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A Study on Green Finance in India, Its Scope and challenges

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ABSTRACT

Public policy is beginning to prioritize green financing. This essay examines the advancements made in India and around the world in green finance. We evaluate the level of public awareness (Google Trends) and the available financing choices (bank loans and bond issuances) for green initiatives using a range of data sources. While public awareness and financing options have improved in India, our findings suggest that a reduction in asymmetric information through improved information management systems and enhanced stakeholder coordination could open the door to longer-term, more sustainable and environmentally friendly economic growth.

Introduction

The term "green finance" describes financing arrangements intended specifically for projects that address climate change or are environmentally friendly. Energy-producing projects that are environmentally sustainable include those that use renewable energy sources like solar, wind, or biogas; clean transportation initiatives that reduce greenhouse gas emissions; energy-efficient projects like green buildings; and waste management initiatives that include recycling, effective disposal, and energy conversion, among other things. Additionally, projects that meet the criteria for being considered sustainable under the Green Debt Securities disclosure requirement include biodiversity protection, sustainable land use, including forestry and agriculture, sustainable waste and water management, and climate change adaptation (SEBI 2017).

New financial mechanisms, like green bonds; carbon market instruments, like carbon taxes; and new financial organizations, like green banks and green funds, are being formed to address the financial demands for these kinds of initiatives. Collectively, they make up green finance.

A key topic in the conversation about the sustainability of economic growth is green finance. The ecology is frequently sacrificed in the name of rapid economic development. Reduced availability of natural resources, deteriorating environmental conditions, and widespread pollution endanger public health and hinder long-term economic expansion. Using environmentally friendly technologies has become more and more important for countries all over the world as a means of safeguarding and significantly improving the environment. To

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encourage more funding allocation for the establishment or adoption of ecologically sustainable projects, a suitable incentive structure is necessary. Other resources like labor and land may also follow if money is diverted from the traditional industries and into the green and environmentally friendly sectors. This ultimately results in the best possible distribution of resources², which over time promotes sustainable growth.

In this piece, we evaluate India's green financing development. In Section II, we go over a few of the global best practices for boosting green financing as well as some of the significant steps India has done. We describe the development of green finance in India in Section III. We address the obstacles and future directions in Section IV, and Section V brings everything to a close.

Public Policy towards Green Finance

(a) International best practices

Since its inaugural summit in 2008, the G20 has included climate change on its agenda; however, in order to address harmful emissions, the circular carbon economy (CCE) has taken center stage more recently. Numerous flagship efforts are being implemented with the goal of raising global awareness and encouraging investment in environmentally friendly projects. about the organizations' general environmental management These initiatives support businesses, both financial and non-financial, in incorporating environmental factors into their financing. Ways to implement green finance among signatories are suggested by major flagship programs such as the United Nations Environment Programme (UNEP), Equator Principles (EP) for financial institutions, Principles for Responsible Investment (PRI), and Statement of Commitment by financial institutions on Sustainable Development. These programmes have several Indian signatories (Table 1). However, a consistent flow of funding for sustainable projects can only be guaranteed in the event that there is a trustworthy source of knowledge about social hazards and a track record of companies identifying possibilities that offer both a respectable rate of return and environmental advantages. (UNEP)³.

In this regard, Sustainable Stock Exchange is an initiative that suggests stock exchanges in signatory nations develop stock price indices that monitor the stock performance of a select group of businesses that operate in these nations and are pioneers in incorporating Environmental, Social, and Governance (ESG) principles⁴ into their financing processes. The purpose of these indices is to assist investors who are considering making green investment decisions. As part of this program, the National Stock Exchange (NSE) and the Bombay Stock Exchange (BSE), two significant stock exchanges in India, each issue their own ESG index.

