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Understanding the Financial Risk of Black Economic Empowerment in the South African Industrial Sector

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Abstract

The South African government policy of Broad-Based Black Economic Empowerment (B-BBEE) has been criticised in terms of its effectiveness, bureaucracy and corruption, and criticised for the risks that B-BBEE is perceived to create for the businesses and industries that implement it. The objective of this study was to evaluate the statistical relationship between financial risk and B-BBEE compliance in South African industrial firms listed on the Johannesburg Stock Exchange. Multivariate panel regressions were performed using the seven elements of the B-BBEE scorecard, as well as the overall B-BBEE score. The findings demonstrate that only two elements of a South African industrial firm's B-BBEE compliance - its Management Control ratings and its Preferential Procurement ratings - have a statistically significant, positive association with its financial risk. The overall B-BBEE score and the other five B-BBEE elements hold no statistically significant relationship with financial risk. Industrial companies are encouraged to manage their financial risk surrounding B-BBEE by improving their human resource retention strategies, tightening the screening process for recruitments and new appointments, and following industry-accepted best practice in their supply chain management, while considering B-BBEE credentials merely as a secondary factor when choosing suppliers. This study contributes to the existing body of B-BBEE and risk research through the scoping, sourcing and replicability of the financial risk metrics and B-BBEE data used.

1. Introduction

Broad-Based Black Economic Empowerment (B-BBEE) encompasses various diverse socio-economic strategies to enhance black participation in all spheres of the South African economy. Much like the empowerment initiatives in Malaysia, Mauritius and Trinidad and Tobago (Sriskandarajah, 2005), B-BBEE were instituted to aid an economic under-class which first evolved from the societal inequities imposed by British colonial rule. The racial income divide was, however, further deepened in South Africa by the post-colonial Apartheid regime — the purpose of which was the intentional advancement of the social and economic interests of the white population, while actively obstructing the equitable access of black citizens to economic opportunities (Habib and Padayachee, 2000). Because of the resulting demographics of the income disparities in South Africa – i.e. the minority

ethnic group holds wealth, while the majority ethnic group is impoverished – it is hoped that the economic redress B–BBEE offers to the majority of the population will be beneficial to the country's economy as a whole. The ultimate objective of B–BBEE is the economic transformation of 'all black people, in particular women, workers, youth, people with disabilities and people living in rural areas', an ideal which is mandated by legislature (Republic of South Africa, 2003:4).

The Department of Trade and Industry (DTI) is tasked with ensuring that the requirements of the B–BBEE Act are met, though to date (October 2024) there is no system to effectively monitor companies' compliance. Enterprises voluntarily submit to annual appraisals by independent evaluators, as a means of evidencing their performance in the progression of the seven elements of B–BBEE (Republic of South Africa, 2007):

- Ownership refers to the effective ownership of corporate entities by black people, through shareholding and voting rights.
- Management Control relates to the effective control of corporate entities by black people at executive and managerial level.
- Employment Equity pertains to a company's initiatives intended to achieve equity in the workplace for the benefit of its black employees.
- Skills Development concerns the initiatives an employer takes to develop the competencies of its black employees.
- Preferential Procurement relates to the extent to which a company buys goods and services from suppliers with high B–BBEE ratings.
- Enterprise Development involves an entity's initiatives taken to advance the development and sustainability of other enterprises.
- Socio-economic Development refers to a company's efforts to promote the upliftment of black people, their communities and their access to the economy.

To a lesser or greater extent, B–BBEE compliance appears to hold potential financial, equity market and performance benefits for South African corporate entities (Mathura, 2009; Kleynhans and Kruger, 2014; Van der Merwe and Ferreira, 2014; Akinsomi, Kola, Ndlovu and Motloung, 2016; Mehta and Ward, 2017; Busse, Kupzig and Vogel, 2023). The appearance of commitment to B–BBEE upliftment is attractive to potential customers and investors and is therefore a source of significant competitive advantage to South African companies. Furthermore, higher B–BBEE scorecard ratings are directly beneficial to entities when securing tenders within the private sector, public sector and from state-owned enterprises (Strydom, Christison and Matias, 2009). Despite the potential corporate benefits of B–BBEE, the upsurge in the government's combative measures against B–BBEE fronting and window-dressing (Department of Trade and Industry, 2018) indicates that South African companies are reluctant to fully embrace the B–BBEE process. These anti-fronting counter-measures include criminalising fronting at the penalty of hefty fines and imprisonment in Section 13O(3)(a) of the B–BBEE Amendment Act (Republic of South Africa, 2014), launching an awareness campaign with a national roadshow of conferences (DTI, 2016) and introducing a whistleblowing mechanism to report fronting to the DTI (DTI, n.d.)

