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Understanding the determinants of the development of the green bond market in South Africa

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Purpose: The study aims at establishing the level of interest in the green bond market by investors and specific factors that influence stakeholders' investment decisions in South Africa.

Design/methodology/approach: The primary data was collected through interviews leveraging survey questions from the Climate Bond Initiative survey and a thematic analysis conducted. Stakeholders involved in green bonds listed on the Johannesburg Stock Exchange were targeted.

Findings/results: Most respondents recognised green bonds as a critical enabler to support South Arica's energy transition and the clarity on South Africa's energy plan will catalyse investment. The study revealed a consensus for the application of strict definitions and standards for green bonds, whilst consideration should be given for leniency to increase issuances as the market matures. A barrier that was highlighted, was the slow development of a pipeline of large-scale projects. Majority of respondents indicated that beyond credit fundamentals; full or partial guarantees, subsidies and incentives will be most important in stimulating the development of the market.

Practical implications: There is strong potential to grow, as investors prefer green bonds with strong returns and green credentials. Incentives such as high tax rates for investments in fossil fuels, once-off incentives for new issuers such as anchor capital or subsidies to carry reporting cost can catalyse this growth.

Originality/value: This study surfaces the underlying dynamics that contribute to the growth and development of the green bond market in South Africa that largely align with that of European and Asian markets. This presents an opportunity to explore strategies that could be translated to grow the bond market.

Keywords: climate change; impact investing; green bonds; investor preferences; sustainable financing; energy transition.

Introduction: Relevance of green bonds to the climate response in Africa

One of the existential questions currently faced by investors and policy research practitioners is how to best address the challenges faced by stakeholders in funding climate change at the scale required to have a meaningful impact. Globally, the last two decades have exposed the reality that for the world to address climate change via greener practices and energy efficiencies, it will require huge capital. The Paris Agreement of 2016 has become a rallying point towards achieving net zero carbon emissions with the aim of minimising the impacts of global warming caused by carbon emissions (UN, 2019).

Interestingly, all African countries have made significant commitments to minimise their carbon emissions despite not being significant emitters except for South Africa and other oil and coal rich countries such as Angola (Ritchie & Roser, 2020). This has created further pressure on African countries to finance alternative energy options in the region that meet their economic growth aspirations, especially given the economic challenges exacerbated by the coronavirus disease 2019 (COVID-19) pandemic (Myeza et al., 2023).

Among its several advantages, Hauman and Hussain (2018) accentuated the key role of green bonds as one of the most affordable vital capitals to fund energy-efficient ventures. A green bond is analogous to conventional bond except that the proceeds of the bond are used to finance projects that mitigate or adapt against climate change (Flaherty et al., 2017; Sachs, 2014; World Economic

Note: Special Collection: Managerial Practices.

Forum, 2021; Zerbib et al., 2018). Green bonds have been a growing phenomenon in many developed markets since their inception in 2007, having raised greater than $1 trillion, which is only 1% of the total bond market (Pronina & Freke, 2020).

There is a significant funding gap valued at $103tn that needs to be closed to meet the current global commitments for climate change (Gianfrate & Peri, 2019). The climate change risk the sub-Saharan African (SSA) region was valued at $35.5 billion in 2015 driven largely by water scarcity, a lack of biodiversity, and extreme weather events (Pandey, 2019). An empirical study of 34 countries in the region showed that a 1 degree increase in temperature can reduce gross domestic product (GDP) by 1.58% (Nnadozie & Afeikhena, 2019).

In Africa, the trends have largely been driven by government and development banks such as the Development Bank of Southern Africa (DBSA) through the support of the World Bank, similarly in Nigeria via the environment and finance ministry and in Kenya through the central bank (Ngwenya & Simatele, 2020b). This research worked towards understanding how African countries can access funding through the green bond market, especially in South Africa as the leading emerging market economy in the region. The $8.5bn funding that has been committed for South Africa's energy transition by the United States (US), Britain, France and Germany, and the European Union (EU) (Winning & Kumwenda-Mtambo, 2022) can assist to catalyse the further $75.5bn required, and green bonds can be an effective instrument in closing some of this funding gap.

Since the African Development Bank's study on why Africa needs green bonds (Shimeles et al., 2016) that made the case for green bonds as a financial instrument, there were approximately less than 15 issuances from non-Development Fund Institutions (DFI) in Africa (Harrison & Muething, 2020). Ngwenya and Simatelea (2020a) highlight that with better knowledge of the market there will be more opportunities to innovate and create a new pool of investors. Therefore, this research sought to close a gap in the available research to better understand the level of awareness and understanding of the value of green bonds to meet the funding needs for a meaningful climate change response.

There has been limited analyses with regard to the reasons constraining South Africa's access to climate finance in the form of green bonds. The research by Banga (2019) provides a generalised overview of the key barriers faced by developing markets in the development of the green bond market, including a lack of knowledge of how green bonds work, inappropriate institutional arrangements, transaction costs, size of issue, base currency for the issue among others. Both the studies by Banga (2019) and Ngwenya and Simatele (2020b) are case study based and are limited in their analyses of the market dynamics that are impacting growth of the green bond market from an investor perspective. There was an imminent need for more empirical research in developing markets (Banga, 2019) on the South African green bond market. The lack of development of a green bond market as a viable climate finance option will limit South Africa's ability to shift capital towards addressing climate change and place it in even more physical and transition risk (Boulle, 2021; Gianfrate & Peri, 2019; Pereira, 2021). In a study of the development of green bond markets in low- and middle-income countries (Otek Ntsama et al., 2021), Africa was excluded as there have been limited issuances on which to assess performance. A recent network analysis (Halkos et al., 2021) of green bond fund flows demonstrates the limited extent to which green bond financing is available in Africa.

The most recent systematic and bibliometric studies conducted on green bonds highlight that globally there are still very limited number of studies on green bonds and particularly among emerging markets, emphasising the need for primary research (Bhutta et al., 2022; Mohanty et al., 2023). The general thrust of this study was to explore the knowledge gap of the green bond market in South Africa. South Africa is one of the major emerging economies of the world contending with the Just Energy Transition,[1] largely dependent on fossil fuels (Mlaba, 2021) and is regarded as one of the most sophisticated financial markets in the region with growing adoption of green bonds (Boulle, 2021; Ngwenya & Simatele, 2020a). The literature on the green bond market is in it nascent stage (Boulle, 2021; Otek Ntsama et al., 2021; Shimeles et al., 2016), with very few documented studies that reflect the state of the market and the successes and challenges thereof (Ngwenya & Simatele, 2020b) particularly in South Africa as one of the most mature financial systems in the world. The key objective of this study is to establish factors contributing towards the development of a thriving green bond market in South Africa. This is intended to support policymakers such as National Treasury (Burger, 2022) who are intending to raise funding through the capital market using green bonds. The sub-objectives of the study are: (1) to determine the level of awareness and interest in the green bond market by investors, (2) to assess the relative credibility of the green bond market, (3) to understand the preferences stakeholders have for green bonds, and lastly (4) to identify the key factors that can be considered in growing the local market. This study brings to the fore the underlying dynamics that contribute to the growth and development of the green bond market in South Africa from a stakeholder's perspective. It provides the first set of primary data research to better understand the drivers of the green bond market in South Africa and the region. This will help to close the funding gap required to meet the challenges of becoming a climate resilient nation. The sections that follow detail an analysis of the literature that

1.The Just Energy Transition refers to the shift from fossil fuel energy sources to renewable energy sources that ensures that people such as employees or communities that benefit from the fossil fuel industry are supported to have economically productive lives. It refers to ensuring that all communities will have access to reliable energy at an affordable price through sustainable energy options.

exists and highlights some of the prevailing market drivers. Thereafter, the study design is detailed highlighting the sample groups and the approach to analysing the responses. The remaining two sections provide a discussion of the key findings and the conclusion, emphasising the key implications of the results.

