttall (2019) listed five ways sustainability links to value creation.

1. Top-line growth. A company with more sustainable products, services, or practices can attract more customers. As B2B and B2C customers become more sustainability conscious, they prefer to buy more from companies with stronger ESG propositions. Conversely, a company with weak sustainability products or practices will lose market share or not achieve its growth potential.

   Apart from the demand side effect, government and community relations will also dictate access to land, labour and other resources. A company vital in these relations will find access to resources supporting its revenue growth plans compared with a company weak in its social relationships.

2. Cost reductions. Reducing energy and water consumption is not only environmentally friendly. It also reduces costs for the firm. Conversely, generating excess waste or using unnecessary packaging can entail higher waste disposal and packaging costs.

3. Regulatory and legal interventions. Companies that pollute, breach labour laws, or violate any other environmental or social impact regulations are likely to incur fines, penalties and enforcement actions. In the worst case, they may face restrictions on advertising or sales.

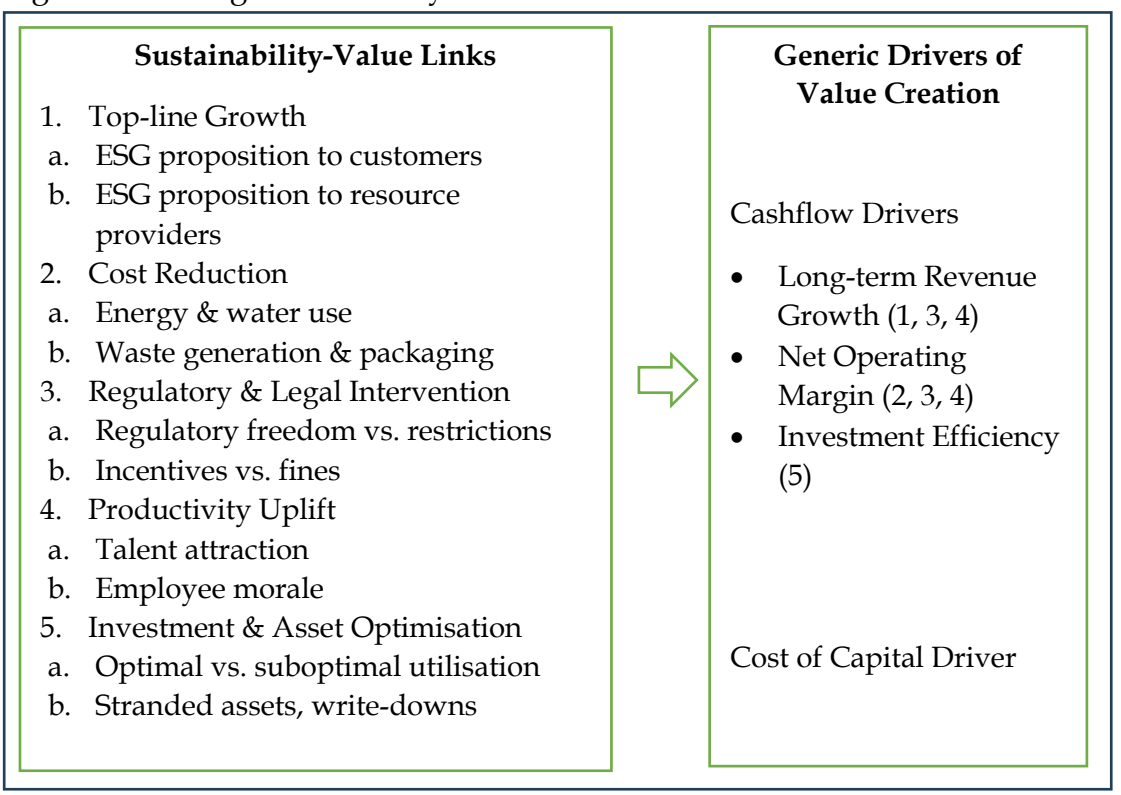
   Conversely, governments may provide subsidies and incentives to companies which promote sustainable products and services. Such

companies will also be able to retain strategic freedom from government regulation.

4. Productivity uplift. Companies with a strong perception of being fair employers and socially responsible will be able to attract talent through social credibility and achieve higher employee productivity from motivated employees. Conversely, companies with weak purpose and social stigma cannot attract or retain employees.

5. Investment and asset optimisation. By ignoring long-term environmental effects, companies making myopic investments will likely end up with stranded assets, asset write-downs, or equipment with lower energy efficiency. Companies allocating capital to more sustainable plants and equipment will achieve more optimal investment returns on such assets in the long run.

Figure 1. Linking sustainability with value creation



Source: Prepared by author based on Hensiz, Koller & Nuttall (2019)

Figure 1 maps the five links described above with three value drivers listed in the previous section. The first link relates to revenue growth, the second to profit margins, the third to revenue growth and margins, and the fourth to investment efficiency. Interestingly, the authors mentioned no pathway from sustainability to the cost of capital, the fourth value driver. It is also pertinent to observe that the article focuses on how a strong ESG proposition would create value and a weak ESG proposition would destroy value. However, it does not cover situations where a strong ESG proposition may not add or trade off financial value for non-financial value.

In three steps, Schramade (2016) proposed integrating ESG into valuation models using a value driver adjustment (VDA) approach.

Step 1. Identify and focus on the most material issues.
Step 2. Analyse the impact of these material factors on the company.
Step 3. Quantify competitive (dis)advantages to adjust the value-driver assumptions

Adjust sales growth
Adjust profit margins
Adjust invested capital
Adjust cost of capital

Note that the value drivers mentioned in Step 3 correspond to the four value drivers discussed in Section 2 of this chapter.

Schramade (2016) also describes the implementation of VDA by Robeco Asset Management's analysts using a case study. Robeco uses a proprietary valuation model built explicitly using four value drivers (listed in Step 4 above). Equity analysts integrate ESG into their model after consulting their counterparts in the sustainable investing (SI) team.

In Step 1, the SI analysts identify each company's most material ESG factors. They then analyse the performance of each company on each of the material

factors, both as trend comparison and peer comparison. Finally, they explore and provide qualitative comments on how a company's ESG performance would impact its value drivers, completing Step 2. Based on the SI analysts' opinions, the equity analysts in Step 3 adjust the value drivers for ESG impact to estimate the final value incorporating sustainability.

Implementing Step 1 of the VDA framework has become easy due to the availability of sector-wise materiality maps by SASB (a global sustainability standards setter) and ESG rating organisations such as the MSCI. In many countries, regulators require companies to report their material factors.

However, the analyst must understand the company's products, operations, value chain, and business model and then independently prepare a final list of material factors after comparing them with those provided by the company and the third parties.

Implementing Step 2 is effort-intensive but increasingly feasible, given the improvement in the quantity and quality of non-financial disclosures by organisations and the presence of ESG data aggregators and rating providers. It requires the analyst to evaluate both qualitative and quantitative ESG information. The primary source of information is the company itself, through its website, annual reports, regulatory filings, media releases, management interviews, investor presentations and analyst conference call transcripts. ESG data service providers also provide quantitative information in a standardised format.

Step 3 presents the most significant implementation challenge since it requires quantifying ESG impact. Adjustments to discount rates, for example, are prone to arbitrariness in the magnitude of adjustment and to the risk of double counting (Bos, 2014). Suppose a company has a higher risk profile resulting from its poor ESG proposition. In that case, the risk is often widely known in the market and, hence, already reflected in the company's equity beta.

Further, since most analysts tend to use valuation spreadsheets linked to key elements in financial statements rather than through value-driver frameworks, they need not implement Step 3 of the VDA method through explicit adjustments to the value drivers. The analysts aim to estimate the firm's value after incorporating all the material factors, ESG factors being a subset. The comparison of value with and without ESG comparison is optional. Having identified the material ESG factors (Step 1) and having qualitatively analysed their impact (Step 2), it is sufficient that the analyst ensures that the assumptions are consistent with material ESG issues and their likely effect.

Subjectivity is inherent in valuation, and ESG incorporation adds incrementally to an already subjective process. Section 6 provides further guidance on incorporating sustainability in firm valuation.

Since sustainability considerations are long-term and their development and impact are uncertain, it may be worthwhile to employ standard techniques for dealing with uncertainty in corporate finance for long-term investment decisions. Bianchini and Gianfrate (2018) discuss the relative merits of some of these, including scenario analysis, Monte Carlo simulations, decision trees and real options. Considering the likely information available and the high relevance of tail risks, scenario analysis emerges as a preferred solution. However, Monte Carlo simulations may be helpful where the distribution characteristics of the critical inputs are known.

The discussion in this section has been regarding the value to financial stakeholders, not including societal value. Section 4 covers the valuation of social and environmental externalities closely related to societal value.

3. Empirical evidence on sustainability-value link

Using ESG rating data from MSCI, Giese et al. (2019) examine the link between ESG information and the valuation of companies through three transmission channels: cash flows, idiosyncratic risk, and systematic risk. To analyse the three channels, they sorted the sample of over 1600 stocks into size-adjusted ESG quintiles.

Cash flow channel: The mean gross profit to assets ratios of the ESG quintiles rise consistently with their ESG rank. The authors attribute the result to strong ESG companies having competitive advantages over peers, which they then translate to generate greater abnormal returns and pay higher dividends.

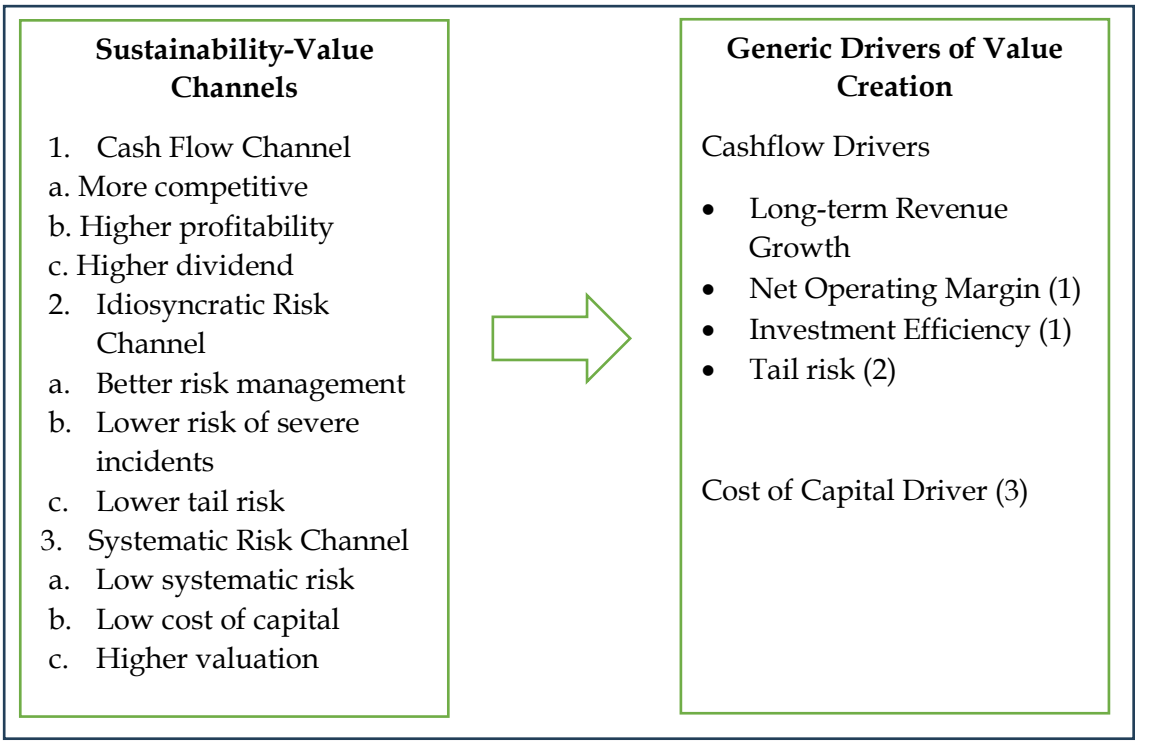
Idiosyncratic risk channel: The residual volatility of the ESG quintiles falls consistently with improvement in ESG rank. According to the authors, companies with better ESG profiles tend to have better risk control and compliance standards for their operations and their value chain. Hence, they suffer from less frequent and less severe incidents of fraud, embezzlement, corruption and litigation. As a result, they are less vulnerable to tail or downside risks.

Systematic risk channel: The systematic volatility of the ESG quintiles declines consistently with an improvement in their ESG rank. The historical beta, earnings yield and book-to-price ratios also fall (broadly, though not invariably) with a better ESG profile. According to the authors, the lower systematic risk results in a lower cost of capital, leading to higher valuation of companies with superior ESG profiles.

Giese et al. (2019) also extensively cite other empirical research papers that support their findings and further bolster their claim that the link between sustainability and value is causal and not merely correlation.

Figure 2 maps the three transmission channels in Giese et al. (2019) with value drivers. The idiosyncratic risk channel connects with all three value drivers related to cashflows. However, the cash flow channel is not mapped with the long-term revenue growth value driver since the paper links ESG ranks only with profitability but not with revenue growth or market share.

Figure 2. Sustainability-value transmission channels and value drivers



Source: Prepared by author based on Giese et al. (2019)

Cornell and Damodaran (2020) use the four value drivers or levers to critically examine the link between ESG and firm value by surveying related empirical research. They find mixed and nuanced evidence which suggests that socially responsible firms tend to have lower discount rates, but the evidence of higher growth or profits is weak. Further, more substantial evidence exists that companies with weak ESG propositions suffer from higher discount rates or tail risks. The market also only seems to incorporate ESG into pricing in the case of companies labelled as bad firms.

The implication of Cornell and Damodaran (2020) is not that sustainability does not affect firm valuation. Instead, empirical evidence has so far failed to provide a convincing case that a stronger ESG proposition enhances firm value and vice versa. There can be several reasons for the same, including measurement issues. The authors question the definitions of ESG, particularly the governance factor, and highlight research that indicates that ESG ratings are divergent and probably not helpful.

One takeaway is to exercise caution, particularly when considering the potential upsides of company sustainability initiatives. A second takeaway is that one must consider tail risks related to sustainability for companies where they are essential. Finally, ESG ratings should not be relied upon as an input for valuation; as far as possible, security analysts should conduct their own materiality and impact assessments.

4. Practical Guidance for Valuation

This section summarises practical guidelines from the above discussion and the referred texts and research papers. The best practices in corporate valuation remain relevant. The six steps below follow Schramade's VDA approach and are broadly consistent with the other approaches discussed in section 2 and the empirical research findings in section 3.

Step 1. Collect contextual information about the firm's business.

One must analyse the impact of sustainability in the context of the business profile, competitive and environmental forces, financial position, and strategy. Hence, in the first step, it is necessary to be prepared with information related to the share in value of various businesses, products and services. Further, it may be helpful to understand the customer segments, competitors and competitive position, as well as the operational process, value chain, facilities and employee profile.

Financial strength, relative stock valuation, credit ratings, and assessments are relevant since they reflect the capacity to invest to mitigate the sustainability risks or absorb their impact. Understanding the management strategies for profitable growth and risk management may also be worthwhile. Noting the ownership pattern, board, and organisation structure will help assess the structural issues related to corporate governance.

Step 2. Identify the material sustainability issues.

The company's material map, material maps of the peers, and material maps for the company or the sector provided by third parties are good starting points. As mentioned earlier, SASB and MSCI provide sector-wise materiality

maps. (Materiality map webpages of these organisations are available at https://sasb.org/standards/materiality-map/ and https://www.msci.com/our-solutions/esg-investing/esg-industry-materiality-map respectively).

However, it is crucial to form one's own opinions regarding materiality. Firms may not disclose adverse sustainability issues. For instance, a cigarette manufacturer may not even list public health as a material sustainability issue. Though third-party materiality map providers may not make such egregious omissions, they may diverge on materiality weights or indicators.

It will be helpful to scan databases and news resources for any sustainability-related news for the company and the sector, particularly controversies.

The above information will make it possible to identify the carbon footprint and other environmental issues created by the products and services, the processes and the value chain. Similarly, one may identify social issues for the relevant stakeholders (including customers, employees, and communities affected by the supply chain).

Step 3. For each issue, collect the required information
This step's first task is to list the relevant metrics against each issue and identify the likely information sources. One may then collect the required information from company sources (annual reports, regulatory filings, websites, investor presentations, and analyst conference call transcripts), reliable databases, and media resources. Where available, underlying information (not just scores) from rating and second-party opinion providers will be helpful.

Step 4. Assess the impact on the environment and society.
This step involves assessing the probability and significance of the impact on the environment and society by time horizon (for instance, within the next five years, 5-20 years, or beyond 20 years). Assessment on ordinal scales is better due to the subjectivity involved and the use of qualitative information.

It will be pertinent to critically examine the company's stated sustainability objectives and strategy in the context of its actual actions and the expected behaviour of stakeholders and competitors. The assessment should include how well the company engages the stakeholders in its sustainability initiatives and its relationships with them. Further, one can ascertain the management's commitment to sustainability by checking who is driving the initiatives, if there are dedicated resources and if there is evidence of adequate oversight. Management's commitment will have a bearing on the long-term assessment.

Step 5. Assess the impact on the firm's value drivers qualitatively.
Understanding the channel through which the environmental and social externalities will affect the firm is essential. Will external drivers such as regulations, pressure from stakeholders, and competitive forces force the firm to incur costs and investments? Alternatively, based on past and current behaviour, will the company's management proactively avoid risks, seek competitive advantage or growth opportunities, and incur costs and investments without waiting for such pressures to emerge? Answering these questions will facilitate the qualitative assessment of how the company's revenues, costs and risks could change due to the externalities.

Each issue must be mapped with the value driver(s) it will impact, along with an assessment of the probability of impact (low or high) and the significance of impact (low or high) over time (within the next five years, 5-10 years, beyond ten years). Issues that will be neither highly probable nor financially significant within the next ten years and those that will not be highly probable and significant beyond ten years may be ignored.