Corporate hesitancy in embracing B–BBEE may be attributable to the fact that, historically, empowerment initiatives in other emerging economies have not been helpful to the countries' corporate sectors and economy. Trinidad and Tobago's economy eventually stabilised after a decade of severe decline during their 'one nation' strategy of hegemonic political and economic projects (Sriskandarajah, 2005). Zimbabwe's Zimbabwe Indigenisation Program (ZIP) was promulgated in 2007 (Zimbabwe Ministry of Youth, Indigenisation and Economic Empowerment, 2007) and it is arguable that the radically reformative empowerment program has been a serious contributing factor to the country's hyperinflationary state of economic crisis since then. Malaysia's New Economic Policy (NEP) was riddled with widespread cronyism, favouritism and maladministration (Hanna, 2006), diminishing the country's economic competitiveness. The NEP's targeted indigenous ethnic

groups became complacent because of the extensive preferential treatment they were given, further reducing their participation in the labour and economic markets (Hock Guan, 2003).

There is no mechanism for measuring the extent to which B–BBEE is achieving its desired empowerment objectives (Acemoglu, Gelb and Robinson, 2007). It is therefore not surprising that a major critique of B–BBEE is that it has been ineffective in its objectives, creating economic opportunities for only the politically-connected elite through unfairly beneficial or outright corrupt application of the B–BBEE policies (Shai, Molefinyana and Quinot, 2019). Corrupt business practices, including those relating to B–BBEE, may increase a company's financial risk as the resulting reputational damage could lead to financial losses and deter potential investors and credit providers, reducing the company's access to capital.

Another criticism is that B–BBEE compliance impedes autonomous business decision-making, as it is fraught with bureaucratic red-tape (Tangri and Southall, 2008). High compliance costs associated with complex B–BBEE regulations, the diversion of time and resources to B–BBEE initiatives and away from core business activities, the financial loss of missed opportunities while awaiting B–BBEE approvals - all these factors hinder management flexibility in their financial decision-making, contributing to financial risk.

Krüger (2011) found that South African management executives deem B–BBEE to be detrimental to business ethics, echoing the criticism presented by Shai et al. (2019). Management executives consider B–BBEE to be counterproductive to industrialisation (Krüger, 2014) as it is perceived to have a demoralizing effect on human development, worker morale and entrepreneurial spirit (Krüger, 2011). This negativity aligns with both Tangri and Southall (2008) and Shai et al.'s (2019) findings, as ordinary workers and business owners may be discouraged by the barrier to market entry posed by difficulty in navigating complicated B–BBEE regulatory processes and they may be further disincentivised seeing empowerment initiatives only benefit a narrow base of already wealthy, well-connected individuals. Krüger (2011; 2014) found that executives view B–BBEE to be anti-competitive, as they perceive it to have an adverse effect on access to markets, product quality, service excellence and client satisfaction. In summary, South African executives perceive B–BBEE to be detrimental to corporate performance (Krüger, 2011) and detrimental to the overall health of the South African commercial sector (Krüger, 2014). Furthermore, these persistent negative perceptions of B–BBEE appear to be due to a perception of increased financial risk.

The research problem of this study focuses on whether the aforementioned negative perceptions about B–BBEE are rooted in reality. This study aims to empirically evaluate whether these perceptions are justified by examining the relationship between B–BBEE compliance and financial risk.

Academic and finance literature often steers clear of providing an exact definition of financial risk because "it is as if everyone knows what risk is so there is no need to define it" (Shah and Baker, 2015:11). As financial risk is commonly understood to have an undefined list of sub-categories, a broader definition is considered preferable to a narrow definition to avoid distorting "the fundamental meaning and consciousness of financial risk" (Shah and Baker, 2015:16). Therefore, in this study, the Johannesburg Stock Exchange's (JSE) definition of financial risk (Johannesburg Stock Exchange, n.d.) has been adopted to use as an umbrella term for the risk of financial loss associated with the financial management of an enterprise.

