

RISK PERCEPTION AND INVESTMENT BEHAVIOUR IN GREEN FINANCE: A STUDY OF PRIVATE SECTOR RENEWABLE ENERGY INVESTORS IN INDIA

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Abstract

The concept of green finance has developed in recent years as an integral part of sustainable economic development owing to the fact that it entails the allocation of financial resources into activities that provide environmental gain as well as economic growth. The rising relevance of renewable energy and environmentally responsible financial management and investments has made investors' awareness and perception of green-finance instruments a subject of research interest. The current study aims at analysing the risk perception and investing behaviour of Indian investors with respect to green finance, especially green-finance instruments that relate to renewable energy. The research will be based on primary data obtained by administering a questionnaire survey to 80 respondents over the age of 25. A five-point Likert scale and purposive sampling will be used in conducting the study. Awareness, investment behaviour, environmental factors and perceptions of financial-economic gains from green finance instruments like green loans, green bonds, green equity, renewable energy and sustainable mutual funds will be analysed in the study. Cronbach's Alpha will be used for reliability, whereas ANOVA will be employed in carrying out the statistical analysis.

Keywords Green Finance, Risk Perception, Investment Behaviour, Green Bonds, Renewable Energy, Sustainable Investment, Green Equity, Investor Awareness.

INTRODUCTION

The increasing environmental challenges in the current century have added to the significance of sustainable development and environmentally friendly economic practices. Increasing levels of greenhouse gas emissions, air pollution, and issues of global warming have necessitated a shift towards renewable and environmentally safer sources of energy. In this changing context, the significance of green finance has been augmented since finances are required to be invested in renewable energy projects and other environmentally sound ventures. Green finance is regarded as an important link between finance, economic development, and environmental sustainability in the current study. Its significance is especially apparent in sectors like solar energy, wind energy, bioenergy, hydropower plants, and energy conservation technologies. Therefore, the realm of financial decisions can no longer be limited to traditional aspects of profit alone.

Green finance consists of various types of investments and financing options targeted at environmentally friendly sectors, projects and firms. Such investments can assist in protecting the environment while also ensuring economic activity via financing of renewable energy sources, energy efficiency measures and environmentally friendly activities. The study reviews different ways through which financial resources could be channelled for environmentally friendly purposes such as green loans, green bonds, sustainability bonds and green equity. The above-mentioned instruments can ensure alternative sources of financing environmental initiatives while also giving investors and financial institutions means of taking into account the environmental aspect of the decision-making process. Thus, the development of green finance goes beyond just investing larger amounts of money in environmentally friendly projects and initiatives.

Renewable energy becomes even more crucial in relation to the green finance concept since India has outlined certain goals of increasing renewable energy capacity. The paper makes mention of the goal to achieve 500 GW of renewable energy capacity by 2030 according to the Panchamrit climate goals, pointing out the annual financing needs for growing solar, wind and hydro power plants. Simultaneously, certain structural factors may affect the decision to invest, such as insufficient monitoring of Renewable Purchase Obligations, development of the debt market, lack of foreign investments and divergent regulatory regimes. Also, the role of institutions such as IREDA

and viability gap funding is mentioned in respect of renewable energy development. All this is indicative of the fact that investment behaviour is affected not just by environmental goals but also by financial risk perceptions, regulatory regimes, profitability expectations and financing options.

The perception of risk therefore becomes an important factor in green-finance investment behaviour. Investors would evaluate the financial products with environmental orientation based on their perception of financial returns, reliability of projects, market conditions, and environment performance. The development of renewable energy sources needs huge investment, and the financial results would be contingent upon technical, policy, market, and project-related issues. The current study mentions the high amount of capital investment required in the case of renewable energy sources and states that renewable projects would need substantially higher capital than coal-based projects. There are also limited contributions by some public sector banks in renewable energy projects. These considerations could have an impact on how investors perceive green investments and can also affect the decision of the investor to go for green financial products rather than conventional ones.