Step 6. Quantify the impact of the financially relevant and material sustainability issues on a firm's value.

The impact of the highly probable issues must be incorporated in assumptions that flow into each value driver in the baseline cash flow or cost of capital estimates. For instance, a problem affecting revenue growth may affect the assumptions of future sales volume or unit realisation of certain products.

Where sustainability affects an assumption, the same may be noted when writing the basis for that assumption. Given the empirical literature discussed in section 3, it may be worthwhile to exercise caution when assuming the positive impact of sustainable initiatives and investments of a firm on its cash flows. It will be prudent, however, to consider the relatively certain costs.

Building different scenarios is the best way to handle the high-impact issues which are less probable, particularly on the downside (the tail risk issues). Suppose the product of probability and the incremental impact of alternative scenarios(s) is estimated to be large enough. In that case, consider calculating a probability-weighted firm value assessment. Otherwise, the alternative scenarios may be appropriately labelled and presented for completeness of evaluation.

It may be impossible to quantify some relevant issues due to a lack of information or developing implications. In the valuation report, it is vital to communicate the sustainability issues incorporated and those not included.

Corporate governance

The above steps do not include an assessment of corporate governance. Corporate governance, as usually represented in the G pillar of ESG ratings, is mainly based on measures consistent with the agency theory. They may not be material to the environment and social sustainability but are financially relevant in their own right.

While it is undoubtedly valuable to assess structural measures such as CEO duality, independence of directors, and board diversity for individual firms, it is feasible and instructive to correlate with a behavioural assessment. Are related party transactions significant? Is there frequent restructuring of the firm? Is there evidence of misallocation of capital or some other evidence of value-destroying actions without apparent rationale? Does the firm tend to take excessive debt? Is there a likelihood of financial misreporting, unexplained choices, or changes in accounting policy? Are there auditor qualifications?

One may deal with financial misreporting by making financial adjustments or normalising (for instance, aligning with other periods or peer metrics). Other aspects may be highlighted in the valuation report.

Six steps of incorporating sustainability and further corporate governance analysis seem significant, but much of it may be incrementally small. Financial analysts, in any case, need to understand the business and consider any material issue, ESG or not, while forecasting revenue growths, margins and investments. The critical difference lies in formalisation. Given an explicit mandate to incorporate sustainability in valuation, the analysts must approach the incorporation more consciously in information collection, spreadsheet implementation and report writing.

5. The Value of Environmental and Social Externalities

Social and environmental impact assessment models have been introduced previously. Corvo et al. (2021) identified 98 social impact assessment methods. Some of these are long-term outcome-oriented, culminating in assigning a monetary value to the impact as per literature reviewing and classifying these models (Grieco et al., 2015; Corvo et al., 2021). Non-profit organisations (NPOs), consultants or funders have developed these models.

The most common monetising models are based on social return on investment (SROI) analysis. SROI models help NPOs secure funding (Maier et al., 2015) since they give the analyses business-like legitimacy. Some private equity impact investors have extended the monetisation approach to businesses, especially young and small ventures. Investors, such as Leapfrog Investments and TPG, have developed their proprietary measures of impact (Yang et al., 2019).

It may be worthwhile for young firms whose products and services directly relate to social and environmental benefits to accept and even seek such assessments to secure impact funding. An alternative for larger and more established firms could be to start accounting for externalities into new long-term investment decisions or businesses with specific targets, but only for part

of the firm. Suitable accounting methods for social and environmental externalities in capital budgeting may be selected and adapted to the company's context. Adaptation will require details of how various probabilities and impacts would be quantified, who will decide and approve subjective estimates, and the decision criteria for project evaluation and selection. Management may set environmental and social impact criteria separate from the NPV or IRR criteria for financial cashflows.

The suggestion that corporations should measure their aggregate societal impact is novel. KPMG (2014) proposed a methodology for corporations to incorporate societal values. Based on the vision that corporate value creation must align with value creation for society, the report proposed that corporations should internalise externalities.

The proposed "true value" methodology involves identifying and quantifying the material externalities to state them in financial terms. The next step involves analysing exposures to the three drivers of internalisation: regulation and standards, stakeholder action, and market dynamics, by conducting scenario analysis to understand future earnings at risk.

The third step involves identifying potential investments to create value by reducing negative or increasing positive externalities. The outcome is the net present value of investments after incorporating the internalisation of externalities.

The Sweden-based Volvo Group used the true value methodology to build a business case for electric buses. The adaptation involved applying the methodology to build societal costs into the total cost of ownership of the buses. Ambuja Cements, a leading cement manufacturer based in India, used the methodology to estimate the "true earnings" after estimating the positive and negative effects of externalities, mainly for internal reporting.

Schoenmaker and Schramade (2023) make a case for integrated value (IV) that includes three dimensions: financial value (FV), social value (SV) and

environmental value (EV). As per their methodology, S and E issues can be expressed in their units and multiplied by shadow prices derived from welfare theory to estimate value flows (analogous to financial cashflows). SV is calculated as the NPV of the social flows and EV as the NPV of the environmental flows. The discount rates used to estimate SV and EV are much lower than for FV, considering the argument for equal treatment of current and future generations and, hence, low time preference between generations. Scenario analysis can help develop insights into the possible internalisation of externalities.

The authors suggest steering the organisations for the creation of IV rather than only FV. They provide decision rules for investment projects. These include ensuring positive value creation for all three value dimensions, a path to recovery where value is destroyed on any dimension, and non-substitution wherein adverse effects on one dimension must not be netted against the positive effects on another.

Though quantifying externalities can be valuable in helping companies make better long-term decisions, innovate and enhance their reputation, the effort is time-consuming. There are technical issues associated with impact measurement. Further, monetisation of social outcomes may raise ethical and political issues (Maier et al., 2015).

The businesses of companies may cover the entire spectrum from those inherently perceived to create social or environmental value (such as education, healthcare services, or renewable energy) to those that have businesses that are inherently perceived to destroy value (such as fossil fuel energy, weapons, tobacco). The former group will be interested in showcasing their E or S value creation. The latter group may showcase their E or S transition, but only provided they are ready to make significant investments in adapting their business models to be more sustainable or make significant offsetting investments.

Several organisations may instead plan for a sustainability transition based on internal ratings per a defined roadmap. Other firms raising funds through sustainable finance instruments may plan sustainable projects or have specific transition targets rather than steer the entire organisation based on integrated value.

Firms must have motivations to manage for integrated value. Motivations include access to capital, gaining societal legitimacy, influencing stakeholders, and innovating to create sustainable advantages. These must be weighed against significant future investments to create and maintain social and environmental values. An alignment of mindset between the management, the board of directors and long-term investors is crucial before the organisation is steered based on integrated value instead of financial value (Kurznack et al., 2021).

Further, managers must decide whether to disclose their E and S valuations to the public. A few companies may find such disclosures helpful in convincing impact equity and sustainable debt investors and raising funds. Further, companies confident about achieving sustainability outcomes and seeking to use it to influence stakeholder perceptions may estimate and publicly disclose their social and environmental values.

However, the benefits should be weighed against the costs. Disclosing one social and one environmental value brings more significant focus on a firm's societal impact than disclosing various metrics against several material issues. The valuations will be subject to scrutiny in the absence of standard methodologies. At some stage, media, analysts, and stakeholders may expect the companies to report updates on these values annually, putting pressure on the management to report consistent improvement.

6. Conclusion

This article discusses approaches to relate environmental and social factors with firms' value. Empirical evidence suggests that the linkage between sustainability and cashflows is tenuous. However, there is some evidence of

an effect on the cost of capital and downside risk. Value-driver-based approaches are adapted to provide practical guidance in six steps to incorporate sustainability in firm valuation. The article also introduces some of the available approaches to evaluate firms' environmental and social value. The relative merits and demerits of measuring and disclosing these societal value dimensions are discussed.

For those mainly focussing on sustainability from a risk-management perspective, the value-driver-based approaches may prove adequate, with appropriate fine-tuning and customisation. However, for those who believe that firms should manage for sustainability and not just financial value, the methods are still under development and yet to mature. Valuing sustainability outcomes is an area of interest for both researchers and practitioners.

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Annexure 1. Deriving the equation for value creation

Starting with the equation (5) for the value of the firm, as mentioned in section 2 of the chapter,

$$Value = \frac{CF_1}{k-g} = \frac{NOPAT_1 - \Delta Invested\ Capital}{k-g}$$

(5)

Reinvestment rate is the ratio of the change in invested capital to the NOPAT. Using reinvestment rate, (5) may be rewritten as,

$$Value = \frac{NOPAT_1(1-reinvestment\ rate)}{k-g}$$

(6)

The reinvestment rate can be replaced in equation (6) based on its relationship with long term rate of growth as shown in equation (7).

$$g = ROIC \times reinvestment\ rate$$

(7)

Thus,

$$Value = \frac{NOPAT_1\ (1-\frac{g}{ROIC})}{k-g}$$

(8)

In the above equation, ROIC is return on invested capital, which is estimated as follows.

$$ROIC = \frac{NOPAT_1}{Invested\ Capital} = \frac{NOPAT_1}{Revenue_1} \times \frac{Revenue_1}{Invested\ Capital}$$

(9)

Dividing both sides of (8), by invested capital,

$$\frac{Value}{Invested\ Capital} = \frac{\frac{NOPAT_1}{Invested\ Capital}(1-\frac{g}{ROIC})}{k-g} = \frac{ROIC-g}{k-g}$$

(10)

Formulating value creation in terms of difference between the enterprise value and invested capital as a percentage of the latter,

$$\frac{Value-Invested\ Capital}{Invested\ Capital} = \frac{ROIC-g}{k-g} - 1 = \frac{ROIC-k}{k-g}$$

(11)

Further noting from (9) above that ROIC can be decomposed into a net operating profit margin and an investment efficiency component,

$$\frac{Value-Invested\ Capital}{Invested\ Capital} = \frac{ROIC-k}{k-g} = \frac{\left[\frac{NOPAT_1}{Revenue_1} \times \frac{Revenue_1}{Invested\ Capital}\right]-k}{k-g}$$

(12)

Chapter-8

CREATING IMPACT THROUGH PUBLIC INVESTMENTS

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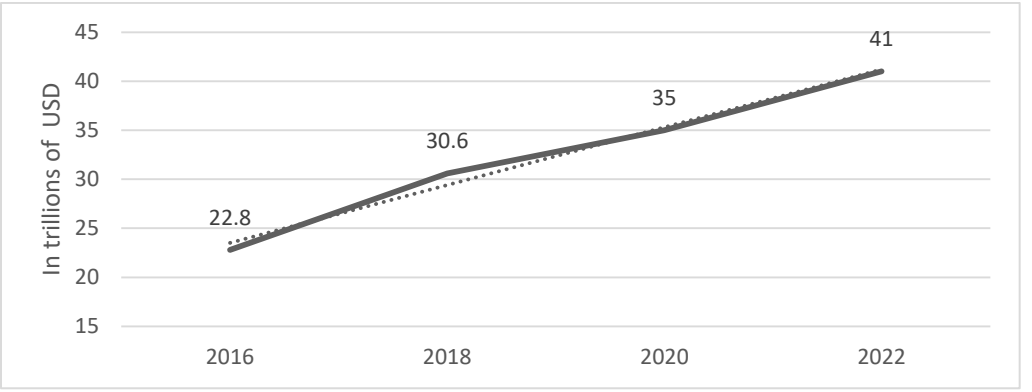
1. Introduction

Public investments can play a critical role in creating impact through sustainable investing. Directing public capital into sustainable projects, technologies, and practices can help accelerate the transition to a sustainable and climate resilient economy and promote inclusive growth and development.

Sustainable investing has gained significant traction in recent decades. Figure 1 shows the AUM of global sustainable investments in trillions of USD and its growth trajectory in the recent past. According to Bloomberg (2022), global

sustainable assets under management will likely surpass USD 50 trillion by 2025.

Figure 1. AUM of global sustainable investments and its growth trajectory



Data source: Bloomberg

Table 1 shows the proportion of sustainable assets held by major global economies relative to their total managed assets in the last decade.

Table 1: Region-wise proportion of sustainable assets to total managed assets

Region	**2014**	**2016**	**2018**	**2020**
Europe	58.8%	52.6%	48.8%	41.6%
United States	17.9%	21.6%	25.7%	33.2%
Canada	31.2%	37.8%	50.6%	61.8%
Australasia	16.6%	50.6%	63.2%	37.9%
Japan		3.4%	18.3%	24.3%

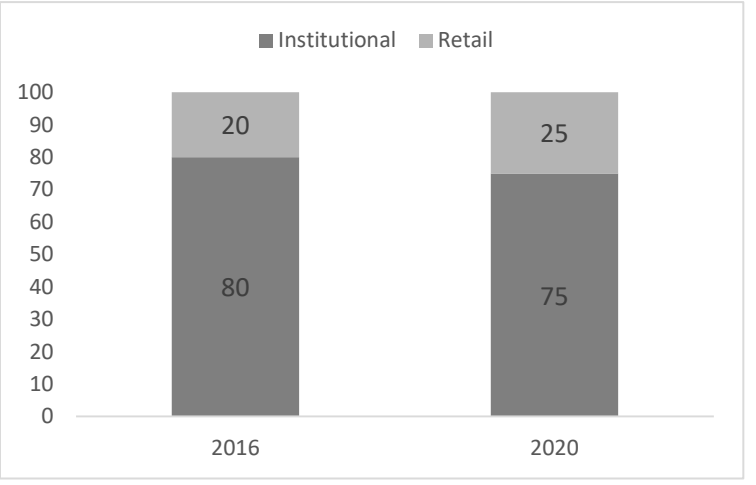
Data source: GSIA (2021)

It is evident that much of the developed world has enormous amounts of capital invested in sustainable assets and continues to grow. However, the emerging world paints a different picture. While sustainable investment penetration is low in emerging markets, it also presents a unique opportunity for emerging market investors to participate in this transition and lead the path to a sustainable future while earning competitive returns on their investments.

2. Case for Integrating ESG Investing in the Investment Process

Investors are increasingly realizing the importance of integrating non-financial ESG information alongside financial fundamentals while making their investment decisions. While institutional investors have been a dominant player in the markets, the popularity of sustainable investments among retail investors is also on an increasing trajectory. Figure 2 shows that the share of retail investors in global sustainable investments has increased from 20% in 2016 to 25% in 2020.

Figure 2. Percentage share of institutional and retail investors in global sustainable investments



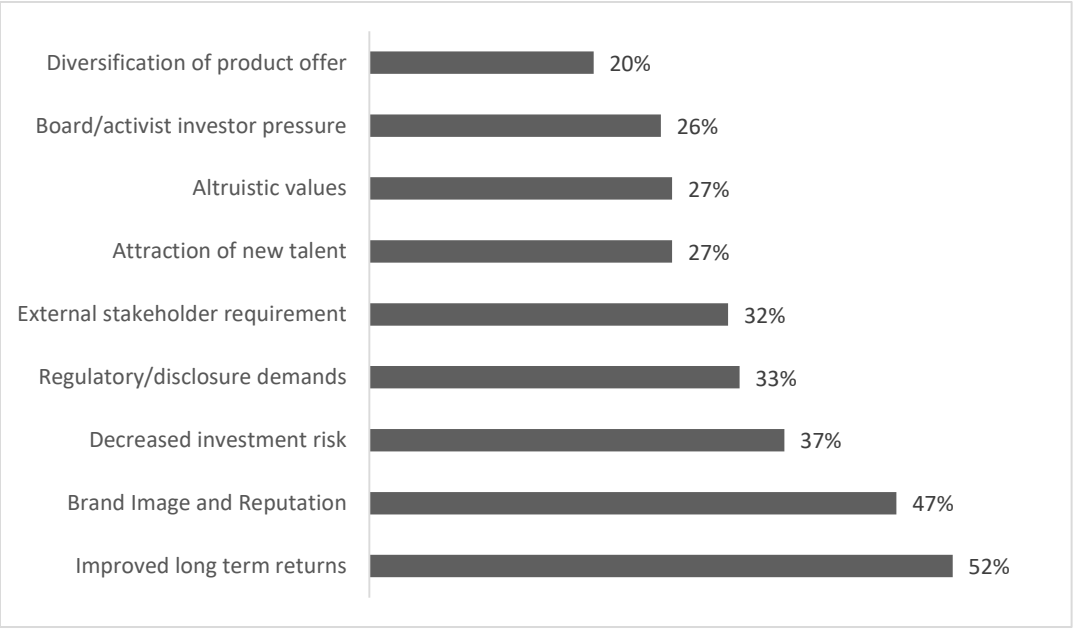
Data source: GSIA (2021)

A survey of institutional investors and asset managers by BNP Paribas (2019) shows that the most prominent reason for institutional investors to incorporate ESG information in investment decision-making is to seek higher long-term returns. Figure 3 sheds further light on the factors that drive institutional investors to integrate ESG into their investments.

Integrating ESG in investment decisions has several benefits for investors. Stakeholder theory posits that organizations that engage with broader stakeholder issues rather than only concentrating on shareholders' profits are well-positioned to create value in the long term (Henisz et al., 2019). Companies that perform well on environmental, social, and governance

parameters exhibit resiliency and are likely to outperform their peers. In line with the adage, "doing well by doing good", investing in sustainability can lead to superior financial returns. With governments increasingly regulating the sphere, early adopters are also at a lower risk of non-compliance and litigations and can be safe investment bets for investors (Boffo & Patalano, 2020). Moreover, sustainable investments provide investors an opportunity to create a real impact in the world without compromising on their returns.

