ORIGINAL RESEARCH PAPER

Commerce

KEY WORDS: Green finance, Sustainability disclosure, Sustainable investing, Green bond

GREEN FINANCE, SUSTAINABILITY DISCLOSURE AND ECONOMIC IMPLICATIONS

Smt J. P. Walvekar

Assistant Professor, Commerce Government First Grade College Ramdurga, Belagavi, Karnataka

ABSTRACT

Systematic literature review of articles in the emerging areas of green finance and discuss the status and challenges in sustainability disclosure, which is crucial for the efficiency of green financial instruments. The authors then review the literature on the economic implications of green finance and outline future research directions. Environmentally sustainable projects, and the rise of green finance intensifies the demand for environmental disclosure. Literature has documented tremendous growth in sustainability reporting over time and around the globe, as well as raised concerns about how such reporting lack consistency, comparability, and assurance. Despite these challenges, the authors find that in general, the literature agrees that a firm's green practice is positively associated with its financial performance and negatively related to a firm's cost of capital. Green finance is also found to bring about enhanced risk management and economic development. One of the first reviews of green finance, sustainability disclosure and the impact of green finance on financial performance, capital market and economic development.

INTRODUCTION

As the world economy recovers from the impacts of COVID-19, the "green recovery" approach was proposed, making it a critical time to review existing research on green finance. In this paper, we follow G20's definition and consider green finance as the financial instruments (such as green bonds), arrangements, mechanisms, and environmentally friendly operational practices, and the disclosure of these arrangements toward reducing carbon emissions and developing climate resilient and environmentally sustainable infrastructure.While some scholars believe that the green path leads to a more sustainable, resilient and urgent recovery as financial services are well-positioned to contribute to the transformation needed for sustainable recovery (e.g. Crona, Folke, & Galaz, 2021; Navickas, Kontautien_e,Stravinskien_e,& Bilan, 2021), others view the green approach as confusing or counterproductive. Therefore, a comprehensive review of the literature is critical for a balanced view and understanding of green finance and its real economic impact. An indispensable aspect of green finance is the corporate disclosure of environmental performance to the capital market and other stakeholders of companies.Therefore, we next review the literature in the area of sustainability disclosure to summarize its trend, enabler and value. In line with the rise of green financial instruments directing resources to more environmentally sustainable businesses/projects, the literature has found that the corporate reporting of sustainability grows tremendously over the past decades and around the globe.

Current literature assures the value of green finance and sustainability disclosure; however, some controversies are identified. Due to the lack of one generally accepted set of standards that guide the reporting of sustainability and the lagged development of third-party assurance, the main challenges for sustainability reporting are its reliability, consistency and comparability. These issues further confound the effectiveness of green financial instruments and raise concerns about the potential opportunistic use of the proceeds (i.e. green washing). Mindful of the challenges, we then review the literature to examine the economic consequences of green finance and green practice.

In general, the literature agrees that green finance leads to green results such as emission reduction and energy saving. Overall, a firm's green practice is positively associated with its financial performance measured by stock market valuation and accounting-based measurements and negatively related to a firm's cost of capital. Our review suggests that there are primarily three channels. First, the green practice lowers a company's real and perceived risk of environmental violation and the associated potential financial and reputational costs. Second, green practice is consistent with the general sentiment of environmental concerns and is favoured by capital market participants as they see the green practice as consistent with their personal beliefs or as a way for them to make an impact through investment. Third, green firms may see improved cash flow as green practices are supported by national and regional governments in the form of government procurement, subsidy and tax credit. As a result, the literature has also documented that green financial instruments contribute to firms' access to capital and innovation related to environmental efforts. In addition, we also find a positive association between green finance and poverty alleviation and economic development.

Our literature review on green finance and sustainability disclosure can find theoretical underpinnings in stakeholder theory, agency theory and others. The stakeholders' theory (Freeman, 1984; Hill&Jones, 1992) emphasizes that economic and financial performance should not be the only goal of firms and that company actions do have an impact on various groups of stakeholders, the environment and society at large. Agency theory (Jensen & Meckling, 1976) addresses the agency problem that stems from the separation of ownership and management and provides theoretical support for monitoring management actions through various mechanisms including transparent information environment. Information economics theories, which can be applied to sustainability reporting, suggest that voluntary disclosure (in addition to mandatory reports) helps reduce information asymmetry and enhance information environment. Accountability to stakeholders, the pursuit of positive socio-environmental impacts and demand for information (to alleviate the agency problem and information asymmetry) together contribute to underpinning the importance of green finance, green practice, and enhanced transparency in sustainability initiatives and outcomes.