Table 1: Participation of Asian Financial Institutions in Global Initiatives

Name of the Initiative	Global signatories	Asian Signatories	Global signatories	Asian Signatories
	From Volz, 2018		As at end 2019	
Principles for Responsible Investment	1,874	122	2,698	387
Equator Principles	91	12	101	22
Financial Institutions UNEP	214	38		
Statement of Commitment by Financial Institutions on Sustainable Development (2011)	66	14		

Four major categories can be used to classify the global regulatory structure. First, companies, both financial and non-financial, are required to disclose their sustainability, or how much risk they are exposed to from their activities relating to environmental, social, and governance (ESG) issues, on a regular basis. Following the lead set by the G20, which encouraged corporations to voluntarily embrace the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD), such disclosures have increased. By June 2020, sixty percent of the top 100 publicly traded firms worldwide pledged to back the TCFD recommendation⁵.

Leading stock exchanges, financial market regulators, and ministries in charge of corporate affairs in a number of countries, including China (2008)⁶, Hong Kong (2012), the United Kingdom (2012), India (2012), the Philippines (2013), Vietnam (2013), and Singapore (2016), implemented a framework for listed companies within their jurisdiction to disclose ESG-related risks (Volz, 2018).⁷ In 2008, Bangladesh required commercial banks to report on their biannual Corporate Social Responsibilities (CSR). In 2011, the banks were encouraged to incorporate systematic environmental risk analysis into their credit appraisals. In 2013, the norm was extended to Non-Banking Financial Institutions (NBFIs), and in 2017 they added social risk assessment as well (Volz, 2018). Asset owners and managers are required by France's 2015 Energy Transition for Green Growth Law to report on the ways in which physical and transition risks affect their

operations and assets. The goal of this strategy is to connect disclosures to the larger initiatives in France⁸ to decarbonize the energy sector. The second is the practice of guided and concessional lending, which is used in many nations. For instance, under Bangladesh's green re-financing strategy, a US\$26 million "revolving fund" was established in 2009 to provide low-interest loans to more than 50 green and renewable energy-related businesses.

In addition, a US\$200 million fund was established in 2016 to support the leather and textile industries' transition to eco-friendly technologies. Bangladesh has been requiring commercial banks to lend at least 5% of their total assets to the renewable energy and other green technologies industry since 2015. (Volz, 2018). The third category consists of financial and non-financial institutions' micro- and macro-prudential policies. China imposed financing restrictions on corporations in 2006, with the basis being their compliance with environmental regulations. In 2010, the policy of differential reserve requirement for commercial banks was introduced in Lebanon. According to Dakau and Volz (2018), banks that have a higher percentage of green projects in their loan portfolio are required to retain fewer reserves.

By taking lending exposure to projects with social and environmental hazards into account, Brazil integrated environmental factors into the banks' Internal Process of Capital Adequacy Assessment in 2011 (Dikau and Volz, 2018). In the end, Brazil suggested that banks include a description of their environmental harm risk in their yearly reports for 2017. Establishing green financial institutions' assessment processes and exposing them to social and environmental issues come in fourth.

The UK government owns all of the GBP 3 billion (USD 3.9 billion) UK Green Investment Bank Ltd, which was founded in 2012 (Geddes et al., 2018). Since 2013, local and regional governments in the Nordic region have come together to form alliances. These alliances have issued bonds on the financial market, with the proceeds going to the sub-national members of the alliance—Kommuninvest in Sweden, Kommunalbanken and KLP Kommunekreditt AS in Norway, KommuneKredit in Denmark, and MuniFin in Finland, as reported by (Nassier 2018). The United States Agency for International Development and the Asian Development Bank offer bond guarantees and partial financing to their respective member banks and nations in exchange for green funding. As explained in the next sections, India has also implemented a number of policy tools during the past ten years in accordance with these worldwide trends.

Bangladesh introduced regulations requiring commercial banks to report on their Corporate Social Responsibilities (CSR) every two years in 2008. In 2011, the banks were encouraged to include systematic environmental risk analysis in their credit appraisals. In 2013, the norm was extended to Non-Banking Financial Institutions (NBFIs), and in 2017 the assessment of social risks was added (Volz, 2018). As early as 2013, Bangladesh published a standard framework for banks to report risks. Asset owners and managers are required by France's 2015 Energy Transition for Green Growth Law to report on the ways in which physical and transition risks affect their operations