Figure 3. Drivers of ESG Integration into investment decisions



Data source: The ESG Global Survey 2019, BNP Paribas (2019)

3. Screening Approaches

While integrating ESG considerations into their investment decisions, investors may use different strategies to optimize returns and achieve sustainability goals (Capelle-Blancard & Monjon, 2014). Some prominently used strategies by fund managers and investors to screen ESG investments are positive screening, negative screening, integrated screening, best-in-class, and impact investing. Each strategy involves screening and stock selection based on specific ESG-based criteria. Investors may choose screening approaches that align with their values, motivations, and investment objectives.

3.1 Positive Screening

Positive screening involves screening investments of companies based on their positive engagement with sustainability issues relative to their peers. Users of this approach identify companies that manage ESG risks and opportunities well and exhibit superior ESG performance. This enables ESG-motivated investors to support businesses that undertake sustainable practices and channel capital towards projects that are environmentally and socially responsible.

Investors can also apply more specific screening criteria using positive screening based on their specific goals, for example, screening those companies that have fared well in employee welfare or have the highest environmental performance. Positive screening is an active approach to investing in companies that positively contribute to the environment and society.

3.2 Negative Screening

Negative screening is an exclusionary screening approach that involves excluding stocks of specific companies, industries, or sectors from one's investment portfolios that engage in activities considered to be harmful to the environment, socially detrimental, or controversial. It allows investors to divest from sectors that have undesirable ESG characteristics like companies producing tobacco, weapons, or those involved in human rights abuses or are highly polluting.

Both institutional and retail investors widely use the negative screening approach. It enables investors to avoid companies that fare poorly on ESG parameters by eliminating unsustainable and 'sin' stocks thereby reducing ESG risks of their investments. While this approach helps investors to effectively divert their capital away from environmentally and socially detrimental companies, it may lead to investors missing out on opportunities to invest in companies in specific sectors even if those companies are significantly improving their ESG performance.

For example, engagement with polluting companies to adopt more eco-friendly ways of production would enable pro-environmental investors to affect real change and positively impact the environment rather than divest completely from them leaving the entire ownership to non-ESG motivated investors.

3.3 Integrated Screening

The integrated screening approach involves considering ESG factors alongside financial parameters in making investment decisions. It entails looking at the ESG factor as a tool to increase financial returns and manage the risks of an investment. This screening approach allows investors to gain deeper insights into the long-term performance and resilience of their portfolios.

Integrated screening is more comprehensive than positive and negative screening as it incorporates ESG aspects in an investor's prevailing investment strategy. Unlike negative screening, it does not eliminate investments in specific sectors but engages with companies striving to improve their ESG and financial performance substantially. This enables investors to strategically position their investments in companies that have high potential to outperform in the long run and, at the same time, hold a portfolio aligned with their values.

3.4 Best-in-Class

The best-in-class screening approach involves investing in the best performers based on ESG parameters within each industry group. ESG parameters are dependent on industry, for example, companies in the fossil fuel industry are going to have a larger carbon footprint than an Information Technology company. Thus, comparing the ESG performance of companies across industries can be misleading. The best-in-class strategy entails engaging with companies that are leaders in sustainability performance within their respective industries rather than divesting from specific industries completely.

The focus of the best-in-class approach is to identify companies that are outperforming their peers on the ESG front and are well positioned in their

industry to manage long term risks and deliver superior returns. The rationale is that companies that are better managed and investing in innovative and sustainable technologies within their industries today will have the first mover advantage of adopting resilient practices and are likely to outperform in the future.

The strategy helps investors filter out poor performers with unsustainable business models while factoring in the industry group to which they belong. This enables investors to increase their ESG footprint without overexposing their portfolios to specific sectors and completely ignoring others. The best-in-class strategy is combined with other approaches like positive or integrated screening.

3.5 Impact Investing

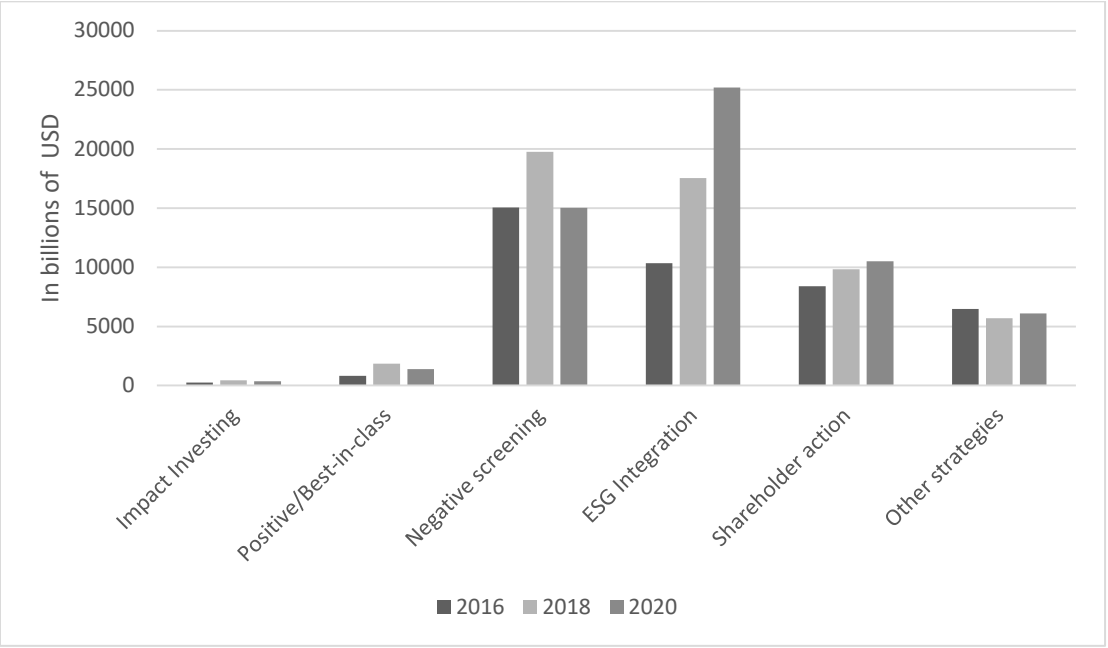
Impact investing entails an investing strategy that focuses on generating a measurable and positive impact on the environment and society besides financial returns. It involves investing in those endeavours that directly address societal challenges like poverty alleviation, affordable healthcare, clean energy, and more. The barometer of success is the tangible benefits to the environment and society derived from such investments and financial returns only come next.

Impact investing is a valuable tool for investors who aspire to make a real difference in the world through their investments beyond mere financial rewards. Investing and funnelling capital to companies that generate renewable energy power, fund microfinance companies, or promote accessible and affordable education or healthcare are all examples of impact investing. Investments in these companies often involve long gestation periods to reap any benefits and could be less liquid compared to traditional investments. Despite the long gestation periods, impact investments are gradually gaining traction from institutional investors, venture capitalists and private equity funders.

Growth and region-wise popularity of different screening approaches

Fund managers and investors commonly combine one or more of the above screening approaches to integrate ESG factors into their investment decisions. Figure 4 shows sustainable investment flows into the different screening approaches since 2016. The most widely used screening strategy globally is Integrated screening, followed by negative screening. Integrated screening strategy has particularly shown remarkable growth in recent years and continues to be immensely popular among institutional and retail investors.

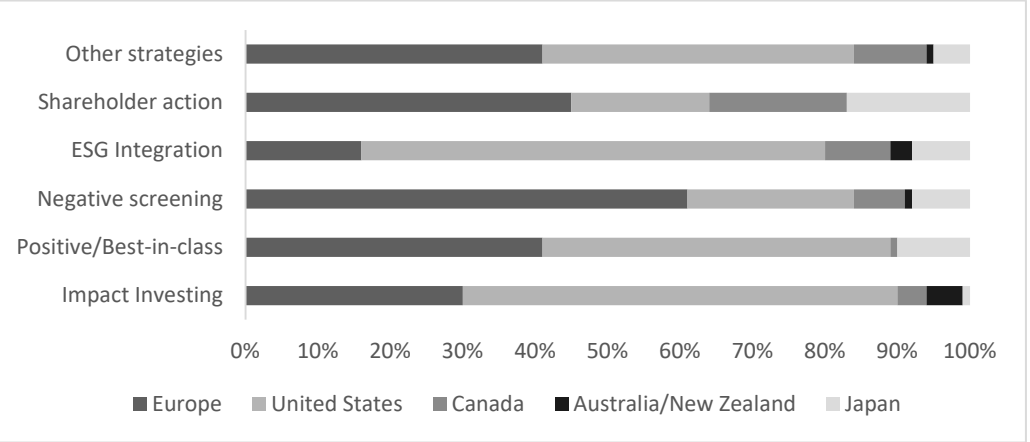
Figure 4. Growth of global sustainable investments in different screening strategies



Data source: GSIA (2021)

Further, figure 5 shows the region-wise popularity of screening approaches for sustainable investments in 2020. It also highlights how the US and Europe remain dominant players in the global sustainable investments stage. Regional differences in preference for screening approaches are apparent. While European investors prefer negative screening, integrated screening, and impact investing are the dominant investing strategies in the United States. Moreover, positive screening and best-in-class are more prominent strategies in Japan, with impact investing gaining minimal traction in the country.

Figure 5. Region wise popularity of screening approaches



Data source: GSIA (2021)

4. ESG Indices, Investment Products and Performance

Recent years have witnessed the development of many investment products across asset classes that investors can select from to park their ESG-motivated investments. Equity is the most prominent asset class through which sustainable investments are channelled. Investors may screen stocks based on ESG criteria and directly invest in them or channel their investments through ESG-focused mutual funds, exchange-traded funds (ETFs), bonds, and other investment products.

Several ESG-based indices have emerged that help identify companies that meet specific ESG criteria and track their financial performances. These indices can also serve as benchmarks to assess the performance of ESG investments. Some of the prominent ESG indices are as follows:

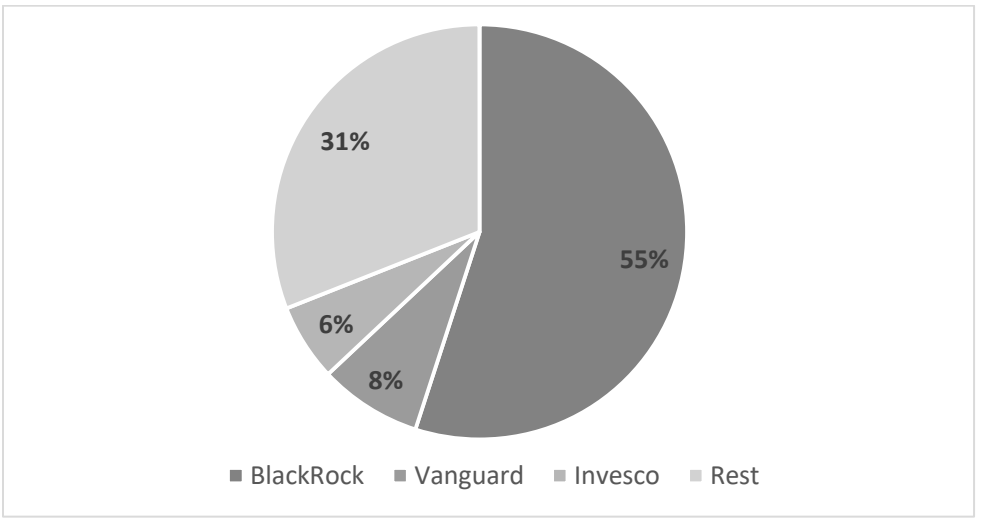
- *MSCI KLD 400 Social Index:* It is the oldest ESG index, established in 1990 and comprises 400 US companies that meet the required ESG criteria.
- *FTSE4Good Index:* It is a global ESG index that includes companies demonstrating specific ESG practices. The index tracks the performance of the companies meeting their specific criteria.

- *Dow Jones Sustainability World Index:* It tracks the performance of the top 10% of companies that are leaders in sustainability out of a universe of the 2500 largest global companies.
- *S&P ESG Index:* It measures the performance of companies meeting the sustainability criteria while maintaining the industry weights of the S&P 500 Index.

Exchange-traded funds (ETFs) are funds trading on exchanges that invest in various asset classes like equity, bonds, derivatives, and real estate. ESG-related ETFs may invest in companies that meet specific investment criteria or track specific ESG indices. These themed ETFs provide an excellent opportunity for investors to hold a diversified portfolio of stocks and bonds while maintaining their desired level of exposure to ESG assets.

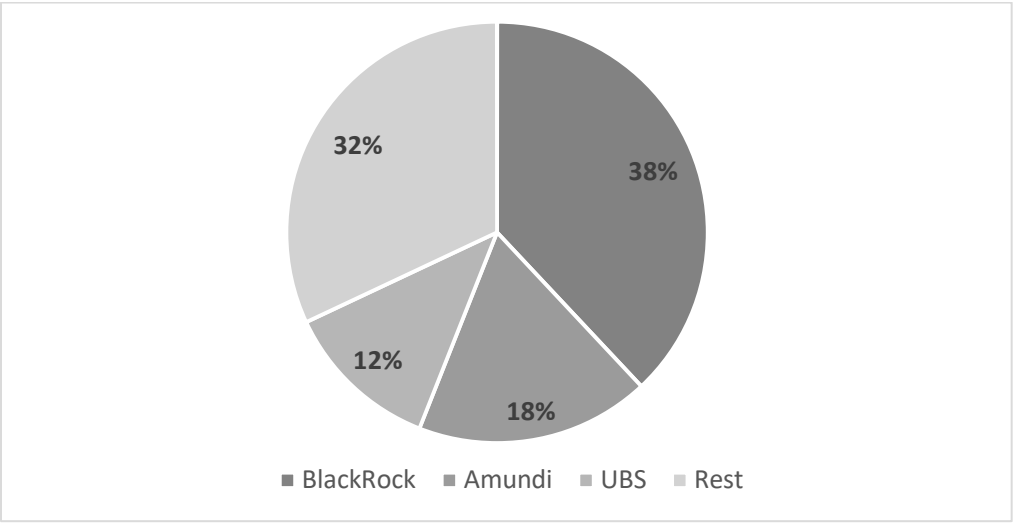
According to Bloomberg, the ESG ETF market is dominated by a few prominent players. Figures 6 and 7 show the AUM market share of major players in North America and Europe. While 40% of the ESG assets in North America are funded by ETFs, in Europe, ESG funds form a significant chunk of ESG investments, with ETFs only forming around 14% of their total ESG investments.

Figure 6. AUM Market Share of US domiciled ETFs



Data source: Bloomberg

Figure 7. AUM Market Share of Europe domiciled ETFs



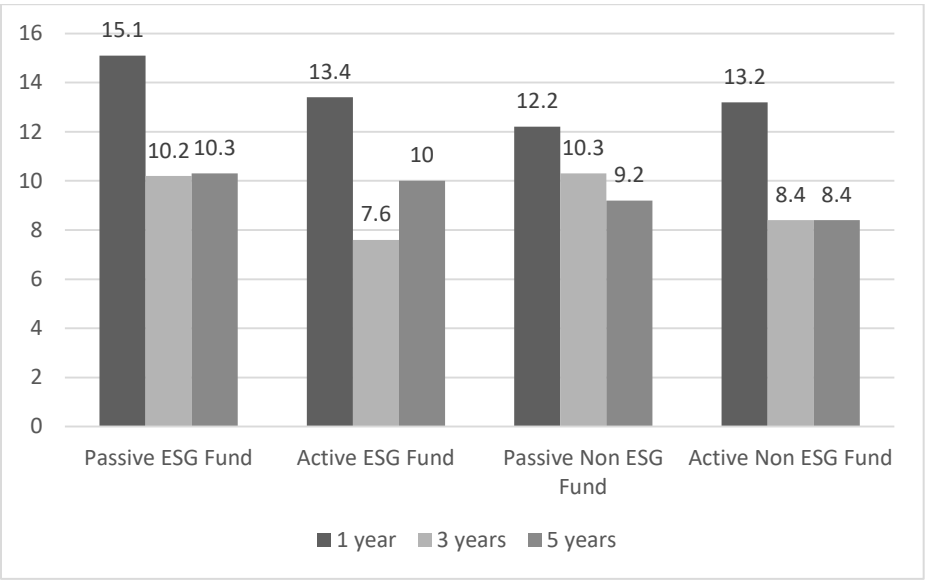
Data source: Bloomberg

There is evidence of ESG indices and ETFs outperforming conventional benchmarks in the last decade; however, flows to ESG ETF funds have been growing slower since 2022 owing to the global slowdown.

ESG funds are another popular investment channel for sustainable investments. The ESG-labelled fund markets are more diversified in terms of issuers than the ETF market, and the large fund houses only dominate 65% of the market. While equity is the primary asset class that ESG-labelled funds invest in, fixed income and money market funds also make up 13% and 19% of the assets, respectively, as reported by Bloomberg.

The performance of ESG funds has significantly varied in the past based on whether it is actively managed or not. Figure 8 shows average returns for 1-year, 3-year, and 5-year periods for passive and active ESG equity funds as compared to their non-ESG peers as per a Bloomberg report in 2023. While Actively Managed ESG funds have struggled to outperform their conventional peers, passive ESG funds have outperformed both active ESG funds and non-ESG funds. However, the report further states that when looking only at the largest five actively managed funds, the returns of actively managed funds rose to 15.6% and 12.3% for 1-year and 5-year periods respectively thus outperforming the passive ESG funds and their non-ESG peers.

Figure 8. Percentage returns from ESG Passive and Active Funds



Data source: Bloomberg

ESG debt markets also provide an attractive platform for investors to park their sustainable investments with many investment options like green bonds, social bonds, and sustainability linked bonds. The current USD 4 Trillion ESG Debt is expected to become a USD 15 Trillion market by 2025, according to Bloomberg estimates.