The green bond market: A stylised overview

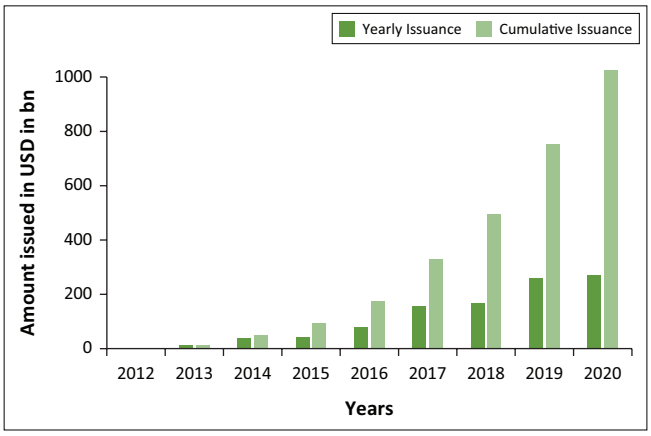
The green bond market has been growing considerably over the last 15 years with an increase in issuances since the Paris Agreement in 2015. There are six different types of green bonds, largely differentiated by their source of funding, as detailed in Table 1 (Otek Ntsama et al., 2021).

The climate bond initiative provides a comprehensive database of all the green bonds issued globally as detailed in Figure 1. The Copenhagen Accord, which forms the basis for the Paris Agreement in 2009, was a milestone, which boosted green bond market development (Piñeiro-Chousa et al., 2021).

Based on the available literature that was reviewed, none explicitly refers to a specific theoretical framework on which the studies were based (Maltais & Nykvist, 2021). A few of the studies that assess the value of green bonds in the market have based their analysis on traditional investment theory. Investment theories are premised on the risk versus return relationship of a given investment. This can be informed by careful analysis of data showing the historical, current, and projected performance of an asset (the Capital Asset Pricing model) or the diversification of a group of assets within a portfolio (Modern Portfolio theory) premised on the risk versus return of a group of assets within a portfolio (William, 1996). While these are useful frameworks for assessing the attraction of conventional financial instruments, it is not applicable in all cases as the critique details (Gianfrate & Peri, 2019).

A World Economic Forum report found that institutional investors were challenged to use the existing frameworks such as Modern Portfolio theory as the metrics of impact investing do not 'fit' within this construct (Drexler et al., 2013). Some of the literature on impact investing showed that agency theory or stakeholder theory was used as it demonstrates the influence that agents such as activists or managers might have to influence shareholders' investment decisions (Mans-Kemp & Van Zyl, 2021). In this instance, the bond issuers' reporting level of transparency and disclosure will have a critical influence on the ability to assess the attractiveness of the investment.

There are growing Environmental Social and Governance (ESG) demands that have led to more investors seeking green bonds to meet their social investment return mandates; and because there is limited correlation with other asset classes, it supports investors divestment strategy (Febi et al., 2018). The work performed by the United Nations Development Programme (UNDP) highlighted some challenges in directing funds towards impact investing because of the specific fiduciary regulations. However, countries such as South Africa, which has promogulated regulation 28 of the Pension Funds Act in 2011 requiring fund managers to consider environmental, social and governance criteria in their investment selection, has seen a slow take-up (UNDP, 2015). A demonstration of this shift is the multi-capital approach to an integrated report that details how a business is effectively harnessing its human and natural capital with its financial



Source: Piñeiro-Chousa, J., López-Cabarcos, M.Á., Caby, J., & Šević, A. (2021). The influence of investor sentiment on the green bond market. *Technological Forecasting and Social Change*, *162*, 120351. https://doi.org/10.1016/j.techfore.2020.120351

FIGURE 1: Global green bond issuance from 2012 to 2020.

TABLE 1: Typology of green bonds.

Green bond type	Attribute	Debt recourse
Use of proceeds bond	Proceeds raised by bond sale are earmarked for green projects in the issuer's portfolio.	Recourse to the issue. Entire balance sheet.
Use of proceeds: Revenue bond or abs	Proceeds raised by bond sale are earmarked for or refinances green projects.	Resource is limited to an issuers pledged revenue streams.
Project bond	Proceeds raised by bond sale are earmarked for a specific project.	Recourse is restrained to the projects assets and balance sheet.
Securitisation (ABS) bond	Proceeds raised by bond sale are pooled are earmarked for green projects.	Recourse is to a group of projects that have been grouped together.
Covered bond	Proceeds raised by bond sale are earmarked for eligible projects included in the covered pool.	Recourse either to the issuing entity or to an affiliated group to which the issuing entity belongs and to a pool of collateral that is a separate from the issuers others assets.
Loan	Proceeds raised by bond sale are earmarked for eligible projects or secured on eligible assets.	Recourse is full to the borrower in the case unsecured loans. Recourse to the collateral in the case of secure loans.

Source: Otek Ntsama, U.., Chen, Y., Nasiri, A., & Mbouombouo Mboungam, A.H. (2021). Green bonds issuance: Insights in low- and middle-income countries. *International Journal of Corporate Social Responsibility*, *6*(1), 2. https://doi.org/10.1186/s40991-020-00056-0

ABS, asset-backed securities.

capital to create an impact for shareholders and broader stakeholder value (Maroun et al., 2022).

The green bond market is cumulatively valued at a trillion dollars and despite the pandemic there was $269.5bn in issuances in 2020 (Han & Li, 2022). The average growth rate of the green bond market has been tracking at 60% with the five major bond issuers being the US, Germany, France, China and Sweden, with the largest portion of funding being directed towards energy transition, buildings and low carbon transport (Anh Tu & Rasoulinezhad, 2021). In the post-COVID-19 era there have been substantial resources dedicated towards economic recovery and the climate change agenda. There has been a drive towards investments that result in energy efficiency that have a positive impact on the environment (Anh Tu & Rasoulinezhad, 2021) while supporting human development. An analysis of the green bonds in the post-COVID-19 era shows that they are regarded as high risk and high return investments, particularly in the Asia region, with most projects being long-term infrastructure projects. The majority of issuers are banks who have a maturity mismatch as their liabilities are largely short to medium term (Taghizadeh-Hesary et al., 2021). This is in contrast to Europe that has a low risk and return with medium-term maturity and the US that has a moderate return and risk profile with medium-term maturity.

A study in Southeast Asia region found that during the pandemic business survival was more important than allocating funding towards climate change (Nguyen et al., 2022), demonstrating the challenges that emerging markets face. Taghizadeh-Hesary et al. (2021) highlight that key to addressing this is an increase in participation of public finance institutions and non-banking financial institutions (pension funds and insurance companies) in long-term green investments, utilising the spill over tax to increase the rate of return of green projects, developing green credit guarantee schemes to reduce the risk of investments; this is similar to the approach followed in Europe (Dan & Tiron-Tudor, 2021; Sangiorgi & Schopohl, 2021).