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(b) Public policy in India

India began putting more of an emphasis on green financing in 2007. Global warming and climate change are significant factors in the framework of sustainable development, according to a December 2007 Reserve Bank statement on "Corporate Social Responsibility, Sustainable Development and Non-financial Reporting – Role of Banks." The National Action Plan on Climate Change (NAPCC) was created in 2008 with the intention of outlining a comprehensive framework of policies for reducing the effects of climate change (Jain, 2020). The Ministry of Finance established the Climate Change Finance Unit (CCFU) in 2011 to serve as a coordinating body for

the numerous organizations in charge of green finance in India. Since 2012, implementing the sustainability disclosure standards has been a major strategic initiative. Since 2012, the top 100 listed businesses based on annual business responsibility reports and market capitalization at the BSE and NSE have been required by the Security and Exchange Board of India (SEBI) to publish amended versions of their reports on a periodic basis. SEBI released guidelines in May 2017 outlining the disclosure requirements for the issuance of green bonds. Additionally, under the Companies Act of 2013, the Ministry of Corporate Affairs mandated that progress on Corporate Social Responsibilities (CSR) be reported. The Committee on Corporate Governance Report from October 2017 suggested that the board of directors hold a minimum of one annual meeting to deliberate on matters pertaining to strategy, budgeting, board evaluation, risk management, ESG, and succession planning.

Incentives related to finances and taxes have been implemented in India. These incentives are consistent with India's obligations under the 2015 Paris Agreement to attain 40% installed electric power capacity from non-fossil sources by 2030 and to reduce greenhouse gas emission intensity by 33 to 35% below 2005 levels. In most states, the Government of India (GoI) provides institutional, residential, and social sectors with a subsidy equal to 30% of the rooftop solar panel installation cost.

Up to 70% of the installation cost is covered by the subsidy in a few of the special category states. Furthermore, recipients are eligible for a generation-based incentive, which entitles them to receive ₹2 for each unit of generation above 1100kWh to 1500kWh annually. Furthermore, the government may set a tariff for the excess power to be sold at. Furthermore, in order to improve credit availability, lower the upfront cost of ownership for all vehicles, and build the necessary infrastructure (such charging stations), the GoI introduced the Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME) scheme in two phases in 2015 and 2019 (Jain, 2020). The State Bank of India has launched a "green car loans" scheme for electric vehicles with a 20 basis point cheaper interest rate and a longer repayment window, compared to the current car loans, in an effort to combat the high upfront cost of such vehicles (Jain, 2020). Additionally, the government has introduced a Production Linked Incentive (PLI) Scheme to facilitate the production of highly efficient modules for the renewable energy industry.

In order to encourage and assist green finance activities, the Reserve Bank has also been implementing proactive policy measures. 2015 saw the addition of the small renewable energy industry to its Priority industry Lending (PSL) program. Under this program, homeowners can invest in renewable energy with up to ₹10 lakh in loans, while enterprises in the renewable energy sector can get up to ₹30 crore in loans (up from ₹15 crore since September 4, 2020). India declared in September 2019 that it wanted to generate 450 GW of renewable energy by 2030.

Through its regular publications and other communications, the Reserve Bank is educating the public, investors, and banks about the opportunities, needs, and difficulties associated with green

finance. For example, the Reserve Bank has included the conclusions of the G20 Green Finance Study Group (GFSG14) in its Annual Report (2015–16). These conclusions address the need for the growth of regional green bond markets, the facilitation of cross-border investments in green bonds, the exchange of knowledge on environmental risks, and the enhancement of green finance activities in general. The broader concerns surrounding green financing that require additional thought are also mentioned in the yearly report. Aspects of intellectual property rights in development and technology transfer from developed countries, the definition of "green activities," and bank assessments of environmental risk are a few of them. The Reserve Bank of India addressed the impact of climate change on financial assets and the need to speed up green finance for environmentally sustainable growth in its Report on Trend and Progress of Banking in India (2018–19). It recognizes the obstacles that have hindered the growth of green finance, including "green washing," or making exaggerated claims of environmental compliance, the existence of several definitions, and maturity mismatches between long-term green investments and investors' short-term objectives. It also emphasizes the necessity of taking legislative action to create a framework that supports India's green finance ecosystem by raising awareness through concerted efforts.