In contrast to the outright negative perceptions about B–BBEE, deductive reasoning infers that there are mixed relationships between the theoretical implementation of the different B–BBEE elements and financial risk:

- One might argue that, in principle, the race of an enterprise's shareholders and management should have no bearing on the quality of its operations and financial management decision-making. However, in post-Apartheid South Africa, there is a remaining legacy of unequal access to quality education for blacks (Arendse, 2019). In addition, blacks are also willing to take more risks when making financial decisions than whites (Dickason and Ferreira,

2018). It is reasonable to theorise that if these characteristics extend to their roles as black shareholders and black managers, it may increase the company's financial risk. Managers are directly responsible for a company's financial decision-making, and an enterprise's risk appetite is determined in relation to those of its shareholders and other stakeholders (Martens and Rittenberg, 2020). Higher Ownership and Management Control ratings are therefore expected to hold a positive relationship with a company's financial risk.

– Building employees' value-creating competencies through skills development and training maximises their human capital efficiency and the benefit they are able to derive from the company's other resources (Morris, 2015). Employee training also has a positive effect on financial management by improving their financial literacy and ability to manage company resources (Oyelakin and Abdullahi, 2022), mitigating the risk of financial loss. Given the historical inequalities hampering black access to education (Arendse, 2019), corporate investment in its own black human capital may be particularly beneficial to companies' financial management and consequently its financial risk. One would therefore expect higher Skills Development scores to be associated with lower financial risk.

– Creating fair, equal and inclusive opportunities for one's workers would presumably improve staff morale, engagement and productivity – regardless of their race. This intuitive thinking aligns with the value-in-diversity perspective which presents a business case for diversity as it produces better business results (Herring, 2009) by avoiding groupthink, leading to a greater variety of problem-solving approaches (Hunt, Layton and Prince, 2015) to risk analyses and financial management. One would therefore expect higher Employee Equity scores to be associated with lower financial risk.

– Basing supply chain decisions primarily on a supplier's B-BBEE score intuitively seems unwise. Transaction cost economics emphasize that the supply decision - the choice between making, buying, franchising and undertaking a joint venture - should be determined by the dependence of the various parties on underlying resources, their competence and their efficiency (Ketokivi and Mahoney, 2020). The theory of constraints dictates that suppliers be chosen based on the extent to which they can improve overall supply chain efficiency by better exploiting or alleviating an identified constraint within the company's procurement process (McCleskey, 2020). Lean supply chain management entails supplier selection based on their ability to meet customers' individual needs, while minimising the associated cost and waste of resources (Moyano-Fuentes, Maqueira-Marin, Martinez-Jurado, Sacristan-Diaz, 2021). Theoretically, supplier selection should therefore depend on the supplier's ability to efficiently and effectively service the company's operational, logistics, and costing needs. The supplier's own B-BBEE rating appears to have no bearing on its ability to meet this criteria. Targeting suppliers based on their B-BBEE rating may lead to the misallocation of financial and other resources and financial loss due to the inefficiency of the procurement process. The pursuit of higher Preferential Procurement ratings might therefore be linked to higher financial risk.

– By its nature, financial spending on the development of enterprises other than itself represents a potential investment opportunity cost for the benefactor company. The type of development support offered and the extent of a benefactor company's financial involvement with the beneficiary enterprise would also constrain its own financial flexibility – which limits its ability to avoid financial distress (Gamba and Triantis, 2008). Therefore, higher Enterprise Development ratings are expected to be positively related to financial risk.

– Charitable contributions to community upliftment tend to have a positive effect on a company's brand image and business reputation, regardless of which race the corporate social investment is directed at. Reputational strength is associated with lower costs of capital and higher revenue (Gatzert and Schmit, 2016), mitigating financial risk. Consequently, this

type of corporate social investment has a positive effect on financial risk management (Tran, Bui, Phan, Dau, Tran and Do, 2019; Yankovskaya, Mustafin, Endovitsky and Krivosheev, 2022). One would therefore expect Socio-economic Development ratings to be negatively associated with financial risk.