There is a proposal for green bonds to extend their maturity because of the long-term nature of the projects in which they are invested (Flaherty et al., 2017). This is supported by early work (Sachs, 2014) that demonstrated green bonds as a useful alternative to share the cost of climate mitigation with generations to come. Tolliver et al. (2020a) have written extensively about the green bond market and drew attention to the seminal work of Patrick (1966) who observed that as economies grow they create demand for new financial services. Click or tap here to enter text. This is applicable today as green bonds and other climate finance options that are emerging as a response to the needs of the fourth industrial revolution (4IR).

The National Determined Contributions (NDC) from the Paris Agreement have been recognised as another key driver as countries have had to make tangible plans to meet their commitments and green bonds are proving to be an effective financing mechanism for the transition (Tolliver et al., 2019, 2020a). Further work by Tolliver et al. (2020b), demonstrates that there is a strong correlation between a countries bond issuance and proportion of energy from renewable sources. India, China and Morocco are ranked in the top 10 in terms of proceeds of green bond finance issued for renewable energy, and South Africa is ranked 17th.

It is particularly more challenging for developing regions such as SSA to raise financing as highlighted by Banga (2019) because the size of financing is too small for the underwriter and the cost of issuance is relatively high. Despite the African market having access to the largest Green Climate Fund (GCF) from the United Nations Framework Convention on Climate Change (UNFCC), there has been slow progress because of the limited ability to plan and co-ordinate projects across institutions (Ngwenya & Simatele, 2020a).

It is interesting to observe that there are many countries with high NDC indexes, which are ranked lower in terms of their bond issuance, demonstrating that they may not be leveraging available finance effectively. This has been quantified in Organization for Economic Co-operation and Development (OECD) member countries where a 1% increase in issuance will increase the energy efficiency index by 0.95% (Baldi & Pandimiglio, 2022). This creates a further incentive for the state to create policy to support and enable the development of a green bond market to give effect to its climate mitigation and adaption strategies. Literature shows that more needs to be done to strengthen the institutional arrangements that underpin the mechanics of a functioning market for green bonds (Anh Tu et al., 2020; Deschryver & De Mariz, 2020; Otek Ntsama et al., 2021; Tolliver et al., 2021).

As the green bond market grows and develops, it will need to be considered how it creates opportunities for medium-sized enterprises who have as much of a demand as large corporates for access to such funding opportunities to adapt and mitigate the effects of climate change (Sartzetakis, 2020). At the same time, it will need to create space for institutional investors who have an interest in large deals to have a material effect on their shareholding for assets under management (Shimeles et al., 2016). However, it is important to highlight that it is not enough for organisations raising fundings or for investor to rebalance their portfolio in leveraging green bonds but the broader implications this has on the human, social and financial capital too (Maroun et al., 2022).

As highlighted earlier because the market is nascent there are still challenges in driving standardisation of definitions, ratings among others and the work by Kawabata (2020) highlights the options available and being exercised for private governance schemes to influence policymaking such as the Green Bond Principles (GBP). These capital market and regulatory institutions can convene and deploy experts

towards addressing key barriers and facilitating global collaboration. While the market has demonstrated rapid growth, there are two divergent green bond standards: GBP and Climate Bond Initiatives (Tang & Zhang, 2020). These contribute towards inefficiency in the green bond market that limits the ability to trade them as regularly and as effectively as desired because there are inconsistencies in the standards and definitions (Anh Tu & Rasoulinezhad, 2021; Mejía-Escobar et al., 2021).

The literature highlights the evolving landscape of the green bond market and the need for research to better understand the dynamics of the market itself and its implications on addressing climate change. This is particularly true for developing markets in the African region.

Study approach

The study follows a method similar to that of the European market green bond market survey (Sangiorgi & Schopohl, 2021), the Swedish Green bond market study (Maltais & Nykvist, 2021) and a Kenyan market study (Magale, 2021) in terms of eliciting direct feedback from those active in the green bond market. The value of soliciting qualitative inputs from active market players was to get insight into market behaviour rationale that may otherwise be limited by assessing market performance data. This study sought to determine if there are broader factors that influence development of the green bond market to change the way scholars think and discuss sustainable finance (Bansal & Corley, 2011), especially as recent systematic analyses of markets (Cortellini & Panetta, 2021) and other studies (Nguyen et al., 2022) suggest that green bonds could replace conventional bonds.

The study aimed to target investors and the intention was to use initial engagements with the three main issuers who have had repeated green bond listings on the Johannesburg Stock Exchange (JSE); these include Nedbank Group Limited, Growthpoint Properties and Standard Bank Group Limited. It was through these issuers that arrangements for interviews with other major stakeholders such as investors were made. Thus, the study firstly employed a combination of purposive and snowball sampling to ensure both a rich and broad perspective. The study was limited by the number of participants attributed to the small but growing green bond market in South Africa. Secondly, while the structured interviews served to ensure comparable results it also limited broader discussion on specific green bonds and their projects.

The study had a total of 21 interview respondents from varying backgrounds that were conducted in 2022 and responses were retained with anonymity (see Table 2). The largest group of respondents (48%) participating in the study were investors and the second largest group (24%) were either analysts or advisors. The remaining two participants were a regulator and an association member. There were three respondents who are issuers, with two respondents from the same insitution. We are simply trying to higlight that there is an overlap between two of the three respondents in terms of the institution they belong to. This is in a market with limited listing with Nedbank having at least eight listing of the estimated 21 listing (Climate Bond Initiative data February 2022). Based on online career profile of the interviewees, the respondents had an estimated average of 17 years' experience in the financial services sector. At least 29% of the respondents were not involved in the green bonds listed in the market and provided a level of awareness among those not active in sustainable finance. While the majority (71%) of the group were involved in listed green bonds, 19% of the respondents were involved in multiple green bonds. Growthpoint 26G was the green bond that had the most involvement, followed by the Nedbank 04G green bond.

TABLE 2: Respondents' profile.

Participant code	Estimated years' experience	Respondent role in the green bond market
R1	10	ESG analyst
R2	35	Investor
R3	15	Investor
R4	13	Investor
R5	13	Investor and environmental risk management
R6	13	Issuer
R7	13	ESG analyst
R8	35	Investor
R9	25	Association member
R10	12	Project manager for green bond project
R11	11	Investor
R12	11	Investor
R13	13	Investor
R14	11	Investor
R15	30	Issuer and originator
R16	10	Originator and investor
R17	30	Regulator
R18	15	Advisor
R19	15	Advisor
R20	15	Board director
R21	15	Investor

ESG, Environmental Social and Governance.

The interviews measured the investors' awareness and attitudes (Rasinski, 2012) towards green bond markets by understanding their level of exposure to green bonds and their preferences towards green bonds in relation to other investment options.

The research instrument used took the form of a structured interview with some open-ended questions and other multiple choice questions leveraging research instruments from both the European, Swedish and Chinese market studies (Refer to Appendix 1 for Interview Guide). Some of the participants completed the interview questions through an online form, while online discussions were held for others over a 45 min to 60 min conference call. In the case of the online discussions, the researcher subsequently completed the form and made supplementary notes. The instrument was slightly modified for each stakeholder group given the

role they play in the green bond market and follow-up questions were sent directly to participants to probe responses to questions. The responses were analysed based on the stakeholder roles by quantifying the multiple-choice responses and thematically analysing the open-ended questions.