Paradox of ESG Outperformance

Sustainable investments are rapidly expanding and entering new markets of emerging countries, and substantial amounts of global capital remain allocated to ESG investments. There is a growing amount of research on the financial performance of ESG investments and how they fare when compared to their non-ESG peers. A large meta-analysis conducted by Whelan et al. (2021) on more than 1000 studies published from 2015 to 2020 concluded that 59% of the studies linked ESG investments with superior returns compared to conventional investments, and only 14% reported lower returns.

However, other studies have stated contrary views, and the verdict in the market is mixed. A study by Bruno et al. (2021) reported that ESG investments

neither generate outperformance nor provide any downside risk. They attribute much of the recorded outperformance to increased media attention and exposure to other standard factors. Moreover, prominent studies have also reported sin stocks outperforming high ESG stocks as they are neglected by institutional investors and underpriced due to lower demand and investor attention (Hong & Kacperczyk, 2009).

The contrary findings could be attributed to a lack of standard definitions of sustainability, rating discrepancies, or due to studies conducted in different markets, periods, or on different asset classes. Results from developed markets where ESG investing is at a matured stage might significantly differ from those of emerging markets where it is still an evolving concept. While developed markets have investors with increased awareness towards ESG factors and may be majorly driven by the sustainability outcomes, for emerging market ESG investors, good returns may still primarily be the major expectation.

According to Damodaran (2021), the question is not only about whether ESG investments lead to good returns but also whether the impact of ESG has already been priced in. Given the case, the dilemma is when ESG investments would deliver superior returns. Investor demand, penetration of ESG investment products, macroeconomic factors like oil prices, and government regulations can all affect the demand and pricing of ESG investments, thus impacting investor returns.

5. Conclusion

Public investments play an important role in mobilizing funds for a sustainable transition and creating an impact on society and the environment. While developed markets have well-established investor bases that value and invest in sustainability, there is a huge disparity when it comes to emerging markets. Increasing investor awareness and regulations by the governments can accelerate investments in emerging markets.

Investors have a myriad of options to channel their ESG-motivated investments. They can select baskets of stocks based on commonly used screening strategies that align with their investment objectives. They can also choose to invest in the different ESG products available for public investments like Exchange Traded Funds, ESG ESG-focused mutual funds, other sustainability funds, and bonds, including green bonds, social bonds, and impact bonds.

While integrating ESG in their investments may help investors achieve their sustainability goals without sacrificing returns or even earning superior returns, the ESG marketplace is dynamic and evolving. New investment products and buzzwords are emerging constantly, and investor preferences are changing. According to a report by US SIF (2022), global trends indicate environmental issues like carbon emissions leading the agenda of both institutional and retail investors. ESG and sustainability-labelled funds are increasing inflows while older labels like ethical funds are losing their sheen. Investors should keep up with the latest trends to benefit from the opportunities that sustainable investments provide and, in the process, also create value for themselves and the society at large.

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Chapter-9

SUSTAINABLE PORTFOLIO INVESTMENTS

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Introduction

ESG (Environmental Social Governance) framework has recently been in vogue to measure the sustainability of the corporations in the long run with focus on environment friendly operations, contribution to the society at large and lawful running of businesses keeping in mind the internal / external stakeholder interests.

Climate change and its adverse impacts have necessitated the corporations, governments and regulators to rethink the ways businesses operate. Most governments around the globe and corporations are now vocal on these issues. Corporations are considering environmental impact of their business decisions and now sustainability has become the cornerstone of the strategic decisions. India has announced that it is targeting to achieve net zero by year 2070 at the United Nations Framework Convention on Climate Change (COP 26) held in November, 2021.

Despite an array of regulations, the instances of corporate frauds have increased over the years with businesses / individuals by passing regulations and bending laws to achieve supernormal profits. The need of doing the business in the RIGHT WAY is crucial given the high stake and extent of investors / lenders in businesses. With increased use of technology host of traditional banking services are now offered online (Fintech) with questions often asked on how these companies are run considering the opaque operations and frequent instances of customers being cheated.

Despite growth in national incomes and corporate profits of large countries / corporations across the globe, the rich poor divide is increasing significantly. Poverty, food shortage, education, health and sanitation are still concerns in many countries. Governments across the globe are doing their part but it doesn't seem to be enough. In the wake of these concerns corporations need to rethink their CSR strategy with a clear focus on measuring impact of their initiatives.

From the sustainability investing point of view, ESG issues found a prominent mention in United Nations report titled *Principles for Responsible Investment* (PRI) in 2006. For the first time, incorporating ESG criteria in financial evaluation of corporations was discussed. So, the push for sustainability was made from the investor fraternity and the corporations were forced to realign the business strategy towards sustainable operations. The PRI as on June 2023 has 5,381 signatories with a US$121 trillion of AUM; a commendable improvement from June 2019 when there were 2450 signatories and over $80 trillion in AUM.

Understanding the E, S and G

Environmental (E): This aspect assesses a company's environmental impact and commitment to sustainability. It includes considerations like:

Carbon emissions and climate change initiatives: Manufacturing companies have a significant carbon foot print from the energy use (largely fossil fuel driven) for production. Also in the value chain, extraction and transportation of raw materials to the factory and finished products to the customer also involve generous carbon emissions.

Pollution and waste reduction efforts: Production processes often produce toxic byproducts which in untreated form mix into water/air/land leading to pollution. These result in contamination of water / groundwater sources, reduced fertility of agricultural land, impure air etc. Pollution and waste management go hand in hand as efficient waste / affluent management will result in low / no pollution.

Biodiversity conservation: Large scale unchecked industrial expansion has resulted in rapid de growth in forest area thereby impacting the bio diversity. Industrial activities in environmentally sensitive zones result in impacting the natural habitat and way of life of animals and migrant birds often.

Energy efficiency: Energy requirements of corporations are today largely met by non-renewable sources of energy. Around 70% power generated in India is though thermal power plants. Sustainable Energy generation from non-conventional / renewable sources like solar, wind and hydro have their own challenges, which need to be addressed.

Resource efficiency: Corporations need to redesign their processes / raw material inputs such that there can be reduced consumption, can be reused and recycled thus putting less stress on the environment.

Social (S): This aspect evaluates social irresponsibleness of corporation and its linkage with various stakeholders in the society

Labor laws: Despite minimum wages and other regulations, the labour force is still being exploited on account of rising population and slow growth in job generation. With land holding getting reduced from one generation to next, the farmer community too is struggling to make meets end. With increasing mechanisation, large scale of operations and diverse / complex working conditions, health and safety of workers needs to be utmost importance.

Diversity, equity, and inclusion in the workplace: Corporations have made significant progress in this area highlighting the synergies that a diverse and inclusive work force brings in. Globalisation of businesses has ensured that

there is a cross cultural exchange and focus is on meritocracy and not on gender / language / place of origin / personal preferences etc.
Community engagement and philanthropy: CSR spending for large (Networth > Rs.500 cr. or Turnover > 1000 cr. Or Net Profit > 5 cr.) is mandatory now and they need to spend 2 per cent of their net profits under Corporate Social Responsibility, according to Company's Act 2013. Industrialist like Ratan Tata, Azeem Premji, Shiv Nadar and others have been in forefront in giving back to society through various initiatives run under their industrial groups.

Governance (G): This aspect evaluates whether the corporation is following the rules and regulations concerning the interests of various stakeholders (internal and external) as per the prevailing laws so that sustains in long run. Appointment and conduct of various committees (audit committee, remuneration committee, nominations committee, risk committee etc.). Management and Board of Directors have a responsibility to run the corporation affairs in a fair and legal manner protecting the interest of stakeholders at all points of time. We have witnessed ne recent times the removal of promoters of firms, top executives and key management personnel on account of various frauds / conduct not in accordance with the rules and regulations.

Under SEBI LODR Regulations 2015, a listed entity needs to disclose to the stock exchange all material events or information, as early as possible as reasonably possible but not later than twenty-four hours from the time event has occurred or information shared. These regulations have been a boon to investors as they receive timely information about any adverse event in the corporation's (commencement or postponement of date of, award / termination of contracts, commercial operations resignation of key management personnel, bank loan defaults, merger or acquisition, buy back of shares etc, frauds by promoters, resignation of auditors etc.). Investors can take timely and informed decisions if they would like to continue holding the shares of the corporation or exit the investment. Frequent disclosure of financial information (quarterly financial statements, half yearly balance sheet, disclosure of shareholding structure etc.) keep investors updated about the financial health of the company.

ESG Literature Review

Rau & Yu (2023) through their research share insights in terms of how ESG data is measured, problems faced during collection of data and quality of data, profile of ESG investors, and role of the institutional investors. They sum up the research by stating the consequences of focus on ESG and CSR on corporations as well as investors.

Duuren, Plantinga & Scholtens (2015) state that conventional managers do integrate responsible investing in their investment processes. One of the major uses of ESG information is to identify and manage business risks. They also found and argue that ESG investing is similar to traditional investing. The researchers conclude the study stating that there is a significant difference in the way the U.S. investment manager's view ESG as against their European counterparts.

Cerqueti, Ciciretti, Dalo and Nicolosi (2020) have tried to analyze ESG investing from a systemic point of view. This involved analyzing how funds with varying levels of ESG compliance respond to the contagion risk on account of fire sales on assets held in common by funds. They opine that for different levels of portfolio liquidation, the relative market value loss of the highly rated ESG ranked funds is lower than the loss experienced by the lowly ranked ESG counterpart.

Drei, Guendal, Lepetit, Mortier et.al (2019) share a range of insights from the study. To start with results from North America and Eurozone vary. There is a partial ordering among ESG ratings and corporation performance. They also note some discrepancies between active and passive management. Social pillar of ESG is steadily gaining prominence. Lastly they conclude that ESG investing and factor investing are largely connected.

Townsend (2020) states that Socially Responsible Investing (SRI) represents a process. It can be applied to study a range of asset classes including debt, mutual funds, private equity etc. What initially started more of a faith based and progressive thinking style has now influenced various areas like accounting, reporting and listing requirements of stock exchanges.

Daugaard (2022) has done extensive literature review to the purpose of this article is to collate a wide range of existing information and create an accumulated reservoir of knowledge of ESG-related literature to understand the major drivers of the ESG performance.

Insights from the research reveal the fundamental debate underpinning ESG responsibility (corporation vs. government), the breath of pertinent stakeholders (shareholders, suppliers, customers, employees, distributors etc.), and the theories critical to understand ESG management and the terms which will achieve best possible ESG progress.

Giese, Lee, Melas, Nagy, et.al (2017) conducted a research on how ESG affects risk, performance and valuation of the company. Results showed that high ESG rating corporations tended to exhibit less systematic volatility, lower beta values and higher valuations. Also, ESG rating change can be viewed as a useful financial indicator in its own right, which the researchers termed as ESG momentum.

Bennani, Guenedal, Lepetit, Ly, et.al (2018 studied the impact of ESG screening on return, volatility and drawdown is highly dependent on 3 factors. These are time period, the investment universe or the strategy. They also share that ESG investing impacts performance in 2 ways. One is, ESG can be used as an alternative model of risk assessment of corporations. Secondly, ESG is an investment style meaning, ESG generates investment which in turn can impact asset prices, and ultimately portfolio returns.

Hamilton et al. (1993) studied the performance of 32 Socially Responsible Investment (SRI) funds and 320 non-SRI funds. These funds were selected randomly during the period of 198 to 1990. The results showed that 17 SRI funds (established before 1985) had higher alpha (−0.06%) against the 170 conventional funds with alpha of −0.14%. Researchers concluded that since the alpha values for both SRI and conventional funds do not differ significantly; there is no effect of SRI on financial performance.
On the other hand, ***Diltz (1995)*** states that portfolios created keeping in mind the environmental performance of stocks, does produce a positive significant

alpha. Jensen's alpha is used as the performance indicator in the above scenario.

ESG Data Sources

Considering the various sub topics under each of three themes of Environmental, Society and Governance; each of those points can be considered from a financial perspective. Each of those factors will likely have a direct / indirect impact on corporation's financial performance. Therefore, investors are keen to understand and analyse these aspects to make investor considerations.

A significant and variety of data points need to collected, measured and analysed to assess how companies are faring on ESG parameters. Such ESG data is provided by various sources including traditional research houses who are adding ESG research to their kitty, firms which are specialised in collection of ESG data, government agencies, regulators, non-government agencies, corporations themselves, academic research universities and others.

Following is the list of firms providing ESG data, insights and ESG ratings

Research Houses	**Financial Data Providers**	**ESG Ratings providers and ESG Indices**	**NGOs and Non-Profit Organizations**
MSCI ESG Research Sustainalytics: ISS ESG Refinitiv Bloomberg ESG Morningstar	Bloomberg Terminal FactSet S&P Global Reuters Stock Exchanges	Standard & Poor's Moody's Fitch NASDAQ MSCI FTSE	World Wildlife Fund (WWF) Carbon Disclosure Project (CDP) Global Reporting Initiative (GRI)

Source: Authors' compilation

Considering the various non homogenous sources of data, varied data points, varied frequency and extent of reporting, coverage of data, multiple ESG reporting standards etc. its crucial from a investors point of view to understand the methodology used by the above companies in arriving at the ESG insights, ESG ratings, ESG scores and rankings. Unlike traditional

financial performance measurement methods (ratio analysis) / credit ratings / IPO gradings etc which were fairly straight forward to understand, the ESG scores are derived by quantifying a lot of non-financial data points, especially environmental data points (carbon foot print and emissions, extent of pollution, use of renewable energy etc) Investors need to check if these ESG insights add value in the investment decision process.

ESG Rating Methodology

Following are the key factors which drive the ESG ratings.

Collection of data: ESG rating agencies source data from varied sources including but not limited to public disclosures, company annual reports, filings made to regulators, articles in print and digital media, surveys conducted by various organisations and direct interaction with the corporations.

Weights of ESG Factors: Environmental, Social, and Governance are the 3 broad heads under which there can be subcategories. Weights to the factors and sub factors are assigned based on the criticality of that factor in the overall ESG performance.

Scoring: Each ESG head or subhead is assigned a numerical score or rating. These scores are mostly on a scale (ex, 0 to 100), with higher spectrum of scores indicating higher ESG performance. The scoring can also be absolute (based on certain thresholds) or relative (based on how the corporation fares in comparison with its industry peers).Scores of all sub heads and broad heads are compiled together to arrive at a ESG score for the corporation

Normalisation and Standardization: This process involves adjusting scores to account for differences in scale of operations and industry / sector the corporation operates in and other concerning factors. Standardization takes care of aspect of smaller size corporations or corporations which are part of less ESG-intensive industries are accordingly not penalized unfairly.

Qualitative Analysis: The quantitative data analysis is supplemented by qualitative analysis which includes but not limited to Corporation's policies

and practices, management's commitment towards ESG cause, its efforts / investments to manage ESG risk and its level of disclosures.

Peer Comparison: ESG scores derived for the corporation are used to compare with relevant industry peers to provide some those of peers and aggregate industry at large to provide context to the ESG scores.

Updates to ESG scores: ESG scores are updated periodically to capture any changes in the factors and sub factors, specific key data points which were used to arrive at the ESG scores. It is important that investors do in depth comparison of each ESG rating provider's rating methodology before arriving at the investment decision.

Comparison of MSCI vs. Sustainalytics Methodology of ESG scoring

Parameter	**MSCI**	**Sustainalytics**
Data Sources:	MSCI collects data from various sources, including company disclosures, public records, and proprietary research.	Sustainalytics relies on a wide range of data sources, including company disclosures, news and media coverage, NGO reports, and government documents.
Weighting and Materiality:	MSCI uses a sector-based approach to determine material ESG factors, recognizing that the significance of ESG issues varies by industry. The company assesses the financial relevance of each ESG factor and assigns different weights based on materiality.	Sustainalytics uses a risk-based approach to determine materiality. It considers the potential impact of each ESG factor on a company's financial performance and reputation. Weighting may vary depending on the sector, but Sustainalytics doesn't provide specific details about how

		weights are assigned.
Scoring Scales	MSCI uses a numeric scoring system on a scale of 0 to 10, with 10 indicating higher ESG performance. Companies are categorized into five broad ESG rating categories: Leader, Average, Laggard, CCC (Controversies), and NR (Not Rated).	Sustainalytics uses a numeric scoring system on a scale of 0 to 100, with 100 indicating lower ESG risk. Companies are categorized into four broad ESG risk rating categories: Negligible, Low, Moderate, and High.
Normalization and Peer Comparison	MSCI normalizes scores to account for industry-specific variations, enabling comparisons between companies in the same sector.	Sustainalytics normalizes scores to allow for peer comparisons within an industry. The agency provides industry-specific percentile rankings to help users understand where a company stands relative to its peers.

Source: Authors' compilation

Correlation of ESG ratings of various ratings providers

As per the research conducted by BDO USA LLP, there is a low to moderate correlation among the ESG ratings (400 corporations) provided by leading rating agencies / research houses. On a contrary when the debt ratings for the same universe of firms was compared there was more than 90% correlation among Standard & Poor's, Moody's, and Fitch Ratings. It is evident that different ESG ratings providers may be looking at the same data differently or might be using different data sources (which may vary in parameters studied, varying time periods, frequency of reporting etc.) So, investors need to be cautious and use their own judgement to rationalise the information at hand

while using the ESG ratings while making stock selection or portfolio creation purposes

Correlation between Rating Providers

	S&P	Sustainalytics	CDP	ISS	Bloomberg
MSCI	35.7%	35.1%	16.3%	33.0%	37.4%
S&P		64.5%	35.0%	13.9%	74.4%
Sustainalytics			29.3%	21.7%	58.4%
CDP				7.0%	44.1%
ISS					21.3%

Source: Adopted from BDO USA LLP, CFA Institute. https://blogs.cfainstitute.org/investor/2021/08/10/esg-ratings-navigating-through-the-haze/

ESG Funds and ESG Indices

ESG Mutual Funds

Mutual fund investments in India have gained a significant traction in past few years. As on August 31, 2023, Indian Mutual Fund Industry had Assets Under Management (AUM) of Rs. 46.63 trillion. The 6 times increase in last 10 years is an indication of growing confidence of retails investors in mutual fund as an investment avenue. Long-term wealth creation, affordability, cost averaging, tax benefits, diversification, confidence on professional fund managers and increased awareness are few reasons which can be attributed to this growth.