The Indian Renewable Energy Development Agency (IREDA), a government-backed organization that promotes clean energy investments, declared in May 2016 that it would establish itself as the country's first green bank in the framework of green financial institutions. In order to finance feasible infrastructure projects with bond tenors longer than five years, India Infrastructure Finance Corporation Limited (IIFCL) additionally introduced a special program called the "credit enhancement scheme" (Jain, 2020). In the part that follows, we will evaluate the development of green finance in India while taking into account the general public's understanding of environmental sustainability.

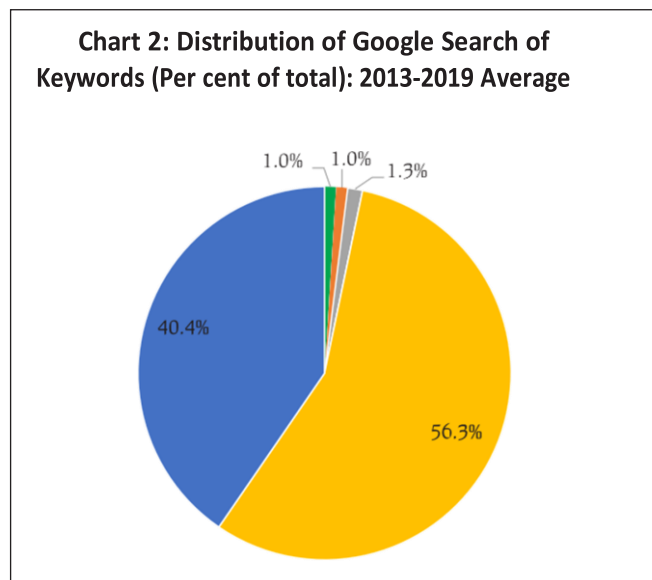
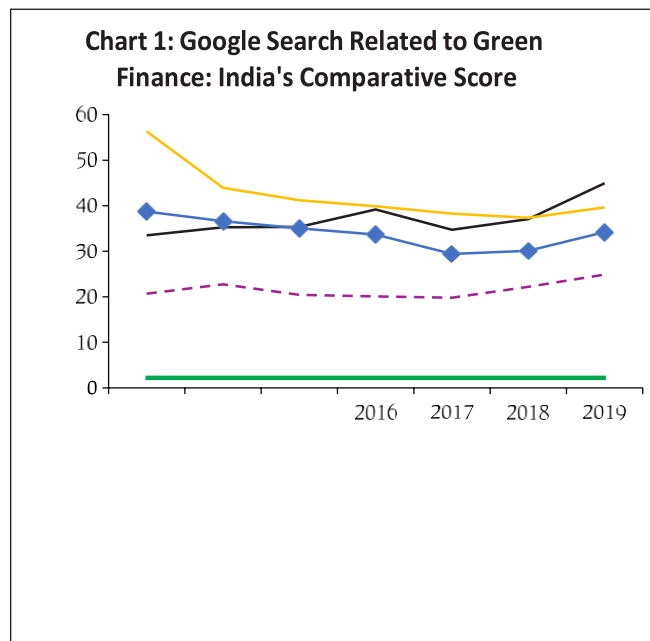
Progress and Challenges of Green Finance in India

a) Improvements in general awareness

Data from traditional sources are scarce for evaluating public knowledge of green finance and sustainable development. In this sense, Google Trends can be a very useful tool for figuring out the trends in Google searches conducted at various times and locations. Based on the volume of Google searches, it can assist us in understanding the level of interest in a particular subject. The data on Google searches for every topic is normalized in Google Trends by calculating the percentage of all searches for all topics in a given region over a certain time frame. The bias resulting from variations in Google's overall search activity over time is eliminated by this normalization. For example, due to the global increase of internet accessibility, the total amount of searches conducted now is significantly higher than it was in 2004. As a result, the total number of searches for any given topic could not provide a useful assessment of the issue's overall interest

over time. Data from Google Trends indicates that people are becoming more knowledgeable about green finance and how it contributes to sustainable economic growth.