This paper will deal with the knowledge of green finance instruments and the investing behaviour of investors related to green finance instruments in India. It aims to find out if the respondents know about green finance, if they have perception about different kinds of green investments and if environmental issues affect their financial decisions. The research will be based on primary data which will be collected from 80 respondents using a structured questionnaire with five-point Likert scale. The respondents are chosen among people with various professions and education, so it is possible to analyse the perceptions of various respondents. Also, the research will analyze the connection between green finance, environmental results, economic development and the readiness of individuals to choose greener financial or energy instruments.

LITERATURE REVIEW

The body of literature concerning green finance has grown considerably because there is a clear link between environmental sustainability and financial decision-making. The source study mentions a large number of publications in regard to green finance over time and considers this topic as a growing body of knowledge. This growing body of literature is a result of increasing academic interest in finance and environmental sustainability. Previous studies have investigated issues such as green finance programs, environmentally sound projects, financing for renewable energy, green banking, green buildings, and green financial products. Thus, the literature proves that the topic of green finance is an interdisciplinary one with the participation of such fields as economics, finance, environment and public policy.

The literature reveals that Chowdhury's contribution in the review stressed the need for developing green finance programs and the significance of providing environmentally focused financing in various aspects of economic activities. Renewable energy, green banking, green marketing, green buildings, agriculture, and waste management have been mentioned as some examples in the literature where green finance could make a contribution to sustainable development. According to this view, green finance should not be limited to a single financial tool or environmental projects but could cover a broader financial system, which involves banks, investments, companies, and government organisations. Furthermore, it is essential to create awareness about green projects and identify them so that they can be eligible for green finance. In relation to the behaviour of the investors, this issue becomes very important since people may lack knowledge about green products and thus be unable or not willing to invest in them.

The analysis of green bonds has made additional contributions to the understanding of the interconnection between environmental goals and financial instruments. Literature examined in the source paper provides information on green bonds being a type of instruments that help channel capital to environmentally sound projects and at the same time provide investors with a financial instrument with which they can engage in sustainable investing. According to literature found in the source paper, the role of banks in issuing green finance instruments has been important in India, while the financial markets and stock exchanges have been gradually taking into account issues of green finance in their activities. Such literature is useful in the study of investment behaviour, as an investor should analyse both the environmental goal and the financial nature of the instrument. The presence of green finance instruments does not guarantee wide investment, as investors might be unaware of such instruments and be uncertain about the risks and profitability of them.

The recent literature reviewed in the study shows the opportunities and problems related to green finance. Literature shows the great potential of green finance in mitigating the climate change problem. Besides, it is suggested that the problem of insufficient awareness of potential investors exists in the area. Another research is dedicated to green bonds in India and identifies the steps undertaken by the government to increase their popularity. Research of green transitions has shown that a large amount of financial investments is necessary from both public and private sides. All these findings clearly show that the development of green finance is possible only through the interplay of financial availability, policy support, investor awareness and the environment.

Therefore, the literature supports not only the investigation of the supply side of green finance but also its demand side, especially the perceptions and behaviour of people who can invest traditionally and environmentally. The reviewed literature also highlights the research frontiers on ESG, corporate social responsibility, and green finance. In recent years, ESG and CSR have gained increasing relevance as performance criteria for companies aiming to strike a balance between their financial goals and social and environmental obligations. From the perspective of the literature review, the government could enhance green finance policies to help with this process. At the same time, it should be noted that the source study points out that green finance is a fairly new area and the terms used there are not standardised around the world. This is an important research gap since the perception of green finance may affect the perceptions of investors. The present study fills this gap through investigating the awareness and investments of the participants together with their perceptions of green loans, green bonds, green equity, renewable energy, and sustainable mutual funds.

RESEARCH OBJECTIVES

The central aim of the research study is to analyse the degree of awareness amongst investors concerning the different instruments of green finance and to investigate the investment behaviour of these investors with respect to green financial instruments. This is because investment entails knowledge about the different features and nature of financial products before choosing them. Hence, the study will take into account the awareness of investors regarding green loans, green bonds, green equity, renewable energy and sustainable mutual funds. The second purpose of the research study is to find out if there is any willingness of investors to make use of environmentally conscious alternative financial products in their investment choices. It is noteworthy that at times there may be a mismatch between awareness and behaviour, as an individual may be aware of green finance but will still prefer traditional investments due to various reasons.