As per Morningstar India research, there Indian ESG funds had combined AUM of Rs. 10,427 crore as on 31st March 2023. There was a 16% fall in AUM from 31st March 2022 levels (Rs. 12,447 crore). However, if we look at a 3-year window, the AUM has increased by around 3 times (Rs. 3,605 crore: 31st March 2020).

Annual returns performance of ESG mutual funds

Scheme Name	Ytd	2022	2021	2020	2019	2018	2017	2016	2015	2014	2013	Annual avg.
SBI Magnum Equity ESG Fund - Direct Plan - Growth Sectoral/Thematic	13%	-2%	30%	14%	16%	5%	25%	5%	3%	44%	5%	**14%**
Quantum India ESG Equity Fund - Direct Plan - Growth Sectoral/Thematic	15%	-3%	29%	26%	6%	-	-	-	-	-	-	**15%**
ICICI Prudential ESG Fund - Direct Plan - Growth Sectoral/Thematic	18%	-2%	23%	13%	-	-	-	-	-	-	-	**11%**
Kotak ESG Opportunities Fund - Direct Plan - Growth Sectoral/Thematic	11%	0%	22%	1%	-	-	-	-	-	-	-	**8%**
Invesco India ESG Equity Fund - Direct Plan - Growth Sectoral/Thematic	14%	-9%	34%	-	-	-	-	-	-	-	-	**12%**
Aditya Birla Sun Life ESG Fund - Direct Plan - Growth Sectoral/Thematic	13%	12%	38%	0%	-	-	-	-	-	-	-	**9%**
Axis ESG Equity Fund - Direct Plan - Growth Sectoral/Thematic	12%	-11%	26%	36%	-	-	-	-	-	-	-	**17%**
Quant ESG Equity Fund - Direct Plan - Growth Sectoral/Thematic	14%	18%	63%	17%	-	-	-	-	-	-	-	**33%**

Source: Moneycontrol.com 29th September, 2023

ESG Indices

ESG indices are tools which help investors track the performance of corporations which meet specific ESG criteria. Some key ESG indices in India include:

Nifty 100 ESG Index: This index comprises of the top 100 corporations listed on the National Stock Exchange (NSE) that meet specific ESG criteria.

S&P BSE 100 ESG Index: This index is developed by S&P Dow Jones Indices and it tracks the performance of the top 100 companies listed on the Bombay Stock Exchange (BSE) that meet specific ESG criteria.

Nifty ESG Index: This index includes corporations listed on the NSE that fare well on ESG parameters thus aiding the investors with a benchmark for ESG-focused investments.

MSCI India ESG Leaders Index: MSCI India ESG Leaders Index tracks companies in India that have robust ESG profiles.

These indices are used by fund managers, institutional investors, and retail investors to assess companies that prioritize sustainability and responsible business practices and accordingly invest in them.

Performance of ESG indices

Index	Launch Date	Price Return	Total Return	Std Deviation	Beta Nifty50	Correlation Nifty 50
NIFTY 50	22-Apr-96	**11.21%**		23.19	1.00	1.00
NIFTY 100 ESG Index	27-Mar-18	**10.97%**	12.49%	17.09	0.99	0.98
NIFTY 100 ESG Sector Leaders Index	15-Jun-20	**12.49%**	14.00%	16.17	0.96	0.98
NIFTY 100 Enhanced ESG Index	27-Mar-18	**11.05%**	12.57%	17.09	0.99	0.98

Source: Authors' calculations

Comparison of Nifty 100 ESG Index (since inception) vs Nifty 50

Particulars	Nifty 100 ESG	Nifty 50
Annual Return (since 27.3.2018)	13.96%	13.67%
Std Deviation	18.17%	18.57%

Source: Authors' calculations

ESG as a factor in asset pricing

With the increased focus on substantiality, governance and societal impact ESG could play a significant role in pricing of the assets. Following are the ways in which ESG could be integrated with arriving at asset price

Risk assessment: One of the foremost ways to use the ESG scores is in way of analysing the riskiness of the corporation. Corporations with weak environmental policies and approaches will have a constant run in with the environmental regulatory bodies. Companies with low corporate governance scores can fall prey to various types of corporate frauds and unethical functioning ultimately impacting shareholder interest.

Regulatory changes: With the governments over the world becoming increasingly concern on environmental concerns, the regulations will keep on getting stricter as time progresses. The corporations which are committed to the cause of environment and also have robust financial / infrastructure resources to re design their processes / operations in line with sustainable manufacturing / sourcing will be in a far better position to meet the regulatory changes.

Cost of Capital: With investors and bankers increasingly preferring green investment / sustainable investment avenues, corporations with higher level of ESG preparedness will find it relatively easier to raise funds at a competitive pricing.

Reputation and Investor perception: The price of an assets is arrived after considering numerous quantitative (Financial and Operational) and qualitative factors (Management Capabilities, Customer Satisfaction). On top of these factors the overall image the corporation created in the minds of investors / lenders via a stream of environmentally friendly actions, strong

corporate governance frameworks and social initiatives which would project a corporation as socially responsible organisation, will go a long way in favourable pricing of corporation in the capital market.

With increased awareness and push towards sustainable financing, corporations need to quickly assess their ESG preparedness of their businesses and recalibrate their operations / resources allocation accordingly. Corporations might have to make significant investments to create ESG compliant business processes and infrastructure, but as studies have shown, all these investments will bear fruit in long run. All in all, investors, whether retail or institutional, will have some positive bias towards corporations which are in line with the factors mentioned above.

Impact of ESG score on portfolio returns and risks

The primary reason for investors going for a portfolio of stocks / asset classes is to ensure diversification of the unsystematic risk. Risk adjusted return (Sharpe ratio) is often used as an apt parameter to measure portfolio performance. Since the portfolio is a combination of various stocks / asset classes, the factors discussed above (ESG be a factor in asset pricing) will apply to portfolios as well.

As discussed earlier, studies in the past have shown contradictory results (Portfolio performance of ESG driven portfolios vs. conventional portfolios). Multitude of reasons can be attributed to this anomaly. It can be different time periods of study, different geographical spread of the corporations under purview (U.S. vs European), a significant overlap in the ESG focused and conventional portfolios, scale of the corporations under purview, skill level of the fund managers handling the funds etc. Time period of study is one very crucial factor as many ESG funds have a short history and the limited duration data might impact the outcome. For example, in the Indian mutual fund space only the SBI *Magnum Equity ESG Fund - Direct Plan - Growth Sectoral/Thematic* has a 10 year history whereas other funds have 3 to 4 years of history.

Notwithstanding, in the times going ahead, with increasing focus on climate change, stricter environmental regulations, continued intuitional investor push towards sustainable financing and lastly the changing retail investor

perception of ESG compliant / non-compliant companies; ESG commuted companies shall excel. As a portfolio manager ESG ratings / scores are the primary indicator of how well the corporations are tuned to ESG compliance. These ratings / scores are used to create a portfolio. However as discussed earlier, there are lot of question marks in the consistency of these ratings and scores.

As it happened in past, most mutual funds did their debt investments based on credit ratings provided by credit rating agencies. However, there were some shocking defaults of highly rated corporations. Since then mutual funds are extra cautious and employ credit analysts in addition to existing resources to ensure there is an internal credit rating to compare with external rating. So on similar lines, investors and mutual funds should do their own through study in addition to inputs provided by external agencies.

Prepositions / Future research agenda in ESG and Portfolio management area

There are various ways in which the ESG factor can be combined with traditional stock selection / portfolio management. Few possibilities are as follows

Factor Investing: Currently we have factor based strategies namely value investing, growth investing, momentum investing, quality investing etc. It would be interesting to study how these factors complement / enhance these traditional investing strategies.

ESG data quality and standardisation: Given the issues concerning the accuracy, adequateness and consistency of ESG data, there is a huge scope in working towards standardised data collection and reporting mechanisms.

Time horizon studies: One of the concerns raised by most researchers around ESG investment data (risk / return / growth) is that the duration of ESG investments study (Be it ESG Mutual Funds or ESG Indices or ESG focused Investing corporations) is fairly small. So often there are question marks raised on the insights drawn by these studies. So as time goes by, it would be

interesting to see if outputs given by current studies differ significantly from those conducted over the longer periods.

Active vs. Passive Funds: There has always been a debate whether professionally managed funds give higher return those passive funds. Same theme can be applied to check if the returns from professionally managed ESG funds beat the passive ESG funds.

Impact assessment: Investors who are moving from traditional investments to ESG focused investments would like to understand if there is some real world impact of these investments (Betterment of environment or improved societal benefits or better corporate governance)

To summarise, ESG focused investing is still a fairly nascent area and a significant amount of development can be expected in near future by contributions from all stakeholders namely corporations, investors, third party data providers, ESG rating agencies, ESG indices corporations, regulators and governments across the globe.

Notwithstanding the challenges, ESG focused investments are the way to go to ensure sustainable businesses and sustainable environment.

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Chapter-10

SUSTAINABLE INSURANCE

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Introduction

Our contemporary world grapples with many challenges on the environmental, social, and governance (ESG) fronts. With a global population reaching eight billion, the fabric of our existence and economic activities is increasingly threatened by the rapid shifts in our environment and the intricate interdependencies among societies, economies, and supply chains. Undeniably, this complexity heightens the risks associated with our existence

and business operations.
In light of these developments, it is prudent and imperative for the insurance industry to adapt its risk management practices to address the evolving landscape. ESG concerns have transcended the realm of novelty and are progressively shaping traditional risk factors. The influence of these concerns on the industry's sustainability and viability cannot be underestimated. Thus, the insurance sector's resilience hinges on its ability to embrace comprehensive and forward-thinking risk management strategies that encompass ESG considerations.

At its core, the insurance industry's raison d'être is to navigate and mitigate risks. In recent years, many insurers have recognized the significance of ESG issues, leading them to integrate these concerns into their operations and decision-making processes, albeit to varying degrees and scopes.

For years, insurance companies have played a pioneering role within the corporate landscape by actively raising awareness about the perils of climate change. More recently, their focus has expanded to encompass broader concerns, such as the alarming decline in biological diversity and the mounting pressures on vital ecosystems, including forests and freshwater sources. These insurers have been instrumental in sounding the alarm on these environmental challenges, highlighting their far-reaching consequences for society.

Furthermore, insurance providers have undergone a paradigm shift in recognizing the imperative to craft innovative products and services attuned to the rapidly evolving global landscape. This transformation extends to developing inclusive insurance solutions designed to meet diverse and underserved communities' unique needs. This includes insurance tailored for low-income populations, individuals living with HIV/AIDS or disabilities, and the ageing demographic, ensuring that insurance services are not only accessible but also responsive to the changing demographics and socio-economic dynamics of our world.

A PATH TO RESPONSIBLE AND FORWARD-LOOKING PRACTICES

Sustainable insurance represents a strategic and conscientious approach that permeates all facets of the insurance value chain, encompassing stakeholder interactions. It involves a commitment to conducting operations in a responsible and forward-thinking manner. This entails the comprehensive assessment, identification, management and ongoing monitoring of risks and opportunities associated with ESG issues. Sustainable insurance is not just a set of principles; it is a holistic approach that seeks to minimize risks, foster innovation, enhance business performance, and make tangible contributions to the broader environmental, social and economic sustainability goals.

The Principles for Sustainable Insurance

At its core, the Principles for Sustainable Insurance constitute the fundamental underpinning upon which the insurance industry and society at large can meticulously construct a more robust, interdependent, and symbiotic partnership. This collaborative alliance situates sustainability as the focal point within the realm of risk management, thereby advancing a forward-looking and optimally administered global milieu.

The Principles for Sustainable Insurance chart a global roadmap that guides the development and expansion of cutting-edge risk management and insurance solutions. These solutions are necessary and essential for fostering critical objectives such as promoting renewable energy, ensuring food security, providing clean water, nurturing sustainable cities, and building disaster-resilient communities. These principles provide a framework for the insurance industry to actively contribute to the betterment of the world while maintaining its core risk management function.

Un Environment Programme's Finance Initiative's Principles for Sustainable Insurance: Pioneering Transformational Change

The UN Environment Programme's Finance Initiative (UNEP FI) has been diligently exploring the prospect of establishing a set of sustainability

principles explicitly designed for the global insurance industry. These principles are intended to serve as catalysts for transformational change and amplify the positive impacts on the industry, its clients, and its broader citizenry. They were formally introduced in June 2012 in Rio de Janeiro, Brazil, with the main goal of being in line with the Sustainable Development Goals of the United Nations Conference on Sustainable Development, or 'Rio+20 Conference.' This initiated the UNEP FI Principles for Sustainable Insurance Initiative, commonly referred to as the 'PSI Initiative.' Its purpose is to advocate for and facilitate the global adoption and effective implementation of these principles, promoting sustainability and responsible practices within the insurance industry worldwide.

The principles that align with the unique needs and aspirations of the insurance sector are as follows:

Incorporation of ESG Considerations:
incorporating governance, social, and environmental concerns that are pertinent to the insurance sector into our decision-making.

Collaborative Engagement:
Highlight the governance, social, and environmental issues while dealing with clients and business partners; collaborate with them to manage the risks thereof and create relevant solutions.

Stakeholder Collaboration:
Encourage broad public action on social, governance, and environmental concerns while engaging with governments, regulators, and other important stakeholders.

Accountability and Transparency:
Displaying transparency and accountability by making public the progress of our implementation of the principles.

The above-mentioned tenets can be thought of as guidelines and are a big step

in bringing the insurance sector in line with ethical and sustainable business practices and promoting a global culture of ESG awareness and action.

Principles are not binding:
These principles function as a voluntary and motivational framework. They are not intended to establish legal obligations or generate legally enforceable commitments or representations toward any signatory's stakeholders or external parties. It is crucial to emphasize that the actions taken by a signatory to align with these principles must align with applicable laws, regulations, and the fiduciary responsibilities owed to shareholders and policyholders.

What are the benefits of becoming a signatory?

Publicly Demonstrating Commitment to Sustainable Insurance:
Your organization can showcase its dedication to sustainable insurance objectives and its commitment to transparency in addressing ESG concerns before the public.

Accessing UNEP and UN Expertise and Resources:
Signatories gain entry to the wealth of knowledge and resources provided by UNEP and the UN, particularly in the areas of ESG matters, policy formulation, and scientific insights.

Participation in UN Gatherings for Dialogue:
Signatories can engage in UN events for discussions with governments and various stakeholders concerning ESG issues, risk management and the insurance sector.

Utilizing UNEP FI Resources and Services:
Access the vast resources, networks, events, and capacity-building services UNEP FI offers. These encompass ESG topics relevant to insurance, investment and banking.

Attendance at the Annual General Meeting:
Signatories are granted the privilege of participating in the Annual General

Meeting, providing a platform for interaction, collaboration, and knowledge sharing among fellow signatories.

Aligning with United Nations Sustainable Development Goals (SDGS)

The 2030 Agenda for Sustainable Development, universally embraced by every member state within the United Nations in 2015, delineates a collective vision aimed at establishing an equitable and prosperous world, not solely in the present but also for the benefit of future generations. At the nucleus of this vision are the 17 Sustainable Development Goals (SDGs), which function as a potent and urgent summons to action for nations across the globe, transcending disparities in their development statuses and fostering a global partnership. The underlying principle is that eradicating poverty and various forms of deprivation should be coupled with strategies to improve health and education, reduce disparities, and stimulate economic growth, all while addressing the challenges of climate change and the conservation of our oceans and forests.

Today, India's development priorities align with the Sustainable Development Goals. With a strong emphasis on collaboration and innovation, India, as a member of the United Nations, has adopted the SDGs as part of its development agenda. Notably, insurance companies in the country are taking proactive steps to engage in various aspects of development. These companies are wholeheartedly committed to identifying and addressing the SDGs, incorporating an ESG approach in their operations presently and in the years to come.

The SDGs are as follows:

Eradication of Poverty:

This objective is dedicated to eradicating poverty in all its manifestations, ensuring universal access to essential resources, education, and opportunities for economic advancement, focusing on the most vulnerable populations.

Elimination of Hunger:

The aim is to eliminate hunger, enhance food security, and encourage

sustainable agricultural practices, guaranteeing equitable access to safe, nutritious, and ample food.

Enhancement of Health and Well-being:
This goal centres on the assurance of robust health and the promotion of overall well-being across all age groups, with particular attention given to the reduction of maternal and child mortality, disease prevention, and the promotion of mental health.

Advancement of Education Quality:
To provide all individuals with inclusive and equitable access to high-quality education, emphasizing accessibility, literacy improvement, and enhancing learning outcomes.

Achievement of Gender Equality:
By bringing gender-based violence and discrimination to an end and guaranteeing equal opportunities for womenfolk in every walk of life, this goal seeks to achieve gender equality and empowerment of women and girls.

Attainment of Clean Water and Sanitation:
In order to guarantee that everyone has access to clean water and health-hygienic conditions, this goal aims to ensure the availability of clean water and promote its responsible use.

Accessible and Sustainable Energy:
The goal is to facilitate the shift to clean and renewable energy sources while guaranteeing that everyone has access to reasonably priced, dependable, sustainable, and contemporary energy sources.

Promotion of Decent Work and Economic Growth:
With a focus on creating jobs and ensuring rights of workers, this goal emphasizes the promotion of full employment, sustainable economic growth, and quality employment for all.
Advancement of Industry, Innovation, and Infrastructure:
Building robust infrastructure, promoting sustainable industrialization, and

fostering innovation and technological advancement are the targets.