We extract the search intensity for five terms (green finance, green bond, ESG, corporate social responsibility, and renewable) as a percentage of total searches made in a given country over time. According to Chart 1, India's Google searches on climate change and green finance are just as intense as those conducted in developed and significant emerging nations. India's comparative score is greater than that of the advanced economies, as seen in Chart 1. Google Trends provides the normalized search intensities for the selected keywords, as was previously described. While normalizing, the country



The search intensity's maximum value is set at 100. Subsequently, the level of search intensity for additional nations is changed accordingly. The weighted average of these scores for the five keywords is represented by the nation scores in Chart 1, where the weights are the percentage shares of searches for each keyword among the total number of searches for all five keywords. Chart 2 indicates that the public interest in India is dominated by subjects linked to renewable energy and corporate social responsibility. Web-search related to the specific instruments such as green finance and green bonds, however, are still limited (about 2 per cent of all five keyword searches).

b). Green lending

We turn to traditional sources for information on bank lending to sustainable projects, such as the Reserve Bank of India's Database on the Indian Economy, which offers publicly accessible information on policy rates, total credit, sectoral credit, and important financial ratios pertaining to Scheduled Commercial Banks (SCBs) in India. The sample has a range of individual SCB counts, from 88 in 2005 to 95 in 2019.

Table 2: Bank Credit Outstanding to the Non-conventional Energy as on March, 2020

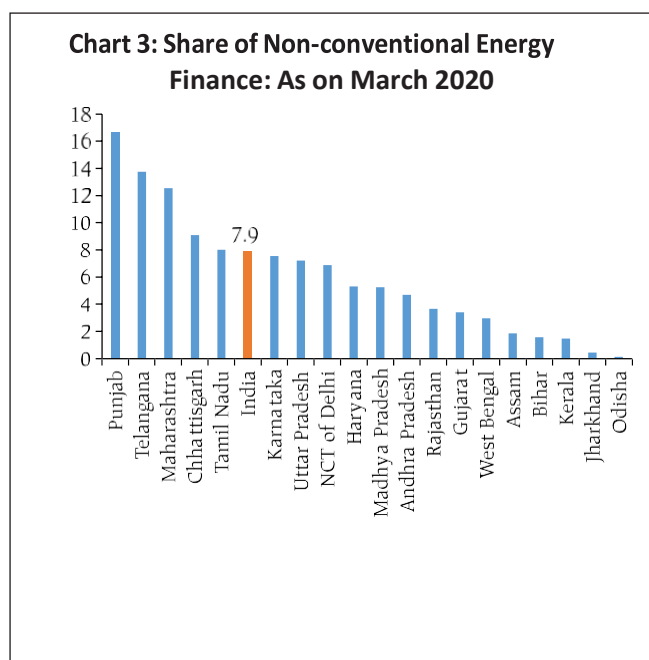
	Public Sector Banks	Private Sector Banks	Foreign Banks	All Banks
<i>Amount outstanding (` Cr.)</i>	21,655	12,302	2,586	36,543
As per cent of power sector credit	6.2	11.9	27.1	7.9
As per cent of total bank credit (excluding personal loans)	0.5	0.5	0.7	0.5

Note: Excludes Regional Rural Banks and Small Finance Banks.

Source: BSR, RBI, Authors' calculations.

The Reserve Bank placed the small renewable energy sector under its Priority Sector Lending (PSL) plan in 2015 as part of its green finance initiative. Approximately `36,543 crore was the total outstanding bank credit to the non-conventional energy sector as of end-March 2020 (Table

2), making up 7.9% of the outstanding bank credit to the power production sector, up from 5.4% in March 2015. Table 2 and Chart 3 show the differences in the commercial banks' exposure to the non-conventional energy sector among bank groups and Indian states. .. For almost 5000 bonds issued in the Indian market since 2015, our data contains the initial issuance amount in US dollars, coupon rate, debt to total assets ratio, and whether or not the bond proceeds were to be used for green initiatives. We did not take extensive information from Bloomberg Terminal; instead, we extracted summary information for the international comparison.



c) Green bonds

Green bonds are bonds that are issued by corporations, intergovernmental organizations, and sovereign entities with the intention of using the bond profits for ecologically friendly initiatives. For comprehensive information on green bonds that governments and corporations have issued in India and other nations, we have turned to Bloomberg. We started by extracting the majority of government and business bonds issued in India since January 21, 2015, regardless of whether they are green bonds or not. In this context, we have chosen bonds in which India is designated as the nation of risk, regardless of the country of incorporation of the issuer.