Discussion and findings

The study relied on primary data collated from direct interviews with stakeholders. The data employed are presented, their measurements and the comparison of the findings to other similar studies such as the work by Nguyen et al. (2022), Sangiorgi and Schopohl (2021), Deschryver and De Mariz (2020) and Maltais and Nykvist (2021). The results are discussed in line with the dominant themes that emerged from the findings: (1) interest and willingness to participate, (2) forces of attraction to the green bond market, (3) deterrents for stakeholders, and (4) market and policy mechanisms to foster the green bond market.

Interest and willingness to participate

Information sources for respondents are predominantly direct contact from underwriters or brokers and internal communication. Most respondents indicated that they rely on multiple sources of information to keep abreast of developments in the market. This demonstrates a highly niche area of investment that relies significantly on direct channels of communication and individual relationships between investors and issuers.

While there seems to be some awareness of green bonds in the South African market, there has not been a change in behaviour or attitude among the majority of respondents as evident in Figure 2. This may potentially be driven by the availability of green bonds, as 28% of the respondents indicated that they prefer to incorporate green bonds where available and 11% plan to incorporate in the future. The majority of the group indicated that green bond assets under management range from 1% to 2% of their total assets under management. There was one outlier (R13) where from 9% to 10% of the portfolio contains green bonds as a result of their fund mandate. This outlier and some of the other respondents with a higher percentage of green bonds under management may be explained by the fact that 11% of the respondents are driven by specific mandates and targets or dedicated green funds to invest or raise funding.

South African respondents had a lower level of market activity than both the European (Sangiorgi & Schopohl, 2021) and Asian (Nguyen et al., 2022) market studies explained by the greater level of nascency (Banga, 2019; Shimeles et al., 2016). Similar to Asian markets that are still evolving, there has been interest and focus on development of the green bond market in South Africa. Market players have become aware of the potential of green bonds. A respondent provided an alternative perspective:

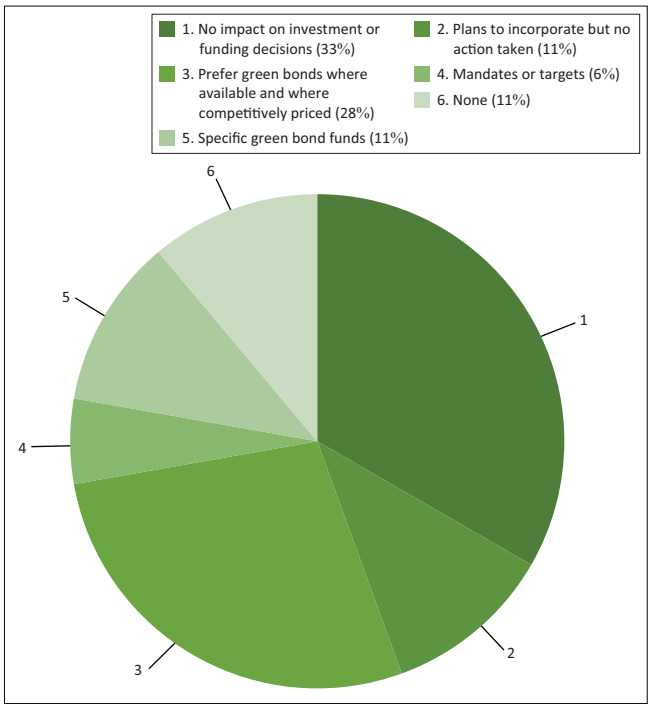


FIGURE 2: Extent to which green bonds have impacted investment or funding decisions.

> 'The big hurdle for green bonds in particular is that the existing lender market in SA, led by the big SA banks, make most of their money from lending and holding debt, instead of arranging and placing debt. Until this changes, green bonds will be niche and on the periphery of SA funding packages.' (R18)

Since the COVID-19 pandemic, there has been a trend showing an increase in investments in green bonds in other markets such as the Asia (Taghizadeh-Hesary et al., 2021), Europe and the United States (Anh Tu & Rasoulinezhad, 2021) and South Africa. In Europe, the size of the green bond assets under management largely mirrored the availability of green bonds, with a few respondents holding less than 0.5% (Sangiorgi & Schopohl, 2021). The findings of this study were similar, as investors sought to demonstrate their commitments to ESG objectives as mentioned by respondent R12 and R13. In other instance given the policy shift towards renewable energy alternatives, which majority of green bonds are being used to support in South Africa, investors R3 and R4 recognised the strong upside. However, green bonds are still viewed as a subset of the debt market rather than sustainable finance product with 28% favouring them only when priced competitively.

Forces of attraction to the green bond market

The study sought to understand stakeholder preferences shown towards green bonds. This provides insights into how they ascertain value and credibility of green bonds. Different types of investors may have different types of preferences based on their respective mandates. This section specifically focusses on factors that make green bonds attractive to investors and other stakeholders. It has been recognised that investor sentiment drives decision making (Otek Ntsama

et al., 2021), therefore understanding stakeholders' preferences can influence development of the market significantly.

Pricing and credit constraints seem to be the most important factors informing investment decisions, which are similar to vanilla bonds with pricing being even more important than credit constraints, where a vanilla bond can be described as an interest-bearing security paying coupons at regular intervals with a stated fixed maturity. Respondent R16 noticed that there is a green premium developing with green bonds earning between 5 bps and 10 bps more and thus increasing the liquidity of the assets. Green credentials are particularly important, with pre-issuance being more important than post-issuance. Respondent R9 highlighted this is largely because 'there is a stronger burden of proof on issuers'. Very few respondents indicated that the issuer's sector is important, and this is potentially driven by a lack of diversity of available green bonds. Currency preferences are less important, with most indicating a preference for local denominated green bonds in discussions, which is supported by the Vietnam market study (Anh Tu et al., 2020), other Asia Pacific markets (Tolliver et al., 2021), and the Kenyan market study (Magale, 2021).

Both European and South African respondents regarded competitive pricing as the most important factor informing investment decisions, while there was a slightly greater emphasis placed by the European respondents (Sangiorgi & Schopohl, 2021) on the green credentials of the bond than by South African respondents. There was also consensus between the South African and the European market studies on the level of importance placed on issuer fundamentals, reporting pre- and post-issuance, and the extent to which they would buy green bonds if the use of proceeds was clear. Contrary to the European market study (Sangiorgi & Schopohl, 2021) South African respondents' approach to investment is largely driven by the competitiveness of available green bonds in the market. Both markets also seem to place a 'halo' on issuers of green bonds, making their other products (non-green) more attractive to investors.

There was a higher preference for bonds issued by development banks and corporates rather than government issued bonds among the South African market respondents. Two perspectives were shared for this reason firstly, concerns about whether the South African fiscus can afford further debt, and secondly, the fact that the Financial Management Act does not adequately support the issuance of green bonds. In addition, there was a concern that the reporting for green bonds is extremely onerous and there is limited capacity to conduct such evaluation.