Mitigation of Inequalities:
This goal strives to reduce disparities within and among countries by addressing income inequality, social exclusion, and discriminatory practices.

Development of Sustainable Cities and Communities:
The aim is to establish cities and human settlements that are inclusive, safe, resilient, and sustainable, with a focus on sustainable urban planning and development.

Responsible Consumption and Production:
This goal promotes patterns of responsible consumption and production, including the efficient utilization of resources, waste reduction, and the minimization of environmental impacts.

Combating Climate Change:
The objective is to address climate change and its consequences through immediate actions to mitigate its effects, adaptation to its impact, and endorsement of sustainable practices.

Conservation of Marine Life:
This goal concentrates on the preservation and sustainable utilization of marine resources, the safeguarding of marine ecosystems, and the resolution of challenges posed by marine pollution and overfishing.

Protection of Terrestrial Ecosystems:
The aim is to conserve, regenerate, and sustainably administer terrestrial ecosystems, combat desertification, halt land degradation, and reverse biodiversity loss.

Advocacy for Peace, Justice, and Strong Institutions:
This goal champions the development of peaceful and comprehensive societies, guarantees universal access to justice, and establishes effective, accountable, and inclusive institutions at all levels.

Forging Partnerships to Achieve the Goals:
The final goal underscores the necessity of reinforcing global partnerships to support accomplishing all other Sustainable Development Goals by stimulating collaboration among governments, the private sector, civil society, and other stakeholders.

These goals collectively form a global agenda to address critical issues and work towards a more sustainable, equitable, and prosperous world.

Indian Perspective
Commencing from the fiscal year 2023, the Securities and Exchange Board of India (SEBI) has instituted a mandatory requirement for the foremost 1,000 listed entities in India, as ascertained by their market capitalization on both the Bombay Stock Exchange (BSE) and the National Stock Exchange (NSE). This mandate entails the submission of a 'Business Responsibility and Sustainability Report' (BRSR) as an integral component of their compliance obligations. This report is anticipated to adhere to the National Guidelines on Responsible Business Conduct promulgated by the Ministry of Corporate Affairs (NGRBC), initially unveiled in 2019.

ESG in Insurance: Cultivating A Sustainable Product and Investment Portfolio
Sustainability should not be viewed merely as a regulatory burden, nor should it be seen as an additional layer of risk assessment and increased costs. Insurers gain significant commercial benefits when they align and expand their ESG product offerings.

How can insurers capitalize on ESG from a commercial standpoint?
The primary source of commercial benefits stems from the ongoing surge in demand for ESG-oriented products. This demand originates from individual clients who wish to harmonize their financial decisions with their ethical and environmental convictions and corporate clients endeavouring to govern their Scope emissions.

Several insurers are seizing this compelling opportunity. Nevertheless, what

drives insurers to invest in ESG product alignment? By embracing ESG principles, insurers will likely witness an uptick in premiums and profits as they become more attractive to ESG-conscious customers. Concurrently, these ESG-informed clients can contribute to a reduction in an insurer's insured emissions, potentially attracting investments and additional ESG-conscious clientele. This mutually beneficial relationship fosters a potent virtuous cycle, delivering advantages to insurers and their stakeholders.

In the short to medium term, two critical aspects must be considered:

Customer Demands:
Customers can be categorized into two primary groups. Firstly, there are those seeking insurance products that positively impact global ESG factors. Furthermore, a segment of customers requires insurance coverage to confront emerging risks from ESG factors. This specific group, in particular, holds greater relevance for non-life insurance products.

Regulatory Requirements:
The realm of sustainability taxonomies and regulatory product nomenclature is advancing worldwide. Numerous taxonomies exist globally, with the EU taxonomy standing out as one of the more established ones. Furthermore, multiple product naming and disclosure prerequisites exist, including the EU Sustainable Finance Disclosure Regulation. Anticipated developments in this arena encompass both geographic expansion and the diversification of covered products.

In empirical observation, the alignment of products with Environmental, Social, and Governance (ESG) criteria exhibits variability contingent upon the product category under consideration. In the life and investment insurance domain, this alignment may encompass the provision of sustainable investment prospects integrated into the structural framework of insurance products. Conversely, within the sphere of non-life insurance, the introduction of eco-sustainable products engenders distinct patterns of risk exposure. For instance, insuring electric vehicles can entail elevated costs attributable to

repair expenses, while affording coverage for the production emanating from novel green energy sources may necessitate inventive and adaptive risk transfer solutions. The approach to ESG alignment in insurance is contingent on the type of insurance product and the associated risks it entails.

Development of Insurance Products

Leaders in the insurance industry are setting the pace by taking proactive steps in the following ways:

Product Development:

Leading insurers are actively engaged in the development of insurance products that incorporate essential ESG features. They are also reviewing existing products to identify potential ESG-related risks. Local sustainable taxonomies and regulatory requirements significantly influence this process. The approach varies depending on the type of insurance product.

Life Insurance Segment:

Within the life insurance sector, insurers are incorporating top-tier ESG investment fund choices that incorporate stringent due diligence standards for investments. They are also directing investments toward sustainable assets. European life insurers are emphasizing the analysis of the primary adverse impacts on sustainability in terms of due diligence and continuous investment oversight.

Retail Non-Life Segment:

Leading insurers are launching new product lines in the retail non-life segment. These products commit to investing a portion of premiums or policyholder reserves into ESG investments that positively impact global ESG factors. Furthermore, an increasing emphasis is placed on insurance claims, with emerging due diligence regulations scrutinizing the ESG qualifications of partners involved in the claims supply chain. As an example, automobile insurers are forming partnerships with repair facilities to facilitate the shift to more environmentally friendly energy sources, which leads to enhanced product offerings and a reduction in Scope-3 emissions.

Specialty Non-Life Segment:
Within this sector, insurers are devising inventive risk transfer mechanisms to underpin emerging green infrastructure projects, such as green hydrogen production. These ventures demand distinctive risk transfer solutions to draw in external financial investments.

Adaptation to Evolving ESG Landscape:
ESG requisites and technologies are constantly developing, and prominent insurers are establishing the competencies necessary to swiftly pivot and adjust in response to shifting market dynamics. Early investment in product innovation will likely enhance efficiency, leading to improved premium growth and reduced expense ratios.

Policyholder ESG Scores:
Policyholder ESG scores are expected to become increasingly valuable indicators. Non-life insurers will use these scores to implement ESG strategies to reduce insured emissions and target specific ESG-profiled businesses. In the realm of insurance, it is foreseen that forthcoming developments will lead to policyholder ESG data becoming a significant determinant in pricing risks. Leaders in the insurance industry are positioning themselves to meet the growing demand for ESG-conscious products and to address emerging ESG-related challenges effectively.

Defining Sustainable/Green Products
Sustainable products are defined as those which, throughout their entire life cycle, encompassing the extraction of raw materials for their production to their ultimate disposal, confer environmental, social and economic advantages while concurrently safeguarding public health and the environment.
Similarly, sustainable and green insurance products pertain to those insurance offerings that cover various aspects of sustainable product development, utilization, and associated liabilities. These insurance products extend to include indemnification against potential environmental consequences stemming from corporate executives' decisions or omissions concerning climate change, encompassed under Directors & Officers coverage.

Furthermore, this expansive definition encompasses insurance policies incorporating features designed to encourage and foster sustainable and green behaviours.

Consequently, sustainable and green insurance products encompass diverse insurance offerings. The subsequent section will provide a comprehensive breakdown of these insurance products

Penetration in Rural India

Using an extensive network of branches and partnerships, concerted efforts are consistently made to disseminate insurance awareness at the grassroots level and encompass an increasing number of citizens within India's purview of insurance coverage. The overarching objective is to fortify the nation's economic infrastructure through high-quality products and services, concurrently fostering substantial employment prospects. A strategic initiative is underway to expand the branch network, explicitly focusing on establishing small operational offices in tier II, III, and underserved locations. The overarching aim is to enhance geographical coverage, bolster insurance awareness, and elevate insurance penetration in areas where such expansion is most imperative.

Crop insurance in India comprises government-backed programs aimed at providing financial security to farmers in crop failure or damage resulting from natural calamities, pests, diseases, and other perils. These initiatives were initiated to assist farmers and mitigate the detrimental impacts of crop losses on their livelihoods.

The two principal crop insurance schemes provided by the Indian government are the Pradhan Mantri Fasal Bima Yojana (PMFBY) and the Weather-Based Crop Insurance Scheme (WBCIS).

Pradhan Mantri Fasal Bima Yojana (PMFBY):

- A government-sponsored crop insurance program called PMFBY was introduced in 2016. It provides farmers with financial support if their agro-

produce is lost to diseases, pests, or natural disasters.

- A small premium that is determined by crop type and cultivation area and expressed as a fixed percentage of the insured amount is required of farmers. The remaining premium is subsidized by the government, with insurance firms that are registered with the government for this purpose offering coverage.

- The program covers the farming community, inclusive of small and marginal farmers, with the goal of protecting them against monetary losses brought on by the crop failure. Based on the amount of crop damage ascertained by the insurance company's evaluation, insured farmers are compensated.

Restructured Weather-Based Crop Insurance Scheme (RWBCIS):

- In India, farmers can receive financial protection from RWBCIS, a weather-based crop insurance program, against unfavorable weather circumstances like drought, excessive rainfall, temperature swings, and other weather-related hazards that could cause crop loss or damage.

- These schemes serve several critical purposes for farmers:

- **Risk Mitigation:** By offering insurance protection for their produce, these programs assist farmers in addressing the risks that are typically associated with farming. In the event that farmers have crop losses arising out of covered scenarios, they are compensated, allowing them to recoup their losses and avoid getting into a debt trap subsequently.

- **Timely Compensation:** These programs place a strong emphasis on paying farmers' insurance claims as soon as possible after the misfortune of crop losses. This guarantees prompt payment to farmers, enabling them to meet their financial commitments and avoiding the need for (typically high-interest) loans to cover their losses. Also, a prompt payment helps farmers avoid the debt cycle and enables them to plan their crops more efficiently for the future.

- **Integrated Approach:** The initiatives use an integrated strategy that blends crop insurance with contemporary as well as futuristic farming methods and technology. With this strategy, farmers can adopt better farming practices, make better use of their resources, and also increase their crop yields. Farmers may earn more money as a result of increased agricultural yields, which may lessen their need for debts and loans.

- **Financial Literacy:** The programs also aim to raise farmers' level of financial literacy. This instructional component teaches farmers about the value of crop insurance, how it works, and how it can shield them from crop losses and unfavorable financial situations. Farmers who possess greater financial literacy are better equipped to make well-informed decisions and handle their finances, which lowers their susceptibility to debt.

- Apart from these, wide-ranging communication programs have been implemented to raise consciousness regarding crop insurance. Every cropping season, these Information Education and Communication (IEC) initiatives are carried out, utilizing a variety of communication platforms as follows:
  Above the Line (ATL): Farmer Meetings, Kisaan Patshalas, Van Campaigns, Skits, Banners, Posters, Leaflet Distribution, Wall Paintings, and more.

- Below the Line (BTL): Radio, Bus Stop Advertisements, TV Ads, Newspaper Outreach, School Events, Bank and Common Service Centre (CSC) Workshops.

- Digital Campaign: Utilization of Farmitra, a vernacular farmer-centric mobile app, social media platforms (Twitter, Facebook, Instagram, LinkedIn), and digital advertising.

- To ensure that farmers are aware of the advantages of crop insurance and its role in efficient financial risk management, these awareness initiatives are funded each cropping season with a percentage of the total Crop Insurance premium (0.5%).

Conclusion

India ranks among the nation's most susceptible to the ramifications of climate change, facing annual financial losses estimated at approximately $9-10 billion due to extreme weather incidents. Insurers shoulder the economic consequences of climate-induced natural disasters, wielding substantial influence on societal recovery mechanisms.

Notwithstanding, Indian insurers exhibit deficiencies in addressing climate-related losses, with nearly 80% of these losses remaining uninsured in the country. In contrast to their global counterparts, Indian insurers have been notably sluggish in the adoption of sustainable practices and products, along with the integration of climate risk assessment into investment and underwriting decision-making processes.

Consequently, Indian insurers must proactively initiate measures to infuse sustainability into their corporate strategy. Initial steps can be directed towards the establishment of green infrastructure, environmentally responsible IT practices, and the cultivation of sustainable product design. Subsequent actions should encompass the realm of sustainable investments and the advancement of green underwriting practices.

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Chapter-11

CATASTROPHE BONDS FOR CLIMATE RISK MANAGEMENT

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Insurance for climate risks or natural catastrophes is difficult because of huge losses, non-diversifiable risk, market failure and uncertainty. India is currently experiencing a surge in extreme climate events, including heavy precipitation, floods, drought-like conditions, and extreme heat and was among the top 10 most affected countries according to the 2021 Global Climate Risk Index (CRI). Catastrophe or CAT bonds allow insurance companies to cover potential losses arising out of climate risks. In this chapter, we examine the existing funding structure for climate-linked disasters and explore the potential of CAT bonds in the Indian context.

1. Introduction

The increasing frequency and intensity of natural catastrophes in recent decades necessitate catastrophe risk financing for developing countries. Post-

disaster financing has significant fiscal impacts and economic losses for resource-constraint countries (Financial Protection Forum, 2016). Funding of disaster risks through taxes could potentially discourage consumption and investment and thereby impede growth in these countries. Capital markets and the insurance industry are not yet equipped in developing countries to fund climate risks and the challenges associated with them (Cummins & Mahul, 2009). Large losses, non-diversifiable risk, uncertainty in loss assessment, and market imperfections hinder catastrophe insurance coverage and market development (Howard, 2020).

Climate-related disasters cause significant financial losses that can be difficult for insurers to cover. These risks are non-diversifiable, meaning that they affect many people and assets simultaneously, making it difficult for insurers to spread their risk across different regions or sectors. The insurance market may fail to provide adequate coverage for climate risks due to a lack of information flow, a lack of incentives for insurers to provide coverage, or a lack of demand from customers. Climate risks are inherently uncertain and difficult to predict and challenging for insurers, to assess the likelihood and severity of potential losses.

The 2021 Global Climate Risk Index (CRI) has classified India as one of the ten most vulnerable countries to climate change, with 75% of its districts considered hotspots for extreme events (Arora, 2023). India faces increasing frequency and severity of climate-related disasters, including floods, cyclones, droughts, heatwaves, coastal vulnerability, agriculture impacts, water scarcity, biodiversity loss, and public health risks (Ministry of Home Affairs, 2019). India is particularly susceptible to the physical effects of climate change because of its extensive coastline, monsoon-dependent agriculture, and sizable agrarian economy, according to the Economic Survey 2022–2023 (Ministry of Finance, 2023). The Reserve Bank of India (RBI) estimates that by 2030, high heat and humidity could cause 3.4 crore job losses in India, putting at risk as much as 4.5 percent of the country's GDP (Reserve Bank of India, 2023).

CAT bonds have the potential to help insurers, reinsurers, and governments

better manage their exposure to natural disasters and other catastrophic events, as demonstrated in developed countries. In India, CAT bonds are being mooted as a more proactive strategic tool to fill the funding gap and develop a comprehensive approach to disaster response and catastrophe risk management (Times of India, 2021).

This chapter presents an overview of the current funding framework for catastrophe and highlights the potential and constraints of CAT bonds in India. This chapter is organised as follows: section 2 describes the existing structure of public financing of climate risk in India. Section 3 explains the features and examples of CAT bonds globally. The next section discusses the implications of CAT bonds in the Indian context, followed by the conclusion.

2. Existing funding structure for climate risk

The Government of India finances climate–related risks and disasters through different funds through the government budgets either at the national and subnational level or through voluntary contributions by individuals and organizations and as part of corporate social responsibility funding from private and publicly owned companies. Three public funds in India for climate and disaster risks include i) National Disaster Response Fund (NDRF), ii) Prime Minister's National Relief Fund (PMNRF) and iii) Prime Minister's Citizen Assistance and Relief in Emergency Situations Fund (PM CARES Fund).

2.1 National Disaster Response Fund (NDRF)

The National Disaster Response Fund (NDRF) is a fund administered by the Central Government in accordance with guidelines from the Finance Commission to cover costs associated with financial requirements following a disaster. The purpose of the NDRF is to supplement the State Disaster Response Funds (SDRF) with additional funding so that in the event of a major disaster, assistance can be provided promptly. The financial assistance provided by SDRF/NDRF is intended only to provide emergency relief; it is not intended to cover losses or damage to property or crops. Put another way,

the NDRF amount can only be used to pay for emergency response, rehabilitation, and relief expenses.

Any additional financing for NDRF is met using general budgetary resources such as a cess on certain goods. Rules permit donations by any individuals and organizations to the NDRF, albeit this source is still untapped. The 15th Finance Commission suggested creating the National Calamity Contingency Fund (NCCF), which would have an Rs. 500 crore initial corpus and be funded by a special surcharge on central taxes.

2.2 Prime Minister's National Relief Fund (PMNRF)

The Prime Minister's National Relief Fund (PMNRF) in India began as a trust in January 1948 by Mr Jawaharlal Nehru to support the people affected by the partition of India and Pakistan. It supports people affected by natural disasters and calamities, as well as treating diseases like cancer and kidney transplantation. The PMNRF, a voluntary fund, accepts donations of Rs 100 from individuals and institutions. As per Table 1, the PMNRF has had a positive balance over the last few years. However, it has a low liquidity of only 15% in the PMNRF and the bulk of the corpus is invested in Tier-II capital such as Development Loans and Fixed Deposits. This makes it difficult to utilise it in case of emergency.