Our review offers three key contributions. First, we summarize extant research in green finance and sustainability disclosure to enhance the understanding of the emerging lines of research. The multidisciplinary review aims to lay a foundation for the future query of knowledge. Second, we provide one of the first comprehensive reviews of green finance, sustainability disclosure and the economic implications, offering a big-picture framework to study the impact of green finance on economic development and recovery. Finally, we outline future research agendas for scholars in accounting and finance areas. The integration of multidisciplinary knowledge can serve as a platform for future interdependent research that investigates new

phenomena, leveraging theories from across disciplines and with new datasets and methodologies.

Methodology And Research Design

As the first step of the review process, we identified the research topic as green finance and sustainability disclosure and their economic impact. Then we searched all relevant studies, starting from peer-reviewed journal articles, books and book chapters from EBSCO, Pro Quest, Web of Science and Google Scholar. Primary keywords included green finance, sustainable finance, climate finance, carbon finance, green bond, sustainable investing, sustainability disclosure and carbon accounting. In the preliminary search, we choose not to limit ourselves to specific journals or years such thatwe could explore the field's entire development rather than a narrower presentation of findings from a particular academic domain or journal type. We included published or in-press articles (including in conference proceedings) as well as a publicly available working paper (e.g. SSRN (social science research network)).

In the second step "Appraisal", we screened the abstracts of the selected articles and compiled a pool of articles that were reviewed, validated and if applicable used for this work. In this stage, we also conducted a reverse search technique in which additional papers were sourced from the citations in the selected articles. Through this process, we identified 199 published articles and working papers in the finance area and 77 articles in the accounting area. We then narrow down the total number of studies to 151 to be used in this study. We then conducted step 3 "Synthesis" and step 4 "Analysis" by categorizing, summarizing and examining existing research on the tools, motivations, enablers, and impacts of green finance and sustainability disclosure. We also identified connections, contractions, and gaps in existing research, discussed controversial issues, and suggested future research directions.

Background: Green Finance Instruments, Motivations And Challenges

In this section, we provide some background for green financial instruments and their motivations. We also identify the demand for and gap in the disclosure of green practices.

Green Financial Instruments

Extant literature (e.g. Bai, Chu, Shen, & Wan, 2021; Falcone & Sica, 2019; Heinkel, Kraus, & Zechner, 2001; Maltais & Nykvist, 2020; Miroshnichenko & Mostovaya, 2019) has examined and defined various green financial instruments. Synthesizing these definitions, we define green financial instruments as private loans, public bonds (corporate, municipal and sovereign), private equity, public equity, investment funds and other financial instruments that fund environmental and climate-friendly projects such as renewable energy, recycling and green infrastructure that supports the net-zero carbon economy and mitigates climate change.

Surveying the trends and developments of green financial instruments, the most common and influential financial instruments are green bank loans and green bonds (Gilchrist, Yu, & Zhong, 2021). Specifically, Buchner et al. (2021) find that in 2021, the majority of the green finance (61%) was raised as green debt (loans and bonds), 33% was equity investment and 6% was government and institutional grants. Other common green financial instruments include green derivatives (Little, Hobday, Parslow, Davies, &Grafton, 2015), green insurance (Mills, 2012), carbon tax and carbon investing and pricing instruments (Hafner, Jones, Anger-Kraavi, & Pohl, 2020).

Motivations Of Green Finance Practice

With the increased global and regional environmental policies, there is a significant increasein green finance practices, and the adoption of green financial instruments as investors become more sensitive to climate-related matters. Specifically, the p ressure on governments,financial institutions and firms to implement environmental protection and climate change has risen after the signing of the Paris Climate Agreement in 2015 (Tolliver, Keeley, & Managi, 2020). Global and regional bodies such as United Nations, World Bank, International Monetary Fund (IMF), European Union and G20 are increasingly mounting pressure on their members and trading partners to implement green finance policies in their finance systems (Bhandary, Gallagher, & Zhang, 2021).