The most attractive factors considered by respondents are (see Figure 3) 'the bond issuers' transparency disclosure practice' and 'the post-issuance transparency detailed upon disclosure'. This is closely followed by the bond issuers' fundamentals and impact reporting. Most participants indicated that the

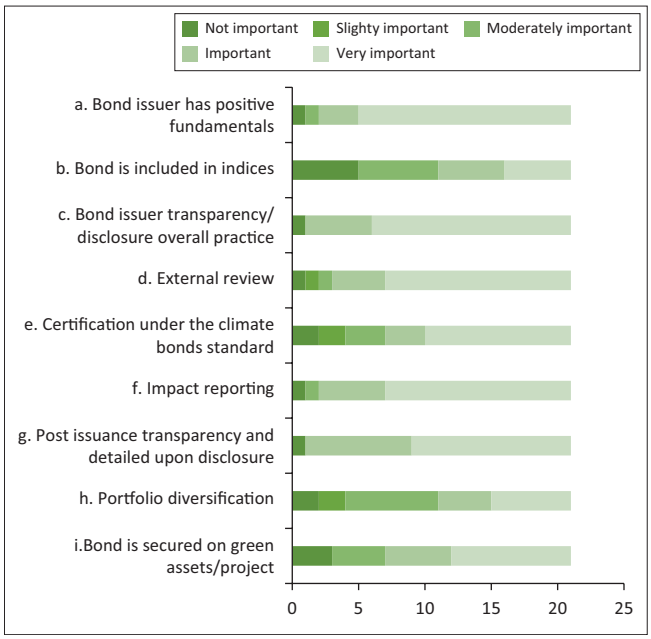


FIGURE 3: Factors that make investing in green bonds more attractive.

inclusion of green bonds in indices was not important to their purchasing decisions. This is potentially driven by the scarcity of green bonds in the local market. One of the respondents – R17 – indicated that 'impact reporting is aspirational and is the next level for many listed institutions but it is (reporting) a hindrance to get more green bonds listed'.

At least 33% of respondents indicated that the purchase of green bonds is moderately important in contributing towards portfolio diversification. Respondent R5 indicated they are trying to manage their commitments to Principles for Responsible Investment (PRI) and the quality of their own investments to maintain their reputation. The standards that stakeholders subscribe to are important drivers of their institution's behaviour, both in terms of regulation and standards (Sustainable banking principles or Equator principles). Respondent R5 highlighted that there seems to be a case of the 'tail wagging the dog' as activity in the market is driven by increased adoption of compliance to frameworks such as the Task Force for Climate Related Financial Disclosures integrated reporting requirements. The emphasis on integrated thinking fostered by integrated reported is creating a heightened awareness among investors and is shaping sustainability imperative (Maroun et al., 2022).

Deterrents for stakeholders

A few factors highlighted by respondents provided some insight into factors that were a deterrent or have little influence, the three main factors being issuers' track record of having issued green bonds, the clear use of proceeds of green bonds, and poor post-issuance reporting.

The majority of respondents (52%) indicated that they show no preference to organisations that have previously issued green bonds. But this was closely followed by 38% who

indicated they are more likely to buy vanilla bonds from an issuer that has released green bonds. Many of the respondents indicated that they were more inclined to purchase vanilla bonds from an issuer of green bonds, but only a few were currently involved in the listed green bonds. Respondent R16, indicated a preference to buy vanilla bonds from an issuer that has issued green bonds, as 'this demonstrates the issuer's commitment towards a more sustainable planet'. There was no indication that there is a negative association in the issue of green bonds that will impact an issuer.

The overwhelming majority of respondents indicated that they would only purchase a green bond if it was clear to them where proceeds would be allocated. Only one individual indicated that they would purchase green bonds even if it was not clear where the proceeds were to be allocated. This is a demonstration of the understanding from respondents of the concept of use of proceeds, which is unique to green bonds, similar to the European market study (Sangiorgi & Schopohl, 2021). The South African market study also showed an unmet demand for green bonds. However, while there was a demand for corporate and sovereign bonds in Europe, there was only a demand for corporate bonds in South Africa. Interestingly, the European study proposed that because of the unmet demand in the European market this could be an opportunity for emerging markets to secure financing. However, in the case of South Africa, the local demand may need to be met while attracting foreign investors for green bonds as the market develops. Some literature shows that there is a small secondary market with limited derivative options (Liaw, 2020) and this may prove to be an opportunity for packaging green bonds in South Africa for foreign investors when there are significant issuances.

There seems to be a lot more leniency among respondents if the post-issuance reporting is poor: respondents were willing to engage and understand the issues experienced by the issuer. Respondents indicated that this was partly driven by an understanding that this is an emerging area and there are practical challenges with some of the implementation. About a quarter (24%) of respondents indicated they are likely to sell if the post-issuance reporting is poor: two of these respondents are currently involved in the green bond market. European respondents (Sangiorgi & Schopohl, 2021) are less tolerant of green bonds with poor performance, while South Africa respondents are more willing to engage and understand the reasons. A respondent reported:

> '[*I*]t can be seen to be a costly affair for both the issuer and investor – this is as result of the additional efforts in terms of monitoring, disclosure, and impact reporting to ensure alignment.' (R13)

But at least 15% of respondents in the European study indicated that they would retain the green bonds in the case of poor performance similar to a minority group in the South Africa market study. It is proposed that higher levels of scrutiny by investors supports self-regulation in the market, and therefore one may desire to have high levels of scrutiny as the market develops. Respondent R15 proposed that, 'SA should consider a looser regulatory framework as the market develops and then tighten up as the market matures'.

Market and policy mechanisms to foster the green bond market

Majority of the respondents rated green bonds as an 'important' and 'very important' mechanism to shift capital from less sustainable to more sustainable investments. In the Swedish market study (Maltais & Nykvist, 2021), investors do not view green bonds as important in shifting capital but rather as creating more awareness in the market for green financing and pushing issuers to consider greener business models. Similarly, issuers (R6,15,16) in the South African market study also highlighted that the value they saw was the enhanced environmental performance for the organisation for which the green bonds were issued.

While the vast majority of the group were in support of strict definitions for green bonds, 29% of respondents indicated that less strict definitions were important to allow diversity in the issuance and to scale up the market (refer to Figure 4). From the five responses received, this was supported by three respondents who are actively involved in the green bond market. The high cost incurred to adhere to strict definitions was highlighted as a reason for the low rate of issuance. The Asset Managers Forum has extensively debated the adoption of standard definitions for green bond issuances. Respondent 17 highlighted that, 'While there is an openness to provide more leniency, there is a concern that the market

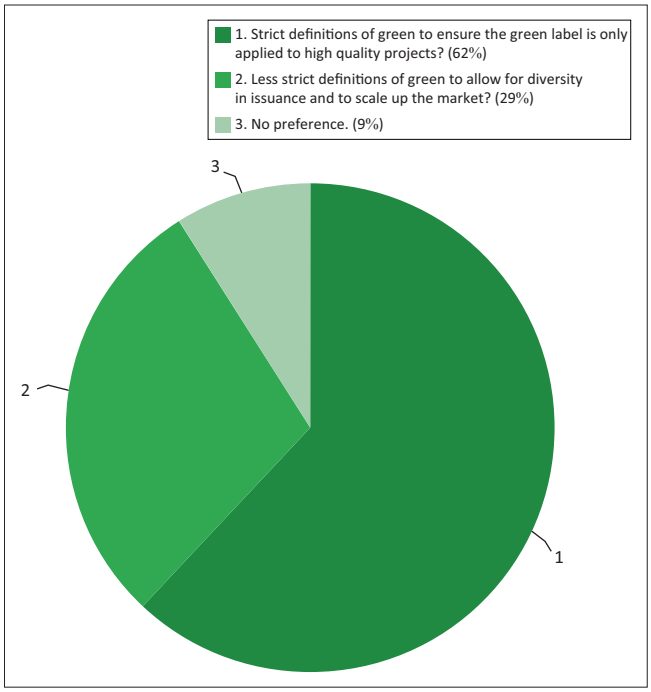


FIGURE 4: Green definition preferences.