Table 1. PMNRF Statement of Income and Expenditure

Year	Total Income§ (Rs. in crore)	Total Expenditure # (Rs. in crore)	Balance (Rs. in crore)
2012-13	211.42	181.62	1727.80
2013-14	577.19	293.62	2011.37
2014-15	870.93	372.29	2510.02
2015-16	751.74	624.74	2637.03
2016-17	491.42	204.49	2923.96
2017-18	486.65	180.85	3229.76
2018-19	783.18	212.50	3800.44
2019-20	814.63	222.70	4392.97

Year	Total Income§ (Rs. in crore)	Total Expenditure # (Rs. in crore)	Balance (Rs. in crore)
2020-21	657.07	122.70	4927.34
2021-22	805.38	175.89	5556.83

Source: GOI website, https://pmnrf.gov.in/en/about accessed on Oct 21st 2023.

§ Total income comprises fresh contributions, interest income, and refunds

Total expenditure includes relief for riots, floods, drought, earthquakes, cyclones, tsunamis, Medical, etc.

2.3. Prime Minister's Citizen Assistance and Relief in Emergency Situations Fund (PM CARES Fund)

The PM CARES Fund, is a public charitable trust for relief efforts during the COVID-19 pandemic. The fund allows micro-donation with a minimum of Rs 10 and can receive contributions from individuals as well as government budgets or public sector undertakings. The fund is headed by the Prime Minister of India, with nominated members such as the Defence Minister, Home Minister, and Finance Minister.

PM CARES Fund is very similar to PMNRF in several ways. Contributions to both the trusts are tax free and tax deductible. Both do not require parliamentary approval and are audited by an independent entity. The PM CARES was surrounded by controversy when the Supreme in August 2020 directed the Centre to transfer Rs 500 crore from the fund to the NDRF for COVID-19 relief measures.

To sum up, the existing funding structure for climate risk in India is limited and not timely, vulnerable to external shocks or changes in political priorities. Due to institutional, political, or technological obstacles, these funds might not be directed toward the most urgent or effective climate actions and are prone to regulatory gaps.

3. CAT bonds as an alternative

3.1 What are CAT bonds?

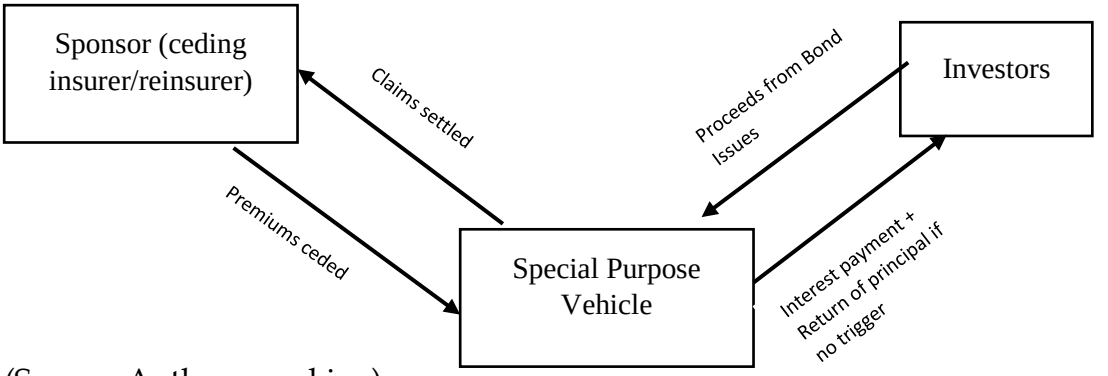
In developed countries, catastrophic bonds were issued for capital and risk coverage following significant loss events like Hurricane Andrew, the Northridge earthquake, and the Kobe earthquake (Sterge & Stichele, 2016). Catastrophe bonds are insurance-linked securities that crowd-source reinsurance coverage, reducing reserve requirements and coverage costs. They are attractive to investors due to their risk coverage being virtually uncorrelated with other risks (Edesess, 2015). These bonds allow insurers, reinsurers, and governments to cede natural hazard losses to capital markets. They represent a new asset class for hedging owing to it being uncorrelated with the market (Franco, 2010).

The first bond of this nature was issued in 1996 by the St. Paul Companies. The CAT bond market experienced a surge in issuance following the 2005 hurricane season. The market halted growth in 2008-2009 due to the credit crisis and Lehman bankruptcy (Morana & Sbrana, 2018). These bonds are gaining momentum among investors worldwide, World Economic Forum predicts further growth, with the space expected to reach $50 billion by the end of 2025.

How do CAT Bonds work?

CAT bonds are issued by insurance companies, and reinsurers to cede their insurance risks, with triggers varying across issuer types (Andy Polacek, 2018). The general manner of operation is presented in Figure 1.

Figure 1: General structure of CAT bonds



(Source: Authors working)

CAT bonds are issued by a special purpose vehicle (SPV) sponsored by the insurer or reinsurer. The premiums received by the sponsor are regularly transferred to the SPV which indicates the ceding of risk (Goldby & Keller, 2019).

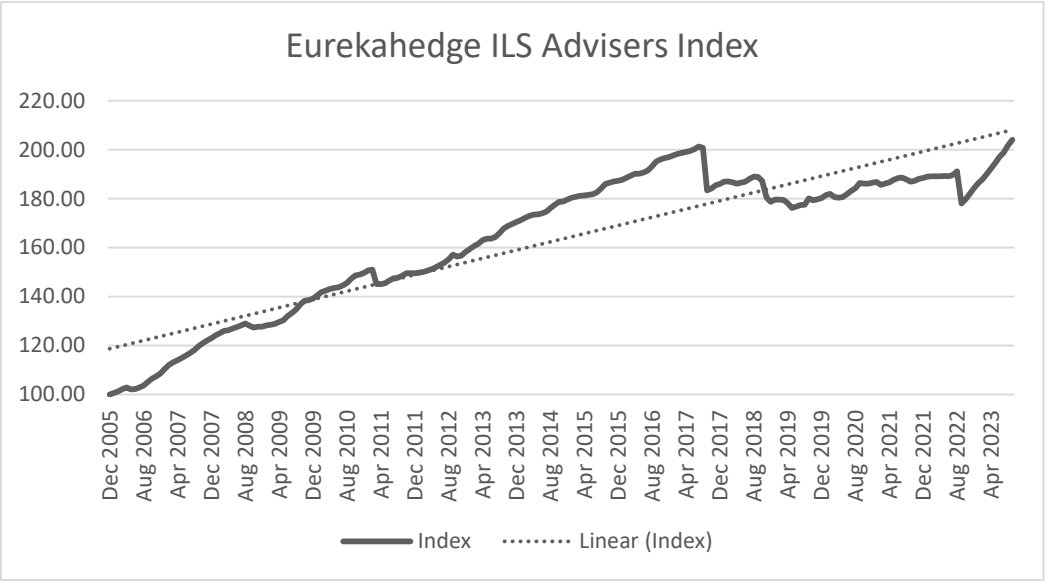
Bonds are issued by the SPV and the proceeds from the issue are held in a collateral trust. The principal received is invested in safe securities, to minimize credit risk. Investors receive regular payment of interest out of the premium and return on principal. If a covered catastrophe exceeds the trigger point, the bond defaults. In case of default, the principal from the bond is used to settle the claims and the investor may not recover the principal. Multiple stakeholders are involved in the issuance and management of CAT bonds, including insurers, reinsurers, SPV and investors, structuring agents, modelling agents and rating agencies. Structuring agents assist in selecting trigger types and protection levels. Modeling agents estimate the risk of catastrophe bonds, based on simulations of potential disaster scenarios. Rating agencies evaluate and rate CAT bonds based on their probability of default. Performance index compilers compute average CAT bond prices and performance trackers (Edesess, 2015).

3.2 Advantages and Disadvantages of CAT bonds

Unrelated to the capital market, CAT bonds provide investors the opportunity to diversify their portfolios and earn strong returns. Governments often build a reserve of money to cover losses in the event of a catastrophe. The bonds transfer the catastrophe portion of risk to financial investors, help overcome these challenges by transferring the risk to third parties (Kunreuther & Heal, 2012).

Popularity of the CAT bonds can be gauged from the Eurekahedge ILS Advisers Index which is a jointly-weighted index based on insurance-linked investments and non-life risk investments. The growth of the index is clear from Figure 2.

Figure 2: Growth of CAT bonds based Index



(Source: Prepared by author from https://www.eurekahedge.com/Indices/IndexView/Special/635/Eurekahedge-ILS-Advisers-Index, accessed Oct 25, 2023)

The advantage of being a hedging opportunity also implies that the growth of CAT bonds is limited to investor's risk aversion to downside risk. This was evident in cases of natural disasters like Hurricane Katrina and the financial crisis (Gürtler et al., 2016).

Internationally issued CAT bonds have an active secondary market, trading over the counter through several broker-dealers. However, liquidity is seasonal, with lower trading volumes during peak risk seasons and scarcer during events. Bonds' liquidity can dry up during payouts or final loss calculations, with wide bid-ask spreads indicating availability but at a cost.

The identification and measurement of a trigger is an important and intricate aspect of CAT bond construction. These bonds can be triggered through parametric triggers, where stakeholders agree on an external trigger for insurance payment. An indemnity trigger allows for a certain level of economic losses incurred. Other triggers include modelled losses or industry

losses, where an exposure portfolio is constructed for catastrophe modelling software (Kunreuther & Heal, 2012).

Risk modelling and CAT bond pricing accuracy are also crucial. The challenge of deploying catastrophe bonds at scale lies in assessing the risk of heterogeneous building stock subjected to rare events. (Sakai et al., 2022) .

3.3 Selected cases of CAT bonds

CAT bond issues are multidimensional covering different kinds of catastrophes with different triggers and varied outcomes. In this section will review a few unique cases of the issue of CAT bonds. A selected list of closed bond issues has been presented in Annexure A.

The fiscal burden of natural disasters is very high, which would make it difficult for any government or insurance or reinsurance company to handle on its own. CAT bonds can raise to $300 million. The bonds have helped the Mexican government to safeguard against earthquakes and hurricanes. The government's Fund for Natural Disasters (FONDEN) has issued four CAT bonds with multiple tranches over two decades to facilitate funding of almost $1 billion. With different SPVs, the government has been able to tackle the disasters faced due to its diverse geography.

While providing required risk coverage, these bonds also provide investor return. The premiums on these bonds have ranged from 4% to 7%, which provides the bondholders with appropriate returns. The default spread has been documented to go as high as 17% to 20%.

Even the presence of credit rating does not completely abate the expected risk. The first catastrophe bond rated by Standard & Poor's Corp. caused a loss of $190 million bond. Issued by KAMP RE 2005 Ltd, it has been anticipated that losses from U.S. hurricane and earthquake claims exceeded $1 billion. The bond was originally rated BB+ by S&P, but in October 2005, it was lowered to CC.

The high spread in selective cases represents a high risk. There have been cases of investor principals being completely wiped out or partially wiped out. Muteki Ltd. (SPV) Issued CAT bonds with a tenure of 5 years to cover Japanese earthquake risk. Muteki Ltd. experienced a 100% dropdown event due to the 2011 Tohoku earthquake, resulting in a $300m principal loss for investors.

4. Implications in the Indian context

4.1 CAT bonds and developing economies

Post-disaster financing strategies in developing countries often have high opportunity costs, as budgets are diverted from priority projects, debt is raised, taxes discourage private investments, and international donor assistance is slow and unreliable. This inefficiency is exacerbated by increasing losses in low- and middle-income countries.

In a developing economy, the insurance market is characterized by its complexity and potential dysfunction. Insurance market failure is primarily caused by informational asymmetries between insurers and buyers and insurers and reinsurers. Even with less severe information asymmetries, adverse selection still contributes to market inefficiency. Underwriting and exposure information quality and quantity differ between developing and developed economies. While developed countries have exponentially increased underwriting information availability, low- and middle-income countries have not (Cummins & Mahul, 2009).

Developing countries face fiscal challenges in disaster response, primarily relying on short-term international support for funding. Switzerland's SECO and the World Bank have partnered since 2012 to develop a joint program to help middle-income countries build financial resilience against natural disasters. The G7 countries have committed to addressing the financial impact of climate change, particularly in vulnerable developing countries (White et al., 2022).

The World Bank helps countries develop tailored strategies using financial instruments, focusing on government contingent liability, risk transfer to competitive markets, and sovereign risk financing. (Cummins & Mahul, 2009). World Bank CAT bonds utilize existing bond issuance infrastructure, eliminating SPV and collateral arrangements, simplifying structuring and reducing transaction costs for clients (Rogers, 2020). One such case is when the International Bank for Reconstruction and Development (IBRD), a unit of World Bank priced and issued bonds to provide risk coverage to Chile against earthquakes and tsunamis. These bonds will become the first bond to be listed on the Hong Kong Exchange (World Bank, 2023).

4.2 Recent Developments in India

The gap between economic losses and available funds through government funds highlights the need for alternate risk transfer mechanisms, such as insurance-driven NatCat programs (NIDM, 2021).

India's International Financial Services Centres Authority (IFSCA) has formed a committee of senior insurance market leaders to recommend future development for a more competitive global insurance and reinsurance centre. These recommendations will also include the mechanism for the issue and governance of catastrophic bonds and insurance-linked securities.

In 2021, National Institute of Disaster Management came out with a working paper that proposed catastrophic claim settlement a trigger-based solution that can pay claims in the event of earthquake, cyclone, or extreme precipitation. The product can be designed to suit the specific needs by using appropriate historical data. The group also proposed for a pilot scheme to be launched in a few states.

Indian bond investors should have received catastrophe bonds from the state-run reinsurer, GIC Re. These bonds would have been benchmarked against ten-year government securities (Sinha, 2014). Almost a decade has lapsed since the initial expression of interest, no bonds have been issued.

4.3 Path ahead for CAT bonds in India

Considering the high gap in funding, CAT bonds are an essential element to possess as a part of the financial response to disaster.

Multi-country CAT bonds offer savings by sharing bond issuance costs and reducing hedge prices due to risk diversification, benefiting both countries and investors. World Bank issue of CAT bonds under Caribbean Catastrophe Risk Insurance Facility (CCRIF) can be a guiding case for risk sharing facility aimed to mitigate the financial impact of catastrophic earthquakes and hurricanes on member governments by providing immediate financial liquidity upon policy triggering. Partnering with countries with different environments can increase risk coverage.

Customizing catastrophe insurance solutions to local conditions, focusing on risk exposure, risk diversification, domestic insurance market development, and access to international markets, while considering region-specific variables (Cummins & Mahul, 2009). Expertise on the entire spectrum of the process, should be transparent, and accessible across geographies, and models should be reliable and regionally specific. Quality models, including longer periods and climate change trends, are crucial for fair pricing. Effective modelling will ensure fair costs for risk transfer.

Linking bonds to investments in carbon reduction and green energy projects, which would encourage action from the poor countries. This has the potential to close the gap between wealthy and poor nations and offer financial motivation for action. In the future, investments and subsidies may be linked to carbon offsets and credits (White et al., 2022).

CAT bonds need to be complemented with other financial instruments. They are most cost-effective when they are part of comprehensive disaster risk financing strategies (World Bank, 2021).

CAT bond's success in financial markets is highly dependent on proper modelling and pricing. A sound regulatory framework and continuous coverage of credit rating is also a key factor for the growth of the bond market

in India. The secondary market is also of the essence to provide liquidity to the investors. Active trading of CAT bonds will enhance the lucrativeness of the bonds and garner more funding. Owing to its uncorrelated nature, CAT bonds in India can become a hedging instrument.

5. **Conclusion**

Climate-related disasters cause significant financial losses and are difficult for insurers to cover due to their non-diversifiable nature and uncertainty. India, one of the ten most vulnerable countries to climate change, faces increasing frequency and severity of these disasters, including floods, cyclones, droughts, heatwaves, coastal vulnerability, agriculture impacts, water scarcity, biodiversity loss, and public health risks.

For a country like India, CAT bonds can offer a risk-free alternative to traditional reinsurance, allowing insurance companies to cover natural disasters. They diversify portfolios and provide strong returns. This helps overcome challenges in transferring risk to third parties.

CAT bonds have a pivotal role to play in the climate risk coverage and disaster funding for India. The widening retail investor base and increasing endurance of domestic investors, makes it capable of using bonds to raise sufficient funds and ensure risk coverage.

Annexure A: List of closed/partially closed CAT bonds

Country	Issue Date	Maturity Date	CAT Bond	Name of the SPV	Name of sponsor	Amount of issue	Spread	Calamity/ catastrophe	Trigger clause	Loss
Mexico	5/10/2012	4/3/2016	Multi Cat Mexico 2012-1 C	Multi Cat Mexico Ltd.	Swiss Re	$100m	7.50%	Hurricanes	Parametric	50.00%

US A	28/07/2005	14/12/2010	Kamp Re	KAMPRE 2005 Ltd	Swiss Reinsurance America Corp.	$190m	5.30%	Hurricanes	Indemnity	68.00%
Japan	24/05/2008	24/05/2011	Mutekki Ltd.	Mutekki Ltd.	Zenkyoren	$300m	4.40%	Earthquake	Index	100.00%
Italy	06/02/2019	14/2/2022	Atmos Re DAC A	Atmos Re DAC	Unipol Sai Assicurazioni S.p.A.	$51m	4.50%	Severe Atmosphere	Indemnity	100.00%
Peru	7/2/2018	15/2/2021	CAR120	IBRD	Republic of Peru	$200m	6.00%	Earthquake	Parametric	30.00%
US A (California)	2/8/2018	13/8/2021	Cal Phoenix 2018-1	Cal Phoenix Re Ltd.	PG&E Corporation	$200m	7.50%	Wildfire	Indemnity	100.00%

(Source: Lane, M., & Beckwith, R. (2023). *ILS Losses 2022-Expectations, Realizations and Implications.pdf* (p. 19). Lane Financial, L.L.C. http://www.lanefinancialllc.com/images/stories/Publications/ILS%20Losses%202022-Expectations,%20Realizations%20and%20Implications, accessed Oct 23, 2023)

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Chapter-12

FINTECH AS SUSTAINABLITY ENABLER

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1. Introduction

The onset of digitalization and consequent rapid infusion of technology in the financial domain, commonly described as Fintech, has ushered in sometimes disruptive changes in various sectors (Sangwan et al., 2019). Fintech can profoundly impact the attainment of the UN established Sustainable Development Goals (SDGs) (Hinson et al., 2019). This article explores the

relationship between SDGs and Fintech, highlighting the role of technology interventions in Finance in driving sustainable development.