Due to these pressures, governments, financial institutions and firms are accepting environmentally focused reforms in the world. Therefore, we synthesize the literature and argue that there are two primary motivations for firms' adoption of green practices: (1) violating environmental policies imposes a negative consequence on firms in the form of direct financial penalty and (2) firms lose social capital and reputation with an increase in the actual or perceived investment risk.

As a result of the negative market reaction to environmental misconduct and violations, firms move toward green practices to capture the high social capital and mobilize community and government support, easing tension between firms and regulators and reducing compliance costs. And they use green instruments to finance their green practices.

Demand For Disclosure

Regardless of the form of green finance, what is embedded in these green instruments is a commitment made by the issuer/borrower that the funds raised will be used toward "green projects". The efficiency of these instruments, therefore, depends on the confidence of market participants in how the proceeds are used for their intended purpose and the actual sustainability performance of the projects funded. Taking green bonds as an example, the key difference between a green bond and a traditional bond is that the issuer of the bond would self-designate the bond as green. Such a label conveys commitment that the funds raised from the bond would be used exclusively to support low-carbon and climate-resilient investment projects.

Naturally, market participants of green finance demand standards and criteria to define what projects qualify the "green" label and standards/frameworks to regulate issuers' disclosure of the usage of bond proceeds and the environmental, social and governance (ESG) performance of the projects invested. For example, the Royal Bank of Canada (RBC) is advocating for clear standards, taxonomy and parameters for sustainable finance (Institute for Sustainable Finance, 2019). As part of its plan to reach $100bn in sustainable financing by 2025, the RBC issued its first V500m ($752m) green bonds in 2019 that target to fund renewable-energy projects and sustainable buildings.

Existing research provides insights into the unique nature of green instruments and how transparency regarding project selection and performance monitoring is the key to the credibility of the green finance market. Park (2019) discussed the earmarking process for green bonds and reviewed public regulation as well as private governance of the green bond market in relation to establishing standards and guidelines to define green bonds and monitor the issuers' use of proceeds. Sartzetakis (2021) reviewed the Green Bond Principles (GBP), which is the first and most recognized set of voluntary guidelines for green bonds issued by the International Capital Market Association (ICMA), and other similar guidelines developed by different countries and/or issuing authorities. Not surprisingly, all these guidelines provide frameworks that cover the definition of "green" projects, transparency regarding project selection and fund allocation, as well as subsequent reporting to the public regarding the use of the proceeds and the environmental performance of

the projects funded. While disclosure about project selection and fund allocation occurs at the early stage and is most likely one-time, subsequent reporting of the environmental outcome of the use of proceeds is ongoing and the quality of which is crucial to ensure the integrity of the financial instrument. We would therefore in the next section provide a review of research on corporate sustainability reporting. Understanding the current status of sustainability reporting helps one evaluate the benefits and limitations of green finance. Insights into the value of sustainability reporting and mechanisms to enhance such disclosure help one identify directions for further development and regulation of the green financial market.

Sustainability Reporting: Trend And Determinants

An indispensable aspect of green finance is the disclosure of environmental impacts of business operations, green initiatives and performance and environmental risk management practices to the stakeholders of companies. As green finance directs investment toward environmentally sustainable businesses, demand rises for business entities to provide transparent information about their green initiatives and sustainability performance to the public in order to facilitate investment decisions and hold the business entities accountable. In this section of the paper, we review the literature in the area of sustainability reporting and summarize the current trend, factors that affect the reporting of sustainability and the impact of such reporting on firm performance.

The trend of sustainability reporting and assurance Sustainability reporting. Sustainability reporting started as voluntary disclosures. As this trend increases, some countries established regulations that require mandatory disclosure. Corporate disclosure of sustainability benefits the reporting entities and leads to "improved reputation, better risk management, and increased customer and employee loyalty" (Schooley & English, 2015). As green finance gains popularity, the capital market demands high-quality information reported by participating companies to guide the allocation of resources toward sustainable business projects and models.