In this context, we have considered bonds for which the nation of risk has been designated as India, regardless of the place of incorporation of the issuer. For almost 5000 bonds issued in the Indian market since 2015, our data contains the initial issuance amount in US dollars, coupon rate, debt to total assets ratio, and whether or not the bond proceeds were to be used for green initiatives. We

did not take extensive information from Bloomberg Terminal; instead, we extracted summary information for the international comparison.

Since 2015, India has been issuing green bonds. India had \$16.3 billion in outstanding green bonds as of February 12, 2020. Since January 1, 2018, India has issued around US\$8 billion in green bonds, or 0.7% of all bonds issued in the Indian financial market. India has maintained a favorable position in comparison to several advanced and emerging nations, even if the value of green bonds issued in the country since 2018 made up a relatively small fraction of the total bond issuance (Table 3).

With maturities of five years or more, but fewer than ten, the majority of green bonds issued since 2015 have been issued. Nonetheless, certain issuers Yes Bank Ltd. (2015), Rural Electrification Corporation Limited, or REC Ltd. (2017), Power Finance Corporation Ltd. (2017), Indian Railway Finance Corporation Ltd., and Indian Renewable Energy Development Agency Ltd. (2017, 2019) have made their positions clear.

Table 3: Green Bonds Issuance Since January 1, 2018 (Corporate and Government: All Maturities)

Country	Amount issued (\$Mn)	Number of bond issued	Amount issued as per cent of all bond issuance (per cent)	Number of bonds issued as per cent of all bond issuance (per cent)
Euro Area	1,96,854	594	1.7	0.4
China	63,023	183	0.3	0.2
USA	35,421	71	0.2	0.2
Japan	11,815	88	0.1	1.1
South Korea	11,781	44	1.0	0.4
Central and Southern America	8,869	53	0.5	1.0
India	7,992	22	0.7	0.3
South-east Asia	7,208	86	0.6	1.4
Australia and New Zealand	5,878	15	1.1	0.8
UK	5,311	17	0.4	0.5
Hong Kong	4,781	19	0.5	1.0

Singapore	496	9	0.05	1.2
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Source: Authors' calculations, Bloomberg.

Adani Renewable Energy Ltd. (2019)¹⁵ and (2017) have released green bonds having maturities of ten years or longer. In 2019, ReNew Power Pvt. Ltd. released green bonds with a shorter maturity length than five years. Since 2015, almost 76% of the green bonds issued in India have been valued in US dollars. Apart from governments and corporations, the World Bank has periodically released green bonds for a number of projects in India (Appendix Table 1). According to the World Bank's 2019 Green Bond Impact report, as of June 30, 2019, the anticipated outstanding amount of Green Bond proceeds earmarked to support the financing of such projects in India is US\$640 million¹⁶.

All things considered, green finance in India is still in its infancy. As of March 2020, bank lending to the non-conventional energy industry accounted for approximately 7.9% of total outstanding bank credit to the power sector; green bonds made up just 0.7% of all bonds issued in India since 2018. We will discuss some of the main obstacles that the Indian green bond market is facing in the following part.

IV. Obstacles and the Way Ahead

Global experiences and the body of existing knowledge indicate that an integrated policy approach to green finance is progressively gaining traction. Although public awareness and financing options have improved in India, the main obstacles may be high borrowing costs, fraudulent claims of environmental compliance, multiple definitions for green loans, and maturity mismatches between long-term green investments and investors' comparatively short-term interests. We go into more detail about a couple of these issues and talk about some potential legislative solutions in this section.