will become susceptible to all sorts of funny issuances'. The European respondents (Sangiorgi & Schopohl, 2021) seemed to be more greatly divided on the applications of stricter green bond definitions than the South African respondents. While the literature supports a stronger top-down and government-led development of the green bond market (Lin & Hong, 2022; Magale, 2021; Ngwenya & Simatele, 2020b), it is important to understand that this needs to be managed. The lessons learnt from the Chinese market experience (the second largest green bond market in the world) show that while this served to scale the market quickly it crowded out private capital and embedded certain market practices, such as only 70% of funds being used for green projects as compared to 95% in other markets (as per international standards) that are now changing as the market evolves (Lin & Hong, 2022).

The most important market tool (86%) to enable the development of the green bond market is 'positive credit fundamentals', which has no direct link to green bonds itself but to the overall quality of debt in the market. The Kenyan market study demonstrated that because they have an underdeveloped credit rating market, they rely on international agencies that are perceived as more credible (Magale, 2021). The 'international credit ratings, which integrate environmental risk analysis' and 'full or partial guarantees' with 62% followed as the next most important market tools. The application of international credit rating that integrated environmental risk analysis was also supported by Liaw (2020). It has been highlighted that there is need for a more diverse group of funders to stimulate the bond market (Sartzetakis, 2020).

Only 38% of the respondents reported it was important to issue green sovereign bonds in contrast to proposals made for greater involvement by government as an issuer of green bonds (Lin & Hong, 2022; Ngwenya & Simatele, 2020b; Tolliver et al., 2021). This is largely because government has taken on significant debt for development and delivery of services, and emerging markets are penalised more for higher debt than developed markets (United Nations, 2022).

In terms of policy enablement, respondents rated official minimum standards for green definitions and criteria set being the most important, followed by subsidies, tax incentives, and regulatory or legislative trends for fostering a green bond market. Some respondents (R2, R5) indicated that, 'subsidies in the form of better premiums or prices for products that enable more energy efficiency should be encouraged to create demand in the market'. Another respondent (R17) highlighted that, 'while subsidies can support the market, it also creates market distortions'. Some of the proposals on incentives and tax subsidies that have been proposed by other studies focussing on the region include a once-off cost to cover monitoring and anchor capital for first time issuers (Tyson, 2021) and subsidies to cover costs to align to conventional issuances (Banga, 2019).

There was similar support by the European and South African respondents for 'full or partial guarantees'. There appears to be an expectation in particular in developing markets such as India, Nigeria and even South Africa, for the provision of full or partial guarantees: this is especially the case for government-issued green bonds, which are already backed by the state (Magale, 2021).

At least 29% of the respondents indicated that 'preferential' capital treatment of low carbon assets and 'mandatory climate-related financial disclosure' were moderately important. There was alignment with the European study in terms of the policy measures to be addressed, but the European respondents regarded preferential treatment of low carbon assets as more important than South African respondents.

Most respondents highlighted that while there is an enabling environment through regulatory and institutional mechanisms and ongoing strengthening of the monitoring and evaluation, the greatest concern was that of political will to commit to the national climate change strategy. These three factors were also highlighted by the only study on the green bond market in South Africa (Ngwenya & Simatele, 2020b). There was an expectation among several respondents that there would be more opportunity to scale and grow the green bond market as the South African energy sector shifts from fossil fuels to renewable energy as highlighted in Figure 5.

There also seems to be an active interest or appetite to raise funding for green projects through the green bond market, which can be seen by the increased number of issues in the last 2 years. There is a growing investor appetite for green bonds in the local market, but significant work needs to be performed to create more awareness. This includes the development of a pipeline of feasible projects being the most critical to increasing the rate and quality of issuances in the South African market (Fernandes et al., 2021). One of the features of a green bond that is under-marketed is the ability to use green bonds to refinance a new portfolio of projects and the relative convenience (in the European market) of their issue relative to conventional bonds (Gianfrate & Peri, 2019).

There is limited awareness in the market of the opportunities presented by green bonds, among a broad range of stakeholders including issuers, investors, and project developers. There are expectations that because of the nascency of the market, there will be cases of 'greenwashing'. Respondent, R15 highlighted concerns that, 'both the local reporting requirements and those set by international bodies are extremely onerous and costly to manage, thus limiting the number of local issuances'. In contrast a respondent highlighted:

> 'Often, issuances are seen as green dressing because of companies using generic indicators (as opposed to those most relevant for their sector or type of business), or targets which are easily attainable during the ordinary course of business, thus not