The literature documents an increase in environmental disclosure over the past few decades around the globe and the environmentally sensitive industries tend to be the ones that see the most reports (Alali & Romero, 2012; Deegan, 2002; Deegan & Gordon, 1996). The growing demand and supply of sustainability reports call for a set of standards that govern the reporting practice. Multiple standards co-exist at the current stage. One example is the Global Reporting Initiative (GRI), which came into being in 1997 with the goal of developing global standards for sustainability reporting. Another example is the Sustainability Accounting Standards Board (SASB) in the US, established in 2011 to develop a framework to guide publicly listed companies in terms of sustainability accounting and reporting.

Quantifying the impact of environmental initiatives is an important task in sustainability reporting. Jeffers (2007, 2008) discusses what should be considered when developing a framework to measure green initiatives and notes the importance to identify and estimate relevant variables in translating environmental initiatives into quantifiable financial data. Gray (2006) offers critiques about sustainability reporting by demonstrating the tension that such reports, especially the high-quality ones, would simply show how incompatible prevailing economic goals are with environmental and social goals. Adams (2020) revisits Gray's (2006) study incorporating recent developments in sustainability reporting standard setting and suggests that the development of GRI standards has brought positive changes.

Carbon accounting. One aspect of quantifying the environmental impact of decision-making is measuring greenhouse gas (GHG) emissions. Carbon accounting as the name suggests specifically focuses on the recognition and measurement of GHG emissions. Through a systematic review of existing literature, Stechemesser and Guenther (2012) derive a definition of carbon accounting as follows: "carbon accounting comprises the recognition, the non-monetary and monetary evaluation and the monitoring of greenhouse gas emissions on all levels of the value chain and the recognition, evaluation, and monitoring of the effects of these emissions on the carbon cycle of ecosystems."

The assurance of sustainability reporting. Like financial reporting and disclosure, sustainability reporting provides information for decision-making. The efficiency of resource allocation hinges on the quality of information reported by business entities. As sustainability reporting and the use of information in sustainability reports grow, there is a call for independent assurance of such reporting by third parties. Junior, Best, and Cotter (2014) review the literature and analyze the Fortune Global 500 companies to provide comparative and trend analyses of sustainability reporting and assurance of these reports.

They find that while an increasing percentage of organizations issue sustainability reports over time, there is no such trend in the practice of having the sustainability reports assured. A recent study by Alsahali and Malague~no (2021) provides an updated overview of sustainability assurance practices based on a sample of 13,000 companies around the world. The period that they focus on is the recent decade to match the emergence of countries mandating sustainability reports. The study addresses the following aspects of sustainability assurance. First, they examine the trend of sustainability assurance and find that even though significant growth in assurance is observed from 2012 onward, it lagged behind the growth of the sustainability reports. Second, they examine three types of assurance providers, i.e. accounting, engineering and consulting firms, and find that while accounting firms have the largest market share, the most growth is seen in engineering firms. Considering the existence of multiple assurance standards, e.g. the International Standard for Assurance Engagements (ISAE 3000) and the AA1000 Account Ability Standard (AA1000AS), the study investigates the choices of standards and finds that different types of assurance providers have different preferences, which raises the concern of inconsistency in the assurance practice. Third, they examine the incidence of companies changing assurance providers from one type to another and find more switches toward engineering and consulting firms than toward accounting firms.

Determinants Of Sustainability Reporting

In this subsection, we discuss and summarize factors found to have an impact on the practice of sustainability reporting, including firm characteristics, monitoring of stakeholders and regulatory changes.

Firm-level determinants of sustainability reporting. Hahn and K€uhnen (2013) review existing literature from 1999 to 2011 on determinants of sustainability reporting and disentangle factors that have received consistent evidence regarding their impact on sustainability reporting from other factors around which evidence is inconsistent an ambiguous. Company size is the only internal factor found to have a positive influence on sustainability reporting, whereas evidence is mixed regarding the impact of financial performance and social and environmental performance. Among the external factors, the literature generates consistent results on how media exposure as a proxy for visibility is positively associated with sustainability reporting and that companies from industries with more significant environmental impacts tend to engage more in sustainability

reporting. At the time of this review, very limited research has examined the impact of regulation even though countries such as Denmark, Norway and Sweden already started to impose policies and legislation to require companies to make sustainability disclosure.