Costs associated with borrowing

In general, the price of issuing green bonds in India has continued to be greater than that of conventional bonds. The average coupon rate for green bonds issued since 2015 with maturities ranging from five to ten years has, as shown in panel an of chart 4, generally stayed higher than that of corporate and government bonds with comparable duration. Chart 4's Panel B depicts a comparable pattern for the green bonds denominated in Indian rupees. Nonetheless, the coupon rate was lower than that of corporate bonds for green bonds priced in US dollars and having a duration of at least 10 years.

It should be noted that the majority of green bonds issued in India are issued by corporations with stronger financial standing or public sector entities ¹⁷. The fact that private sector green bond issuers on average reported a lower debt-to-assets ratio than non-green bond issuers¹⁸ makes this clear (Table 6). Their stock values also reflect their improved financial standing. Chart 5

demonstrates that over the past few years, there has been a constant increase in the ratio between the stock price indices of ESG leaders and the headline stock price indices.

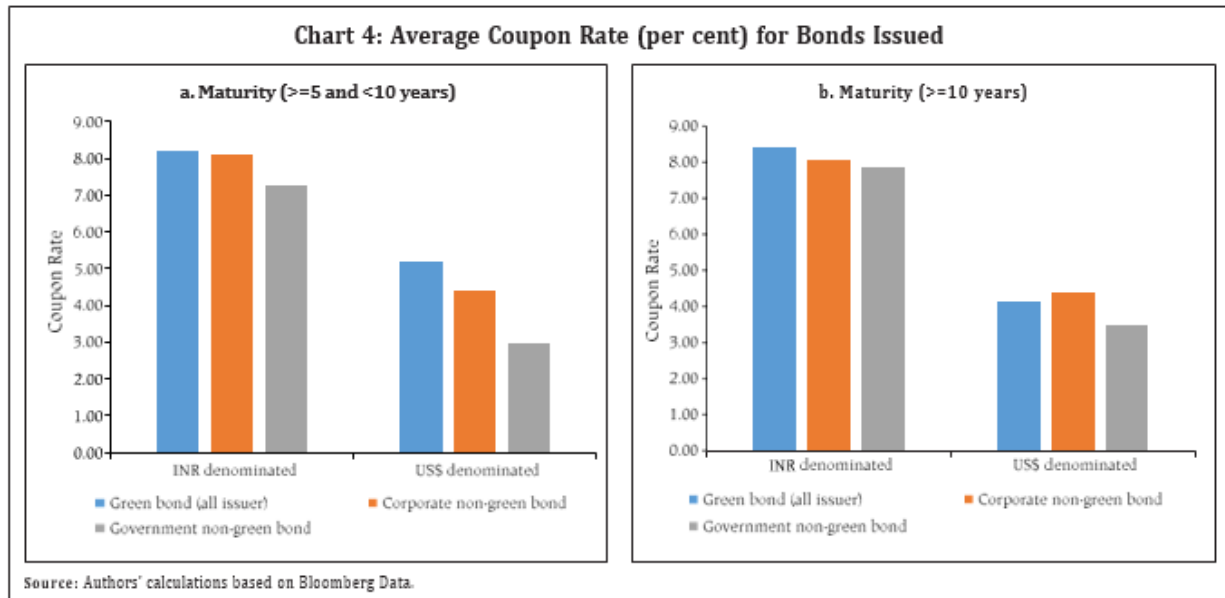


Table 6: Debt as Percentage of Total Assets for Corporates: By Category based on Green Bond Issuances

(Average between January 1, 2015 and February 12, 2020)

Sector	Issuer	Non-issuer
All	63.8	72.9
Power	67.6	77.7
Renewable/non-conventional energy	69.4	96.6