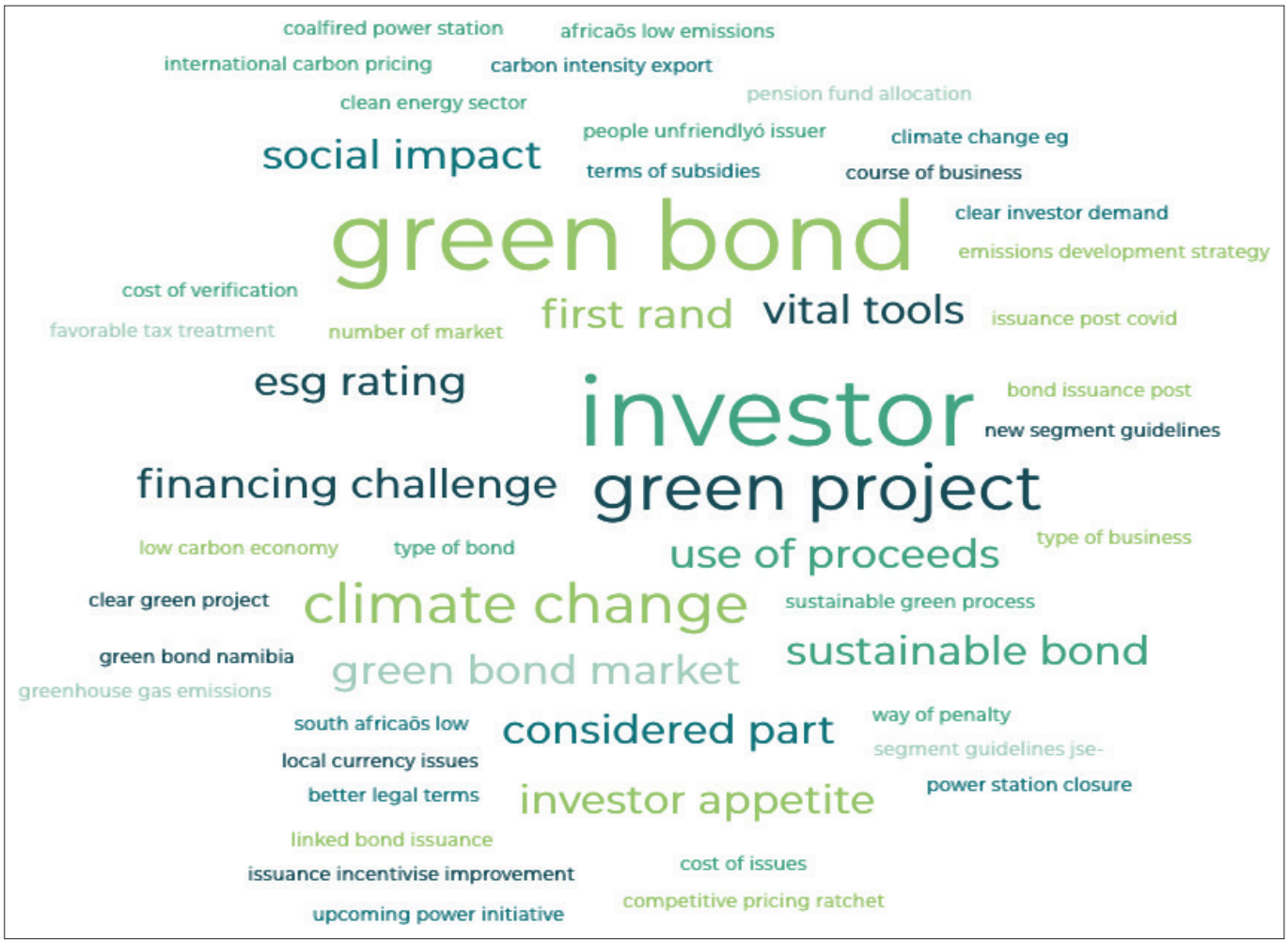


FIGURE 5: Emerging themes on growth and scale of the market.

> stretching the company to really drive sustainable green processes and/or projects as part of their operations. You also find some issuances incentivise improvements but do little by way of penalty for underperformance.' (R11)

Respondent R5 raised concerns that the current set of green bonds is having limited economic benefits, 'especially in the real economy' where there has been a decline in manufacturing production; therefore, while there are alternative renewable energy projects being developed, they do not take into consideration opportunities such as battery manufacturing that can create local employment.

In terms of obstacles and drivers of growth and development of the green bond market, respondents in Europe (Sangiorgi & Schopohl, 2021) placed emphasis on standardisation and regulation of the market and diversity of issuance as most critical. South African respondents also emphasised the need for more issuances and diversity but there was less emphasis on standardisation, and this may be addressed by the ongoing work led by National Treasury on the green finance taxonomy (National Treasury, 2022). Similarly, the US and Southeast Asia market studies (Deschryver & De Mariz, 2020; Nguyen et al., 2022) found that the cost and complication of green bond issuances was a key barrier for the development of the green bond market: despite the nominal issuance cost, there are ongoing monitoring and verification costs that add up.

Many of the respondents highlighted that in order to better support the development of the market, there should be more engagement between market players to understand what investors desire and what can feasibly be arranged by issuers in particular. This includes engagements by green project developers and governance structures to enable the market. It was also highlighted that there should be more inclusion in the investment making process to mitigate risks of greenwashing in the local market.

The findings from the research shows that there are various similarities and some nuances for the development of the green bond market as highlighted in Table 3. This was evident in both emerging markets such as South East Asia and developed markets such as Sweden, Europe and the US. There was also a demonstration that the South African market is grappling with the same challenges as other developed markets, such as the strictness of the green criteria definition and the cost of managing green bonds.

TABLE 3: A summary of thematic comparative assessment: Similarities and some nuances for the development of the green bond market.

Themes	Market factors	South Africa	South East Asia and China	Europe	United States
Interest and willingness to invest	Green bond activity	Low	High	High	Medium
	Green bond activity during and post the pandemic	Accelerated	Accelerated	Unclear	Accelerated
Force of attraction	Preference for local currency denominated bond	Yes	Yes	Yes or comparable currency	Yes or comparable currency
	Competitive pricing of green bonds	Highly important	Unknown	Moderately important	Highly important
	Green credentials	Slightly important	Unknown	Moderately important	Moderately important
Deterrents for stakeholders	Tolerance for poor post issuance reporting	Some tolerance	Unknown	Low tolerance	Unknown
	Cost of reporting	Major deterrent	Major deterrent	Major deterrent	Major deterrent
Market and policy	Role of green bonds to shift capital	Highly important	Unknown	Moderately important	Moderately important
	Robustness of green bond definitions	Strict	Lenient	Strict	Strict
	Support for issuances to stimulate the market (relative preference)	1. Corporate 2.Development banks 3. Sovereign	1. Sovereign 2. Development banks 3. Corporate	1. Sovereign, 2. Development banks 3. Corporates	Unknown
	Support for full or partial guarantees to stimulate issuances	Highly important	Highly important	Highly important	Unknown
	Support for preferential treatment of low carbon assets	Moderately important	Unknown	Highly important	Unknown
	Concerns regarding greenwashing prevalence	High	High	High	High

Conclusion

In conclusion, this study sought to build a better understanding of the value of the green bond market and the demand that exists among investors for green bonds. The respondents highlighted a clear preference for green bonds that are competitively priced and where the use of proceeds translate into a sustainable environment similar to respondents in both developing and developed markets. These insights should guide further issuances in the local market, and create a stronger pipeline of feasible projects that can be financed. Such financing mechanisms can accelerate South Africa's ability to meet its NDC targets among other national environmental objectives. There is an opportunity to heed the lessons learnt from other markets' top-down and government-led approach (Lin & Hong, 2022; Ngwenya & Simatele, 2020b), which may prove to be an effective measure in the interim to scale up the green bond market while crowding in funding from the capital markets.

A recurring theme that featured among respondents was creating awareness, both in terms of instrument from a financial perspective and also its application to improve sustainability. Respondents highlighted that it is important in the development of the local green bond market to create stronger credit fundamentals for the success of the overall debt market, and to apply strict definitions of green bonds. The credit fundamentals are important to give investor's confidence in their ability to ride-out turbulent conditions. In relation to other emerging markets (Anh Tu et al., 2020; Deschryver & De Mariz, 2020; Lin & Hong, 2022; Magale, 2021), where institutional capacity and governance mechanism were highlighted as a development area, this was not the case for South Africa. It was proposed by respondents that incentives and regulatory reforms will foster an enabling market for green bonds. More research is required on which specific interventions may yield the desired results such as once-off subsidies to cover the costs of new issuers for monitoring and provision of anchor capital (Tyson, 2021).

Respondents indicated that they were more willing to investigate reasons for poor performance post-issuance, indicating that there is a higher degree of tolerance while the market is nascent. This provides some encouragement to new issuers, especially those beyond the financial services sector where evidence showed there are higher returns (Taghizadeh-Hesary et al., 2021).

The study's scope was limited by the small participant pool in South Africa's emerging green bond market. Furthermore, the use of structured interview questions limited the depth of discussion, preventing a thorough exploration of specific green bonds and projects.