Regulation, governance, and sustainability reporting. The European Union (EU) Emission Trading Scheme introduced in 2005 represents a significant movement toward governing and incentivizing low-carbon initiatives. Based on a "cap and trade" principle, companies must keep their carbon emission under the cap and at the same time can buy or receive emission allowances to trade with one another. In terms of regulation of sustainability disclosure, the EU adopted Directive 2014/95/EU, also called the Non-Financial Reporting Directive (NFRD), which was then incorporated by member states into their legislation requiring large European companies to publish regular reports on the social and environmental impacts of their activities. Jackson, Bartosch,Avetisyan, Kinderman, and Knudsen (2020) investigate the effectiveness of mandatory nonfinancial disclosure requirements and found that firms in countries with such mandates adopt more socially responsible activities without reducing socially irresponsible activities.

The Value Of Sustainability Disclosure

Sustainability disclosure and firm performance. Early evidence on how sustainability translates into company value has been mixed (Romero, Lin, Jeffers, & DeGaetano, 2014). While research has found a positive association between sustainability initiatives and corporate value (e.g. Burnett, Skousen, & Wright, 2011; Clark & Allen, 2012), other studies find no significant stock market impact imposed by sustainability reports (Guidry & Patten,2010) or even negative association between corporate social performance and financial performance (Lee, Faff, & Langfield-Smith, 2009).

More recent research provides evidence on the positive side. Alshehhi, Nobanee, and Khare (2018) analyze the literature on the relationship between corporate sustainability practices and financial performance. Reviewing 132 research papers shows the majority of evidence of the positive relationship between the two. International evidence suggests largely consistent results. Lo and Sheu (2007) examine US companies and find a positive relationship between corporate sustainability and firm value as proxied by Tobin's q. Similar results are found among listed companies in Singapore (Loh, Thomas, & Wang, 2017). Kuzey and Uyar (2017) examine a sample of Turkish public companies and document a growth of sustainability reporting in the country and find evidence that sustainability is value relevant.Bachoo Tan and Wilson (2013) add Australian evidence to the literature and find that highquality sustainability reporting reduces the cost of capital and enhances the market's expectation of future firm performance.

Consistently, carbon accounting research suggests that GHG emission has a negative impact on firm valuation. Griffin, Lont, and Sun (2017) document a negative pricing impact of GHG emission and quantify such impact to be a $79 price discount per ton of GHG emission. Matsumura, Prakash, and Vera-Munoz (2014) examine the effect of carbon emissions on firm valuation and document a negative impact in the magnitude of a $212,000 decrease in firm value for every thousand incremental metric tons of carbon emissions. Further, they find that companies that voluntarily disclose carbon emissions receive a valuation benefit compared to the companies that do not disclose such information.

Most existing research excludes financial institutions from their sample due to the unique feature of the financial industry. Buallay (2019) however specifically study 342 financial institutions from 20 different countries and associate their ESG score with firm performance. The findings show a positive impact of sustainability on market valuation whereas a negative impact on financial and operational performance. The evidence offers insights from the financial industry and suggests that the long-term and short-term effects of sustainability efforts can be different.

Sustainability disclosure and value relevance. A set of research specifically investigates the impact of sustainability reporting on how the market evaluates financial statement metrics, that is, value relevance. Lourenço, Callen, Branco, and Curto (2014) refer to the inclusion of the company in the Dow Jones Sustainability United States Index as a proxy for sustainability reputation. They find that the index companies' financial data have higher value relevance, suggesting that sustainability reputation is valued by the market. Comparing a set of Indonesian companies that received the Sustainability Report Award with their counterparts, Sutopo, Kot, Adiati, and Ardila (2018) find that the value relevance of award-winning companies is higher, suggesting that high-quality sustainability reporting increases the perceived value of financial statement data. Berthelot, Coulmont, and Serret (2012) provide Canadian evidence that the capital market positively values the reporting of corporate sustainability even when it is voluntary.

Evidence on value relevance points to the capital market benefits of sustainability reporting, which by enhancing transparency and firm reputation improves the market perception of financial reporting. Sustainability as non-financial disclosure has a spill over effect on the efficiency of the capital market while incorporating information contained in financial disclosure into the market valuation.

Challenges In Green Finance And Sustainability Disclosure

The main challenges in the areas of green finance and sustainability disclosure center around the measurement of the green effects and the reliability and comparability of the reported corporate environmental performance data.