However, the theoretical implementation of B–BBEE could differ vastly from its actual implementation in practice. Therefore, the research problem warrants investigation as unmerited negative connotations could be a deterrent to B–BBEE compliance, resulting in the forfeiture of all its benefits. Furthermore, existing empirical research on the topic of B–BBEE and risk is very limited and exploratory in nature. As far as could be established, only two such studies exist. Morris (2018) examined business risk, confirming that B–BBEE has no statistically significant relationship with an entity's level of business risk. Dreyer, Viviers and Mans–Kemp (2021) examined financial risk, but with certain shortcomings to the research design. Using aggregated data from Empowerdex's top 100 most empowered companies and Bloomberg's proprietary default risk probability, they found a positive relationship between financial risk and total B–BBEE ratings, but could not identify any statistically significant relationship with the individual B–BBEE elements. The financial risk implications of B–BBEE are therefore heavily under-explored and still not clear. The current research study sought to bridge this research gap and make an incremental contribution to the extant literature on financial risk and B–BBEE through a more robust research design which addresses the shortcomings identified in the prior research.

The research objective of this study evaluates the validity of negative B–BBEE perceptions by examining the relationship between the seven elements of B–BBEE and corporate financial risk. The findings confirm that Management Control and Preferential Procurement are positively associated with financial risk, and the relationships are statistically significant. A positive relationship was observed between financial risk and Ownership and Enterprise Development, while a negative relationship was observed between financial risk and Skills development, Employment Equity, Socio-Economic Development and the overall B–BBEE ratings. However, these latter results were not statistically significant and thus not conclusive.

The remainder of this manuscript is organised as follows. Existing literature relevant to understanding financial risk and the risk implications of B–BBEE are summarised in Section 2. Section 3 outlines the research design, methodology and sample selection process utilised in the study. The discussion of the descriptive statistics and regression results follow in Section 4. Section 5 discusses the research conclusions, limitations of the study and recommendations for future research.

2.   Literature review
The literature review of prior empirical research on financial risk exposure served to gain an understanding of financial risk and develop expectations of its relationship with B–BBEE.

2.1   Understanding financial risk
Financial risk exposure is a well-explored research area and there is an extensive body of existing literature on the subject matter using various measures of financial risk, independently or in combination with each other, both locally and in other emerging and developed economies. However, no singular metric or combination of metrics for financial risk could be identified as dominant, most universally-accepted or most favoured in prior research. Therefore the literature review focuses on accounting-based financial risk ratios as the requisite data would be derived from annual integrated report disclosure and thus more easily accessible and calculable.

The Zmijewski-score offers a financial risk formula combining financial ratios measuring income-generating capacity (proxying cash flow ability), the current ratio (proxying liquidity) and a capital structure ratio (Zmijewski, 1984). The O-score and its variations (Ohlson, 1980; Griffin and Lemmon,

2002) measure financial risk by combining two profitability ratios, the current ratio and a working capital ratio (proxying liquidity), the debt ratio (for capital structure) and funds from operations-to-debt ratio (assessing cash flow adequacy). Altman's Z-score (Altman 2002) combines a retained earnings-to-assets ratio (representing capital structure), a working capital ratio, the asset turnover ratio, and an operating income ratio (proxying liquidity). Tykvova and Borell (2012) compared these metrics - Zmijewski-score, O-score and Altman's Z-score - when measuring financial distress risk in the European Union.

Based on the literature, no individual financial risk measure appears to be 'better' than any other. However, a common factor linking the underlying calculations of these widely different financial risk measures, is that they each included coverage of one or more of the following three sub-categories of financial risk — i.e. liquidity, cash flow adequacy and capital structure. Therefore, it is reasonable to presume that a good financial risk metric should measure all three of these risk sub-categories.

The rest of this sub-section will discuss literature reviewed on the determinants of financial risk. It is generally accepted that a borrower's ability to relinquish tangible assets as security or collateral to lenders, in lieu of cash repayment, reduces their risk of default and consequently financial risk. This inverse relationship between potential for collateralisation and financial risk was confirmed by both Van Binsbergen, Graham and Yang (2010) in the United States and Achek and Gallali (2015) in Tunisia, who both found that higher proportions of property, plant and equipment and inventory to total assets have a negative impact on the cost of debt. Furthermore, Karjalainen (2011) found that collateral may mitigate the agency costs of debt.