The outcomes of the research can better inform measures taken by actors such as JSE, National Treasury, and the Asset Managers Forum to better understand how prevailing and proposed mechanisms can have an impact on growing the green bond market. The relative similarities between the findings compared with Asian and European markets also help to support translation of effective strategies to the local market. The recent release of the green bond taxonomy (National Treasury, 2022), the implications of the International Sustainability Standards Board new financial reporting disclosure (IFRS, 2023) for sustainability and climate on adoption of green bond financing and the increasing rate of issuance has created a positive momentum for the development of the green bond market. Further research should assess the extent to which the enabling policy environment has had an impact on the growth

of the market and the extent to which 'emerging markets' can benefit from a leap-frog effect given the high demand for infrastructure development.

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Competing interests

The authors declare that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

Authors' contributions

H.D. designed the study, conducted the primary research and wrote up the final report. S.A. provides guidance and reviewed iterations of the study.

Ethical considerations

Ethical clearance to conduct this study was obtained from the Stellenbosch University, Stellenbosch Business School Research Ethics Committee, a sub-committee of the Stellenbosch University Social, Behavioural and Education Research Ethics Committee (REC:SBE). (No. 25519).

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Data availability

Data are not available as consent has not been obtained from participants for further use beyond the research and publication thereof.

Disclaimer

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Appendix starts on the next page →

Appendix 1

Interview questions

TABLE 1–A1: Screening questions

1.	What type of stakeholder are you?
	an issuer
	an investor
	an association
	a regulator
	a verification service provider
	Project manager of green bond proceed projects
	Other, Please specify:_____
2.	Which of the listed green bonds on the Johannesburg Stock Exchange have you been involved with?
	Issuer — **Alpha Code**
	GROWTHPOINT PROPERTIES LIMITED — GRT24G
	GROWTHPOINT PROPERTIES LIMITED — GRT25G
	GROWTHPOINT PROPERTIES LIMITED — GRT26G
	NEDBANK LIMITED — NBG01G
	NEDBANK LIMITED — NBG02G
	NEDBANK LIMITED — NBG03G
	NEDBANK LIMITED — NBG04G
	NEDBANK LIMITED — NBG05G
	NEDBANK LIMITED — NBG06G
	NEDBANK LIMITED — NBG07G
	STANDARD BANK GROUP LIMITED — SST201
3.*	To what extent have green bonds impacted your investment or funding decisions?(tick applicable)
	a. No impact on investment or funding decisions
	b. Plans to incorporate but no action taken
	c. Prefer green bonds where available and where competitively priced
	d. Mandates or targets
	e. Specific green bond funds
4.*	What percentage of your fixed income assets under management is currently invested in green bonds?
5.*	What are your preferred channels for green fixed income investments/funding? (tick applicable)
	a. Sovereign green bonds
	b. Development bank green bonds
	c. Corporate green bonds
	d. Pure play bonds (where more than 75% of revenue is generated by clean assets)
	e. Private placements of green bonds
	f. Green loans
	g. Other, Please specify:_____
6.*	If you invest or intend to invest in green bonds, how important are the following factors in making an investment decision? (Rank each option individually 1–5, where 1 is not important, 5 is very important)
	a. Credit rating constraints
	b. Currency preferences
	c. Issuer or sector constraints
	d. Minimum size of issue/liquidity
	e. Satisfactory green credentials at issuance
	f. Satisfactory green credentials post issuance
	g. Pricing
	h. Other, Please specify:_____
7.*	Rank the asset classes in which would you like to buy more green bonds: (rank each 1–5, from no preference to high preference)
	a. National Governments (including state owned entities)
	c. Local governments
	d. Development banks
	e. Financial corporates
	f. Non-financial corporates
	i. Other, Please specify:_____
8.*	Would you be more inclined to buy a vanilla bond from an organisation that has issued a green bond, over a vanilla bond from an organisation that hasn't? (Tick which applies best)
	a. Less inclined
	b. No preference
	c. More inclined

*, Questions reserved for responses from issuers and investors.

9.*	Would you buy a green bond if it was not clear that proceeds were going to be allocated to green projects?
	a. No
	b. It would be less likely
	c. Yes
10.*	Would you sell a green bond if post-issuance green bond reporting is poor?
	a. No
	b. More likely/engage
	c. Yes
11.	Rank the following issues that could make investing in green bonds more attractive: (Rank each option individually 1–5, where 1 is not important, 5 is very important) available.
	a. Bond issuer has positive fundamentals
	b. Bond is included in indices
	c. Bond issuer transparency/disclosure overall practice
	d. External review
	e. Certification under the Climate Bonds Standard
	f. Impact reporting
	g. Post issuance transparency and detailed Upon disclosure
	h. Portfolio diversification
	i. Bond is secured on green assets/project
12.	Would you prefer: (Tick one)
	a. Strict definitions of green to ensure the green label is only applied to high quality projects?
	b. Less strict definitions of green to allow for diversity in issuance and to scale up the market?
	c. No preference
13.	Rank the main market tools and mechanisms that in your opinion could be developed or leveraged to support investment in green bonds: (rank each 1–5, where 1 is not important, 5 is very important)
	a. Positive credit fundamentals
	b. International credit ratings which integrate environmental risk analysis
	c. Full or partial investment guarantees (i.e. non-financial obligations, contract breaches, currency)
	d. Green sovereign bonds
	e. Green bond list and platforms supported by exchanges
	f. Green funds set up by international organisations (demonstration of track record)
	g. Other, Please specify:_____
14.	Rank the main policy mechanisms that would enable you consider will increase investment in green bonds: (rank each 1–5, where 1 is not important, 5 is very important)
	a. Penalising capital requirements for high-carbon assets
	b. Preferential capital treatment for low-carbon assets
	c. Tax incentives
	d. Subsidies
	e. Mandatory climate-related financial disclosures (e.g. adoption of TCFD)
	f. Regulatory and legislative trends
	g. Official minimum standards for green definitions and criteria set
15.	In your opinion, what is the main driver that will enhance growth and scale of the green bond market? (Name one) (Text-based answer – use at least 300 or more characters to describe the driver)
16.	What is the main obstacle? (Name one) (Text-based answer – use at least 300 or more characters to describe the obstacle)
17.	How do you keep abreast of opportunities/developments in the green bond market? (tick any that apply)
	a. Direct contact from underwriters or brokers
	b. Individually using Bloomberg or Thomson Reuters/EIKON
	c. Specialised analyst (web and data providers sources)
	d. Climate Bonds market blogs and research reports
	e. Internal communication (colleagues, word of mouth and similar)
	j. Other, Please specify:_____
18.	How could rising interest rates alter appetite for green bonds? (Tick one)
	a. No change
	b. Increase
	c. Decrease
	d. Cannot say
19.	How do you regard the importance of the green bond market in shifting capital from less sustainable to more sustainable investments?
	Not at all important
	Slightly important
	Moderately important
	Very important
	Extremely important
20.	Rank the category of incentive that you regard as most important for stimulating investment in green bonds (rank each 1–5, where 1 is not important, 5 is very important)
	Financial Case (i.e. better financial returns, reduced financial risk, Universal investor incentives, Lower cost of capital, better capital access)
	Business Case (i.e. branding, operational efficiency, creating new markets, reduced business risk)
	Legitimacy/institutionally orientated drivers (i.e. legitimacy seeking and the social license to operate, accountability to identifiable stakeholders, institutional pressures)

*, Questions reserved for responses from issuers and investors.