Due to the lack of one generally accepted set of standards that guide the reporting of sustainability and the lag of growth in the third-party assurance of such reporting, the main challenges for sustainability reporting are its reliability, consistency and comparability. Dragomir (2012) examines the corporate sustainability reports of the largest five European energy companies for assessment of their reporting quality in terms of corporate environmental performance and finds that the reports lack clarity and consistency in the methodologies used, suggesting that research based on cross-sectional data drawn from corporate sustainability reports can be risky due to incomparability of such data.

Similar concerns and challenges apply to carbon accounting. Wegener, Labelle, and Jerman (2019) examine the GHGemissions reports across corporations and document the lack of comparability in these facility-level quantified emissions data and that therefore relying on such information can mislead the readers. Bowen and Wittneben (2011) show that the challenges carbon accounting faces are a result of tension and negotiation between different goals, such as accuracy, consistency and certainty, across different reporting levels.

The measurement issue then leads to concerns about the legitimacy of using sustainability indicators in contracts such as executive compensation. Bebchuk and Tallarita (2022) find that in almost all cases in which S&P 100 companies use ESG metrics, it is difficult if not impossible for outside observers to assess whether this use provides valuable incentives or rather merely lines the chief executive officer's pockets with performance insensitive pay. They, therefore, conclude that

the current ESG metrics likely serve the interests of executives, not of stakeholders and that the expansion of ESG metrics should not be supported even by those who care deeply about stakeholder welfare.

Economic Implications Of Green Finance

Relationship Between Green Instruments And Green Results

To better understand the economic implications of green finance, we first examine whether and through what channel green finance leads to green results such as emission reduction and energy saving. Several tools exist to measure the green results, such as carbon emission reduction, qualitative sustainability, benchmarking standards, and survey-based approaches (Truant, Corazza, & Scagnelli, 2017). Using data from 30 Chinese provinces from 2005 and 2018, Chen and Chen (2021) find that the development of green financial instruments contributes to carbon emission reduction, and this has a spatial spill over effect of not only reducing the emissions of a local region but also inhibiting the emission of adjacent areas.

CONCLUSION

This paper reviews green financial instruments, sustainability disclosure practices and the impact of green finance on firm performance and economic development. We first provide background for green financial instruments. Literature suggests two primary motivations for firms' adoption of green practices: (1) violating environmental policies imposes a negative consequence on firms in the form of direct financial penalty and (2) firms lose social capital and reputation with an increase in the actual or perceived investment risk.

Increasing public attention to the environment and the rise of green finance intensify the demand for environmental disclosure. Literature has found consistent evidence that sustainability reporting grow tremendously over the past decades and around the globe although the adoption of third-party assurance is found to lag. Along with critics and concerns about how such reporting lack consistency, comparability and assurance, efforts are being made in terms of developing generally accepted standards for reporting and government regulations that mandate sustainability disclosure for large companies.

We find that in general literature agrees that a firm's green practice is positively associated with its financial performance and negatively related to a firm's cost of capital. Moreover, green financial instruments contribute to firms' access to capital and innovation related to environmental efforts. As a response, equity investors hedge the environmental risks by creating portfolios including green companies and corporate managers make strategic firm-level decisions in consideration of the climate and related risks.

Notes

1. The G20 Green Finance Study Group (2016) defines green finance as ‘‘financing of investment that provides environmental benefits in the broader context of environmentally sustainable development[. . .] for example, reduction in air, water, and land pollution, reduction in greenhouse gas (GHG) emissions, improved energy efficiency while utilizing existing natural resources, as well as mitigation of and adaption to climate change and their co-benefits’’
2. Various terms are often used interchangeably to green finance are climate finance, carbon finance, environment finance and sustainable finance. In this paper, we use the term ‘‘green finance’’ as a general term to cover all of the terms.

REFERENCES

1. Adams, C. A. (2020). Sustainability reporting and value creation. Social and Environmental Accountability Journal, 40(3), 191–197.
2. Alshehhi, A., Nobanee, H., & Khare, N. (2018). The impact of sustainability practices on corporate financial performance: Literature trends and future research potential. Sustainability, 10(2), 494.
3. Banahan, C. M. (2018). The bond villains of green investment: Why an unregulated securities market needs government to lay down the law. Vermont Law Review, 43, 841–869.