Van Binsbergen et al. (2010) found cash flow levels, company size and market-to-book ratio (as a proxy for growth potential) to be positively associated with the cost of debt, but negatively associated with debt usage. Larger firms with significant cash flows and growth opportunities therefore behave in accordance with the pecking order theory, by utilising less debt financing as they suffer higher costs of debt (Van Binsbergen et al., 2010). Berk (2006) similarly found that Slovenian listed companies with strong growth opportunities and financial performance tended to use less debt funding — presumably due to their ability to generate sufficient funds internally. He used market-to-book ratio and return on capital as his measures of growth potential and financial performance, respectively. Furthermore, Klock, Mansi and Maxwell (2005) identified a negative correlation between financial risk as measured by S&P Global Ratings' (S&P Global) credit rating spread and the size and financial performance of US firms.

In a cross-sectoral study of Chinese firms, Yang, Hassan, Al-Baity and Zou (2015) came to the opposing conclusion that larger firms with greater profitability and growth opportunity displayed higher total debt exposure and thus also higher financial distress costs. They also observed that industrial firms hold higher levels of debt than other sectors. This observation loosely corresponded with their finding that higher total debt is associated with lower employee productivity, as it may be argued that industrial firms are more physical capital intensive than labour capital intensive. Mitton (2007) offered further contradictory evidence with respect to debt ratios in emerging economies, by confirming a positive relationship with company size and asset tangibility and a negative relationship with profitability and growth opportunities.

2.2   *Understanding the financial risk implications of B-BBEE*

The existing literature which directly examines the relationship between B-BBEE and financial risk is scant. One such study was identified, however it found no statistically significant relationship between the B-BBEE elements and Bloomberg's metric for default risk probability (Dreyer et al., 2021). The underlying calculation of the risk metric is not made public by Bloomberg, so it could not be analysed or independently recomputed. As the Bloomberg database is compiled from multiple sources, it would have added confidence to be able to evaluate the construction of the risk metric for validity and fitness for purpose. The study also aggregated data across different sectors, downplaying

the impact and importance of statistical variations that B–BBEE regulatory differences between business sectors could cause. A further criticism is that the B–BBEE scores by Dreyer et al. (2021) were sourced from Empowerdex's annual lists of top 100 most empowered companies and were thus inherently skewed upward.

The current research study therefore adds value and provides an incremental contribution to the limited existing research on B–BBEE and financial risk exposure, adding robustness to the findings of Dreyer et al. (2021)'s initial exploration by intentionally improving on the identified shortcomings in their data. This study uses B–BBEE scores obtained directly from publicly available B–BBEE certificates (proven to be statistically symmetric, thereby avoiding upward or downward bias) within a single sector (thereby circumventing sectoral B–BBEE charter differences), along with a financial risk metric independently calculated from published audited financial statement data and publicly available equations of financial risk ratios (thereby enabling reproduction, review and replication) used by an internationally reputable Big Three credit ratings agency (thereby enhancing credibility of being fit for purpose).

The remaining literature offers more indirect inferences about B–BBEE and financial risk. Ackerman and Meyer (2007) concluded that lending to B–BBEE companies should be regarded as a business opportunity and not a risk if certain credit risk mitigants were applied. South African lenders should consider the entity's credit history, quality of management, capital structure and availability of security when assessing the creditworthiness and financial risk of potential B–BBEE borrowers (Ackerman and Meyer, 2007). Higher B–BBEE ratings might therefore be linked to poorer creditworthiness and higher financial risk, but not necessarily.

Pike, Puchert and Chinyamurindi (2019) found that B–BBEE promotes tender corruption and economic strain. Their finding supports the reasoning that the pursuit of higher preferential procurement ratings to win tenders is linked to higher financial risk.

Stepanova and Rabotinskiy (2014) found mixed evidence on the impact of ownership structure and ownership concentration on financial risk (as measured by cost of debt) in developing countries. Klock et al. (2005), on the other hand, established that the degrees of institutional and executive ownership are negatively associated with financial risk. Their results imply that lower agency costs and directness of shareholders' managerial control are beneficial in reducing an entity's financial risk. Facilitating B–BBEE ownership often involves complex shareholding structures which do not entail the B–BBEE shareholders having direct managerial control. B–BBEE ownership may therefore be associated with higher corporate financial risk.