Another objective of this research is the assessment of whether investment in green finance and renewable energy sources could help promote economic growth in India and at the same time create environmental advantages. This objective is related to the link between renewable-energy investments and the decrease in the environmental burden, especially the reduction in greenhouse gas emissions. This study tries to find out whether green energy financing can lead to environmental gains along with economic development. Also, the motivation for green energy financing will be assessed, as well as whether there could be any relation between sustainability and financial performance. This objective is important since investors may regard environmental benefits as relevant, although financial factors are also significant.

Another objective is to evaluate the extent of public awareness and willingness to opt for more sustainable energy or finance in comparison to conventional alternatives, as well as the demand for green finance by renewable energy companies. Such an objective acknowledges the fact that the growth of green finance will require active involvement of many parties, including investors, financial institutions, corporations and consumers. Individuals' willingness to use green alternatives can drive the demand for sustainable finance products, while renewable energy companies will need appropriate sources of finance for expanding their operations. The research will try to bridge the gap between the individual-level investment behaviour and broader finance needs of the renewable energy sector.

RESEARCH METHODOLOGY

An exploratory research methodology will be applied in this research study to investigate risk perception, awareness and investment behaviour related to the use of green finance mechanisms. Primary information will be used in the process of carrying out this research. Information will be obtained using the help of a structured questionnaire. Respondents will be personally interviewed using the structured questionnaire to obtain information relating to risk perception of different green-finance mechanisms and their interest in environmentally-oriented investments. A five-point Likert Scale was used to collect information and hence perceptions and attitudes were captured using response scales. Statistical analysis will also be carried out in the process of analysing collected information. ANOVA is the main statistical tool that will be used to analyse the responses whereas Cronbach's Alpha was used to determine the reliability of the measurement scale.

The sample size is 80, and the participants include both males and females who are above 25 years of age. The reasons for using the above age group are explained in the study where people above 25 are considered to be better at making their own investment decisions. The respondents came from various occupational and educational backgrounds, which included students pursuing further education, salaried individuals, entrepreneurs, and those involved in work-from-home operations. There is variation in terms of education and annual income in the sample. The sampling technique used in selecting the respondents was purposive sampling. The survey comprised questions regarding the awareness and investment activities of the respondents regarding green loans, green bonds, green equity, renewable energy, and sustainable mutual funds.

The data analysis will be conducted through demographic and statistical analysis of the answers on the aspects of sustainability, financial feasibility, financial and environmental factors, customers, expansion of business, and job creation. In this research, the analysis of variance (ANOVA) will be used to identify any possible differences or relationships in order to address the aims of this research; the criterion for acceptance or rejection of the null hypothesis will be set at the 5% level of significance. The research will also explore the environmental impact of investments in renewable energy by estimating carbon emissions from renewable energy systems compared to the same scenario but without renewable energy sources. The normality test will be performed on carbon emissions with the help of Kolmogorov-Smirnov procedure with regard to statistical testing concerning the first aim of the research.

DATA ANALYSIS AND INTERPRETATION

The demographic composition of the 80 respondents is significant in terms of understanding the investment perceptions in the study. The respondents were put in three categories in terms of age: 25-40 years, 40-55 years and above 55 years. Respondents in the 25-40 age group were 25, forming 31.25% of the sample while those between 40-55 years were 30, forming 37.5%. On the other hand, those above 55 years were 25 respondents forming 31.25%. In other words, the sample comprised of respondents who are from different ages as adults, rather than focusing on one age group. In terms of occupation, the respondents included students, salaried workers, entrepreneurs and those who engage in work from home. Entrepreneurs comprised 28 respondents, forming 35%, salaried workers comprised 25 respondents, forming 31.25%, while those working from home comprised 15 respondents forming 18.75%.

The profile of the respondents on education reveals that the sample included people having different educational backgrounds. There were ten respondents having qualifications less than a bachelor's degree, forming 12.5% of the sample. 14 respondents, forming 17.5% of the sample, had a bachelor's degree. The maximum number of respondents had master's degrees, in the form of thirty respondents, forming 37.5% of the sample. In addition, there were twenty-six respondents possessing professional degrees, which made up 32.5% of the total sample size. This profile of the respondents is important since education may be a contributing factor to the understanding of financial matters, environmental concerns and new investment instruments. Nevertheless, it cannot be concluded from the study that educational qualification is a direct determinant of awareness or investment behaviour in green finance; the demographic profile of the respondents should therefore be understood as such without making any conclusion about causality. Income distribution also suggests differences among the respondents, wherein thirty respondents, i.e., 37.5%, were earning less than Rs. 5,00,000 annually, while twenty-seven respondents, i.e., 33.75%, were in the Rs. 5,00,000–Rs. 10,00,000 bracket.