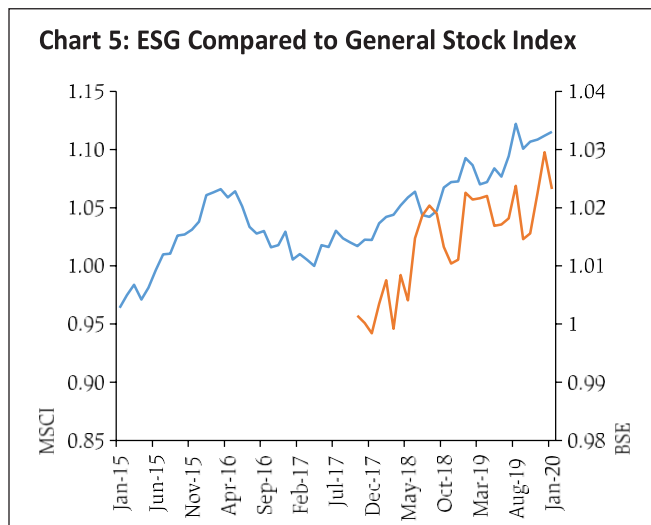
Source: Authors' calculations based on Bloomberg Data.

This suggests that companies that prioritized ESG-related projects in general outperformed other companies in the market¹⁹ in terms of their stock values.

The higher borrowing costs of green bonds in India, notwithstanding their relative security, may be caused by greater risk perception, asymmetric information (addressed later in this section), and other governance difficulties. According to existing research, green projects frequently involve

significant upfront costs and some cost-saving elements that are only useful over an extended period of time. The cost of borrowing is increased by maturity mismatches in green projects and their financing (G20 GFSG, 2016)20.

A common definition of green finance is lacking, and information asymmetry frequently leads to "green-washing," in which investors are misled about green bonds (Berensmann and Lindenberg, 2016). Given that the Indian financial sector is still developing in comparison to more mature countries, many of these problems are probably also prevalent there.



Cost of borrowing and asymmetry of information

Perhaps the biggest obstacle has been the high cost of borrowing, and our analysis suggests that this could be because of the asymmetric knowledge. Thus, improving India's information management system could lower borrowing costs, maturity mismatches, and result in more effective resource allocation in this market. It should be noted that a number of nations, including Australia, China, India, and the United States, maintain databases pertaining to green building projects within their borders in order to close this information gap (Shen et al 2020).

Like many other nations, India lacks a national measurement, reporting, and verification platform for tracking climate finance, despite the fact that it does monitor greenhouse gas emissions through a variety of reporting mechanisms, such as PAT (perform-achieve trade) and RPO (renewable purchase obligations) (Jain, 2020).

Development of Market Infrastructure

There are still a ton of untapped prospects because of the size of the domestic market and the relatively low penetration of green instruments thus far. Several studies have highlighted the significance of (a) enhancing coordination between environmental and investment policies and (b) developing a workable policy framework that can be implemented at the state and federal levels to resolve current conflicts. Accordingly, a number of policy initiatives, including

expanding the market for corporate bonds, standardizing language related to green investments, ensuring consistent corporate reporting, and eliminating information asymmetry between investors and recipients, can significantly help address some of the issues with the green finance industry (RBI, 2019).

Additional governmental policies

An alternative strategy would be to collaborate with trade associations that have launched campaigns to promote "green buildings," which are constructed to use less energy and water, manage waste more effectively, and create healthier living environments. These organizations may be able to better assess the financial and operational demands of the government at all levels by working with them. It may also implement measures that increase the profitability of non-conventional energy generation and distribution, particularly for smaller businesses. In India, there are several carefully considered laws that offer financial incentives for environmentally friendly projects, all while considering the effects these initiatives will have on the supply chain, inflationary pressure, and fiscal consolidation.

V. Final Thoughts

Public policy is beginning to prioritize green financing. Our examination of India's green finance advancements in this report shows that the country's funding alternatives and public awareness have improved somewhat in recent years. Previous research indicates that achieving sustainable long-term economic growth may be facilitated by improving information management systems and increasing stakeholder collaboration to reduce the asymmetric information around green projects.

The globe is currently battling COVID-19 and its effects on the expansion of the world economy. Undoubtedly, reviving the world economy is the most pressing policy task at hand. All stakeholders, however, now have a chance to reconsider the operational, financial, and policy approaches they have previously taken and to support a longer-term, more environmentally sustainable course of action as a result of the epidemic. Undoubtedly, one significant tool that may support this transition to sustainable economic growth is green finance.

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