Designed to address the social, economic, and environmental challenges humanity faces, the UN had set up 17 goals and 169 targets in 2015 that are collectively referred to as Sustainable Development Goals (SDGs). 193 countries have so far adopted the SDGs that are the means through which global challenges such as inequality, poverty, environmental degradation and climate change are sought to be addressed. Taking into account social, economic, and ecological sustainability, the SDGs prioritize progress for the most vulnerable. For all stakeholders to achieve the SDGs by the given deadline of 2030, significant effort will be needed. Since the adoption of the SDGs in 2015, some progress has been made, but much remains to be done. (Hák et al., 2016; Pradhan et al., 2017; Robert et al., 2005; Sachs et al., 2019).

A fintech company is one that uses digital technologies to support or facilitate banking and financial services. It aims to improve and automate financial services delivery and streamline their use. At its core, Fintech enables its end users to better manage their financial dealings. The internet revolution has accelerated its growth. Among the sectors and industries that now use fintech are retail banking, education, fundraising, non-profit organizations, and investment management. The topic of cryptocurrencies is also covered by Fintech. Using technology to accelerate sustainable development is made possible by the convergence of these two domains. Fintech facilitates financial inclusion, sustainable growth, and digital transformation (Basole & Patel, 2018; Gomber et al., 2018; Sangwan et al., 2019; Vives, 2019).

This article explores the role that Fintech can play in achieving the SDGs by promoting financial inclusion, enhancing access to capital, and fostering innovation in financial services. It investigates how Fintech can drive sustainable finance and reduce inequalities within and among countries. It also delves into the associated pitfalls, and their mitigation through governance innovations.

2. Fintech and SDGS

Fintech has emerged as a transformative force in the financial services industry. It leverages technology to deliver financial services and products, revolutionizing how people access, manage, and use financial services. Due to its ability to offer innovative solutions that are more convenient, affordable, and accessible than traditional financial services, Fintech has gained traction in recent years. (Gomber et al., 2017; Haddad & Hornuf, 2019; Lee & Shin, 2018).

At the global level, Fintech companies contribute greatly to financial inclusion, which is a key enabler for achieving several SDGs. Fintech helps expand the reach of banking, reduces inequalities and economically empowers individuals by providing the underserved populations access to banking services through mobile banking apps or digital wallets. Fintech platforms such as crowdfunding websites or p2p lending platforms enable access to working capital for individuals and small businesses who may not qualify through traditional banking channels. This stimulates entrepreneurship and economic growth and contribute to achieving SDGs related to decent work and economic growth. Fintech has facilitated innovation in financial services by implementing new products and services offerings that are more accessible, affordable, and convenient than traditional banking methods. In the course of disrupting traditional financial services, Fintech companies have been using disruptive technologies such as blockchain, AI and big data analytics. This fosters innovation and contributes to achieving SDGs related to industry, innovation, and infrastructure (Carè et al., 2023; Ferrata, 2019; UNDP, 2021).

Central bank digital currencies (CBDCs) and cryptocurrencies have the potential to impact the least developed countries (LDCs) in several ways. Their uses include payments, remittances, and savings. Through CBDCs, financial services can be extended to the underprivileged who are traditionally unbanked or underbanked in LDCs. As a result of CBDCs, financial markets can become more efficient and transaction costs can be reduced. People who lack the necessary infrastructure to participate in the digital revolution of

CBDC may also be left behind, thereby exacerbating existing patterns of discrimination and exclusion. Also, CBDCs could result in a loss of privacy for users, since central banks would have access to their detailed transaction information (Estrada & Arturo, 2023; Foster et al., 2021; UN, 2023; UNDP, 2021).

To ensure that CBDCs are used in a way that promotes sustainable development in LDCs, there is a need for innovation in governance structures that effectively incorporates the impacts of CBDCs on SDGs as well as incorporating the viewpoints of the nations seeking to be uplifted more effectively. By promoting transparency, accountability, accessibility, innovation, and inclusive governance, these innovations can help ensure that digital financing is used in a way that is in keeping with the principles of sustainable development (Ozili, 2022; Silva, 2023; Themistocleous et al., 2023; Wang, 2023).

Poverty can be reduced through access to financial platforms and the services thereon, including to the online marketplaces (SDG 1). These can also help in reducing inequalities (minorities or other vulnerable LDC population segments, including gender (SDGs 5 & 10). Fintech companies provide facilities of low cost payment transactions and remote payments, thereby positively impacting the SMEs and their employment potential and positively contributing to SDG 8 (economic growth) and improvements to SDG 9 (industry, innovation and infrastructure). Personal loans or advances to SMEs are facilitated through Fintech, including through partnership with banks. These enable SDG 8 (financial inclusion and economic growth). Fintech gives rise to job opportunities in unorthodox ways (SDG 8) and gig economy that also help in achieving SDGs 5 and 10 (reducing inequalities). By 2025, Fintech could boost the economic growth of emerging economies by up to 6 percent (Carè et al., 2023; Museba et al., 2021; Saqib et al., 2023; UNDP, 2021).

When barriers to debt are lowered and credit is encouraged, it can lead to a widespread default and a resultant liquidity crisis, which negatively affects financial institutions and individuals alike (SDG 1 & SDG 16). Data privacy,

cyber security, and algorithmic bias can negatively impact individual consumers, small businesses, in addition to peace and extant institutions (SDG 16). These technology related issues are also known to adversely impact gender and other social disparities (SDGs 5 and 10). Gig economy platforms can create difficult work situations (SDG 8) resulting from uncertain work hours, inadequate wages, minimal social and job security and lack of service benefits. While provisioning of financial platforms and payment infrastructure accelerates financial inclusion (SDG 1), they require access to technology, and a lack of it can increase inequalities (SDGs 5 and 10) in regions or towards women or other vulnerable sections of the populace. Companies that provide Fintech services are often subject to lower levels of regulatory controls than those that provide traditional financial services. In their effort to cultivate the start-up culture of moving fast and breaking the status quo, Fintech companies may neglect risk management at enterprise levels, potentially putting vulnerable groups at risk of financial instability (Carè et al., 2023; Ferrata, 2019; UNDP, 2021).

3. **Fintech: Diverse Approaches**

Fintech companies have experienced a significant surge in recent times, simultaneously addressing inequalities and promoting inclusive growth. However, this inclusive growth has taken different forms through different approaches depending on regional contexts. Countries in SSA (Sub-Saharan Africa) and MENA (Middle East and North Africa) have embraced Islamic finance concepts in Fintech to enhance inclusivity in their operations. In contrast, European countries have focused on leveraging Fintech for climate-friendly and green finance initiatives. Meanwhile, Asian and some African countries have utilized Fintech as a replacement for volatile and unreliable transaction sources, improving accessibility to formal and safer credit options.

In contrast to the industrial revolution, the adoption of Fintech companies as mainstream financial services institutions has been more rapid in developing and emerging economies than in developed countries. Additionally, the range of services offered by these entities in Emerging Markets and Economies (EMEs) has been broader. While the adoption of Fintech has been relatively slower in developed countries, elements of financial technology such as

mobile payments, peer-to-peer lending, digital lending, and alternate credit scoring have emerged as popular services there (Mhlanga, 2023).

In EMEs in the American continent, Fintech has mainly acted as an enabler. Fintech has facilitated financial inclusion in Latin America and the Caribbean (LAC), regions historically challenged by financial exclusion. The rapid expansion of Fintech companies in countries such as Colombia, Chile, Argentina, Mexico, Brazil, Honduras, and the Dominican Republic has reduced financial frictions. These countries have leveraged Fintech solutions, including mobile payments, digital banking, p2p lending, and DLT (blockchain) technologies, to improve access to banking services, reduce regulatory constraints, and foster competition and innovation (Rousset et al., 2021).

Several areas in the European continent have witnessed the impact of Fintech. It has become an integral part of financial inclusion strategies in countries like Romania and has contributed to advancing climate actions by improving regulations and promoting the application of financial technology to sustainable finance in Turkey (Bayram et al., 2022).

Climate Fintech has gained prominence in the EU, with the aim of enhancing corporate climate action and influencing day-to-day operations. By integrating financial systems, Climate Fintech contributes to identifying and promoting climate-conscious and Fintech-friendly asset owners, decarbonizing capital flows and investments (Bhowmik, 2022; Mhlanga, 2023).

Turkey has introduced sustainability via Fintech solutions, improving payment systems with educational content on responsible consumption. This was achieved by enhancing regulations, establishing data infrastructure, national taxonomy, and carbon pricing mechanisms to assess and manage climate-related financial risks. Additionally, Turkey introduced a regulatory sandbox environment for Fintech companies to test their solutions and foster innovation (Bayram et al., 2022).

Spain has actively embraced Fintech solutions to improve regulations, promote ease of doing business, and foster innovation and competition. It has introduced a strategic plan for sustainable banking to implement the environmental goals and policies of the EU and the UN (Bittini et al., 2022; Rambaud & Gázquez, 2022).

Switzerland has been at the forefront of green Fintech innovation, with a survey of 40 green Fintech companies revealing four key dimensions for success: adoption and availability of new technology such as blockchain, AI, and big data analytics; business model innovation to create, deliver, and capture value; a unique value proposition; and the measurement of impact, including ESG factors, carbon footprint calculations, and sustainability ratings (Puschmann et al., 2020).

In the MENA and SSA regions, a version of Fintech influenced by Sharia has gained prominence. Banking institutions in these regions adhere to the Shariah principles of Islamic practices, emphasizing justice, equity, risk-sharing, and social welfare. The principles of Islamic banking and finance underlie the operations of local financial (both banking and non-banking) institutions, providing alternative funding sources for infrastructure, green finance, and micro, small, and medium enterprises (Abubakar & Aysan, 2023; Trimulato et al., 2022).

These regions have also nurtured neobanks and various Fintech start-ups, focusing on alternative finance, digital assets, capital markets, payments, fundraising and lending, insurance, and social finance. (Alshater,M. M., et.al, (2022)) . The Global Islamic Fintech Report 2021 estimated the Islamic Fintech market size at $49 billion in 2020, with a CAGR of 21%. It identified 241 Islamic Fintech services globally, with 40% serving the Southeast Asia market and 32% in MENA. Bahrain, Malaysia, Saudi Arabia, and Indonesia were highlighted there as the top countries in Islamic Fintech (DinarStandard & Elipses, 2021). The main drivers of Islamic Fintech growth are customer demand, social impact, and financial inclusion. Islamic Fintech companies,

however, face challenges related to regulatory uncertainty, lack of standardization, and funding constraints (Saba et al., 2019).

Fintech growth has been closely linked to poverty reduction in African countries, particularly through the development of mobile money and alternative credit strategies. Research indicates that Fintech measures have had a statistically significant positive impact on reducing extreme poverty in the MENA and SSA regions (Emara & Mohieldin, 2021). M-Pesa, which is the most popular mobile money in North African region, created some alternative credit strategies that have enabled financial inclusion.

In Zambia, a study conducted in the Chongwe district of Zimbabwe in 2019 demonstrated that mobile money serves as a valuable tool to enhance financial inclusion. It offers affordable and convenient financial services, innovative solutions for credit, savings, insurance, and investment, thereby enabling financial inclusion (Haabazoka et al., 2021).

Kenya's M-Pesa is a notable example that has significantly impacted the country by facilitating payments without the need for a traditional bank account. It has been attributed to at least a 2% reduction in poverty rates in Kenya. Regulators in Kenya have not only focused on financial innovation and inclusion but also on consumer protection. Regulatory measures, such as the Data Protection Act (2019) and amendments to the Central Bank of Kenya Act (2021), have given the Central Bank of Kenya the authority to authorise and regulate the digital credit providers and control the pricing parameters for digital credit. Additionally, Kenya introduced a regulatory sandbox by the Capital Markets Authority (Mugo, 2023).

Vietnam has shown more efficiency in achieving financial inclusion while having fewer Fintech enterprises. However, it encounters difficulties with regard to financial stability, consumer protection, data privacy, and cybersecurity. It highlights the requirement for an ecosystem of support that incorporates cooperation and coordination and promotes public awareness and education (Tam & Hanh, 2018).

Ant Financial Services Group's China Ant Forest campaign, which debuted on the Alipay mobile app in August 2016, demonstrates how Fintech can advance environmental goals using cutting-edge digital technologies. The results of this groundbreaking integration of Fintech with sustainable development are outstanding. Millions of users have been encouraged by Ant Forest to adopt sustainable lifestyles while also supporting reforestation initiatives in China. It shows how digital technology has the power to inspire widespread, locally driven environmental action to tackle problems like desertification and land degradation. This case study demonstrates how Fintech platforms can be instrumental in advancing sustainable development objectives by encouraging environmental awareness, participation, and real benefits for the ecosystem and local populations (Zhang et al., 2021).

India has been a crucible of experimentation in joint emphasis on Digital initiatives by the public and private sectors. Fintech is not just a private-sector phenomena in India. The government has been a major force driving innovation and financial inclusion. Aadhaar, a biometric identity platform, has been utilized by initiatives like the Aadhar-enabled payment system and the creation of the Unified Payments Interface (UPI) to provide a solid foundation for digital financial transactions. The Jan Dhan Yojana, which sought to give everyone access to bank accounts, was crucial in boosting banking accessibility, especially for people who were previously shut out of the financial system.

Payments banks, including Bharti Airtel, India Post, and Paytm, exemplify regulatory changes that have extended the reach of digital payments. These entities have gained permission to offer a range of banking functions, such as remittances, mobile payments, fund transfers, and ATM services. Paytm stands out as one of the largest digital payment enablers in India, boasting over 300 million registered users and serving seven million offline merchants. The Fintech landscape is not limited to payments alone; it also encompasses loan comparison portals like BankBazaar, which provides an array of services, from personal loans and home loans to credit cards and mutual funds (Dananjayan et al., 2023; Panagariya, 2022).

4. Fintech: Challenges

Despite its potential for advancing SDGs, Fintech also introduces unique challenges. The regulatory hurdles that Fintech faces are one of its biggest challenges in contributing to the SDGs. As in evident in the domain of cryptocurrencies, Fintech companies frequently operate in a regulatory grey area, which can limit their ability to expand into new markets and scale up operations. To ensure consumer protection and financial stability, regulatory frameworks must be updated to accommodate Fintech solutions' unique features. Customers of fintech companies provide them with vast amounts of personal information, which can be exploited or misused. Establishing robust data privacy regulations that protect consumers' data while fostering innovation in financial services is essential. The reliance of fintech companies on digital infrastructure makes them vulnerable to cyberattacks. Data breaches, financial losses, and reputational damage can result from cyber security risks. To mitigate these risks, robust cybersecurity protocols are crucial. As discussed earlier, fintech solutions may exacerbate inequalities, cause job related insecurities, and perpetuate social biases. Designing Fintech solutions with ethical considerations is essential to minimizing adverse social impact and protecting vulnerable sections of the population. As with any new frontiers of technology, the importance of striking a balance between innovation and responsible practices cannot be overstated (Ediagbonya & Tioluwani, 2022; Hinson et al., 2019; Hoang et al., 2022; UNDP, 2021).

5. Governance considerations

Effective governance of Fintech companies and their operations can help ensure that the benefits of digital finance are accessible to all, especially those who are underserved or excluded from traditional financial systems. Inclusive governance can help promote transparency, accountability, and participation in decision-making processes, which can lead to better outcomes for all stakeholders. In addition, it reduces the other inherent risks and challenges of Fintech, like data cybersecurity, data privacy, and ethical considerations. A new generation of global, dominant digital finance platforms is emerging, with cross-border spillover effects on many areas of sustainable development around the world, especially in developing countries. The promotion of

inclusive governance in Fintech is therefore essential to ensure sustainable development and alignment with the UN SDGs (D. Arner et al., 2022; Susilowati et al., 2022; UNDP, 2021).

In order to support sustainable development, the stakeholders should jointly adopt a principles-based approach to governance. In addition to maintaining financial stability and consumer protection, Fintech operations should also strive to preserve financial and market integrity. Regulatory frameworks have to be flexible and responsive to dynamically changing circumstances that often accompany Fintech. The regulations should promote responsible behaviour, instilling a commitment to sustainable development, with appropriate and proportional oversight and enforcement so as not to hamper innovation. A principles-based approach to the governance of Fintech companies can help to ensure that digital financing is used in accordance with sustainable development principles. By promoting transparency, accountability, accessibility, innovation, and inclusive governance, these principles would ensure that Fintech contributes to maximizing positive SDG impacts while minimizing the negative ones (D. W. Arner et al., 2020; Jamie Sgro et al., 2019; Michael, 2021; Violette Khammad et al., 2019).

6. Conclusion

In the financial sector, fintech can play a pivotal role in driving sustainable development by promoting financial inclusion, enhancing access to capital, and fostering innovation in financial services. By leveraging technology and offering innovative solutions, Fintech contributes to achieving several SDGs related to reducing poverty, promoting equality, creation of sustainable cities and communities, climate improvement, decent work and economic growth. In spite of Fintechs' potential to help the world attain its sustainability objectives, compliance and cybersecurity issues have the potential to impede progress. As Fintechs move from growth-focused disruptors to sustainability-first global actors, their transition can be complex. However, it is important to address challenges associated with Fintech to maximize its positive impact on sustainable development. In order to meet the immense challenges the world

faces - economic, social, and environmental - we must harness the much-needed innovation of existing Fintechs and those emerging.

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