The research examined perceptions of the respondents along different dimensions such as sustainability, viability of the product from a financial point of view, financial & environmental considerations, customer-oriented dimensions, business impact and job creation. The questionnaire included green loans, green bonds, green equity, renewable energy and sustainable mutual funds among the green finance instruments. The responses were gathered on a five-point Likert scale, enabling the research to reveal the difference between the perceptions and attitudes of the respondents concerning the green finance instruments. The source material suggests that the methods of the statistical analysis included demographic analysis and ANOVA, while the reliability of the results was measured by means of Cronbach's Alpha coefficient. The level of significance for hypothesis testing was set at 5%. This approach allows creating a systematic framework for the verification of the statistical significance of any differences revealed. But the current document does not provide the full numerical ANOVA table, frequencies of each Likert scale, mean score and Cronbach's Alpha coefficient for each tested variable, as well as significance values for each tested variable.

The environmental factor in the analysis focused on the interaction between financing of renewable energy production and the level of greenhouse gas emissions. As described in the study, the carbon emissions linked to renewable energy systems were determined from the yearly energy-production statistics for the study period, whereas the carbon emissions in the absence of renewable-energy resources were estimated for comparison. The difference between the two was taken as the indicator of the environmental impact related to renewable energy financing. The study states that the installation of renewable energy resources is the intermediary stage of financing that helps in generating renewable energy and hence affects greenhouse gas emissions. A hypothesis was proposed according to the above objective, and the Kolmogorov-Smirnov test was performed to investigate the normality assumption in connection with the emissions data before the statistical analysis. The existing source provides evidence of the negative relationship between renewable energy financing and emissions, but it does not include the detailed calculations necessary for measuring the effect size.

FINDINGS AND DISCUSSION

The first major finding from the study is the non-uniformity of awareness about green finance among respondents. The source article clearly states that some of the respondents were aware of green finance, while others did not have any clue as to what it means. This is an important finding since awareness is an initial condition necessary for engagement in green finance. Without having knowledge about the meaning and features of green financial instruments, investors will find it hard to assess their investment decisions regarding the use of green loans, green bonds, green equity or sustainable mutual funds. Indeed, the literature review part of the study notes that lack of awareness is one of the main challenges associated with green finance development. This means that the promotion of green finance can hardly be accomplished solely through the development of new financial products. It is also crucial to work on communication and awareness regarding green investment characteristics. Increased awareness will help investors recognize conventional financial products from environmentally oriented ones.

The second finding relates to the link between renewable energy finance and environmental impact. The study considered carbon emissions in relation to the circumstances, including the use of renewable energy sources and compared it with the same circumstance but without any renewable energy source. The difference in the two scenarios has been regarded as an indicator of the environmental benefit resulting from renewable energy finance. Thus, the study links the financial resources to the environmental effect by using the investment in the renewable energy system as an intermediate channel for the reduction of emissions. This finding is in line with the fundamental idea behind green finance that tries to allocate financial resources into economically viable activities that provide environmental benefits. However, despite having some findings, the study lacks complete data on emissions and the numerical statistics required to quantify the effect size of the relationship. Consequently, this finding must be viewed as a part of the current study in the context of proving the environmental significance of renewable energy finance.

The third observation concerns the diversity of factors influencing investment perceptions of respondents. The research has not limited green finance to one financial instrument only but considers various financial instruments such as green loan, green bonds, green equity, renewable energy and sustainable mutual fund. This kind of diversification is important since investors may have different perceptions regarding green finance instruments according to their financial features and environmental goals. The study has incorporated dimensions like sustainability, financial viability, financial and environmental aspects, customers, business and jobs growth. As a result, green investment behavior is viewed as a multidimensional concept rather than decision-making driven by environmental preferences only. From the framework of the study, one can observe that investors have the possibility to take into account environmental results along with financial and economic impacts in evaluation of green finance opportunities. The review of literature suggests that green finance involves a variety of products and applications. Thus, the observations confirm that green-finance market development should be focused on environmental goals as well as financial features of each instrument.

The fourth finding involves the role of financial awareness, institutions and interventions for the development of green finance. From the perspective of the discussion of the study, one should understand that green finance is still quite a new area of activity which does not have standardised definitions and terminology in the context of different countries and institutional setups. This is a very important issue, especially from the perspective of the needs of investors. It appears to be the case that uncertainty about the definition of the concept and classification of the green financial products may influence the capacity of investors to make a decision about the options. The study discusses the importance of clarification, financial awareness and appropriate institutions. At the same time, the study reveals the technological diversity of green finance that requires not only awareness of finance but also awareness of renewable energy systems, energy storage, and technical units and standards. This is another barrier to information for normal investors.

CONCLUSION

The findings indicate that the importance of green finance is growing in sustainable economic development in India in terms of its association with finance sources, renewable energy, environmental protection, and environmentally-oriented economic development. First, based on the primary research that involves 80 respondents, it becomes clear that people have different levels of awareness of green finance. Some people know what green finance is and can realise the importance of such financial instruments, while others do not know what green finance means at all. This difference in the awareness level of the population plays a vital role in developing markets for green finance because any investment requires certain information about the nature and features of financial products available. As a result, the development of green finance should involve not only an increase in the number of financial instruments available but also an increase in awareness among potential investors.

Additionally, it becomes clear that there is an environmental aspect of renewable-energy investment, which makes green finance different from ordinary financial operations. In particular, the study examines the emissions generated by renewable-energy plants compared to emissions in a similar case but without renewable-energy sources. This way, the authors interpret the difference obtained as an example of environmental benefits related

to renewable-energy investment. Here, it is possible to see how the relationship between financial decision-making and environmental outcomes is established through investments into renewable-energy infrastructure. Nevertheless, it appears that the available literature does not offer any specific figures to estimate the actual level of reduction in emissions. Thus, the conclusion should be limited to the existing relationship between renewable-energy financing and environment goals.

Another conclusion derived from the study is that the behaviour of investors with regard to green financing needs to be understood in terms of several financial and environmental aspects. The study analyses sustainability, financial viability, financial and environmental concerns, customers' issues, the business aspect and job creation. This suggests that investors do not necessarily view green financing purely from an environmental perspective. Financial viability and wider economic issues continue to play a role in analyzing investment opportunities. Different types of green investments such as green bonds, green loans, green equity and sustainable mutual funds have different financial structures and risk profiles and investors could analyze them in different ways. Therefore, the need to understand these differences becomes critical in the case of this study. In turn, the development of green finance necessitates financial products that should be clear regarding their environmental objective and financial aspects.

Green finance is described by the research as a developing area, in which definitions and terminologies might vary from one country to another and even in institutional settings. The variety of such definitions and terminologies might confuse investors, financial institutions, and companies as far as determining what green finance activity and instrument is. Besides, as renewables and other environment-oriented projects are technical projects in their essence, participating in them requires knowledge exceeding traditional financial understanding. As a result, the research highlights the need for a clear definition and better disclosures, education of investors and availability of information about green finance instruments. This will lower informational barriers for people willing to participate in green finance and understand financial and environmental aspects of various investment alternatives.

On the whole, it is concluded that the process of green finance creation in India needs cooperation among investors, financial institutions, renewable energy firms, government bodies and other parties involved in the issue. It is shown by the results of an investigation conducted among 80 respondents that investor awareness and their perceptions concerning investments are important factors whereas the environmental part of investigation proves the importance of financing renewable energy systems. Therefore, the study indicates the necessity of paying special attention to the issues of investor awareness, financial education, transparency of green finance instruments and support of sustainable investment. The practice of green finance can lead to environmentally sound economic development in case of proper allocation of financial assets on renewable energy and other sustainable initiatives. However, it should be noted that further researches may broaden the range of participants as well as investigate separate financial instruments as they can add evidence concerning the relationship of risk perceptions, financial expectations, environmental awareness and real investment behavior.

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