De Jongh (2004) noted that social risk management practices enjoy a cross-impact of the risk components of social risk, financial risk and environmental risk, which have positive cross-risk implications for organisations and individuals. Stated simply, steps taken by a company to manage social risk also have the effect of managing financial risk and environmental risk – and the consequences of managing these risks are enjoyed by the company, its stakeholders and society. Employee affirmative action, staff development through formal and on-the-job training and occupational education initiatives are ways of managing social risk from within the company's own workforce. Therefore, De Jongh (2024)'s findings suggest that that managing affirmative action, employment equity and skills development would boost a company's B–BBEE ratings and also be associated with lower financial risk. Similarly, it implies that corporate socio-economic development initiatives that benefit society by reducing social risk would also be associated with lower financial risk for the company.

Conventional understanding of the risk-return trade-off implies that any performance benefits of B–BBEE compliance might be gained at the cost of incremental risk - contributing to the expectation of a positive association between B–BBEE and financial risk. Entities may willingly sacrifice flexibility in their financial decision-making and knowingly make less-than-ideal financial decisions in pursuit of higher B–BBEE scores and the potential benefits associated with B–BBEE compliance.

Mudau (2022) found that B–BBEE has a positive impact on organisational effectiveness – particu-

larly with respect to managerial effectiveness, organisational sustainability, organisational strategy and organisational culture. Mathura (2009) identified a positively skewed performance relationship - with higher B-BBEE ratings being associated with higher profitability, and no negative effect from lower BEE ratings. Preston and O'Bannon (1997) found that there are financial benefits to be gained by a company from undertaking socially corrective B-BBEE actions. Kleynhans and Kruger (2014) and Mehta and Ward (2017) noted a positive association between equity market performance and B-BBEE compliance, while Van der Merwe and Ferreira (2014) identified similar equity market benefits from black management control. Busse et al. (2023) found that B-BBE scores hold a positive relationship with turnover and labour productivity. According to the risk–return trade–off, the corporate benefits identified from having higher management control, socio-economic development and overall B-BBE scores may be associated with higher financial risk.

Despite the various expectations raised in the prior studies about the relationship between B-BBEE and financial risk, it is important to note that the B-BBEE landscape constantly changes. Numerous amendments were made to the B-BBEE Codes of Best Practice between May 2015 and November 2019, amendments were made to the Preferential Procurement Regulations in 2022 (Republic of South Africa, 2022) and the Employment Equity Amendment Bill was introduced in 2020 (Republic of South Africa, 2020). These regulatory amendments change the way B-BBEE is implemented, as do legal precedents set in constitutional, criminal and civil legal proceedings. For example, in 2022, a Constitutional Court ruling on the Mining Charter directly impacted the principle of 'once empowered, always empowered' in specific scenarios (Omarjee, 2022) as it allowed mining companies to retain their B-BBEE Ownership ratings even while no longer meeting the minimum criteria (because their previous black shareholders had voluntarily sold their shares to non-black shareholders). Although this ruling related specifically to the mining and minerals sector, its potential application to B-BBEE ownership in other sectors is not unforeseeable. It goes without saying that these legal and regulatory changes could greatly alter the dynamics between the way B-BBEE ratings are calculated, companies' B-BBEE behaviour and the risks attached to them.

3. Materials and methods

3.1   *Availability of corporate B-BBEE scorecard data*

It is not clear to what extent the South African government is practically able to comprehensively monitor the implementation of B-BBEE in the country as a whole. Section 13G(2) of the B-BBEE Act (Republic of South Africa, 2003) and Section 2.6 of the supplementary Codes of Good Practice (Republic of South Africa, 2013) compel entities to hold independently evaluated scorecards as evidence for any assertions made regarding their compliance with B-BBEE regulations. Listed companies then have to report these scorecards to the Companies and Intellectual Property Commission (Republic of South Africa, 2003). Unlisted companies are merely encouraged to volunteer to be rated, and neither listed nor unlisted companies are obligated to publicly disclose their B-BBEE ratings. Furthermore, the depth of voluntary disclosure of B-BBEE information in corporate integrated reports is limited and depends largely on the constituents of an entity's corporate governance structures (Ntim and Soobaroyea, 2013) — i.e., size and diversity of the board of directors and proportion of non–executive directors.

With over 70 000 voluntary submissions updated annually, the independently–run Beagle database (Mpowered, n.d.) has been operational since 2010 and consequently, is the most comprehensive, publicly and freely accessible library of verified B-BBEE certificates available to public citizens and academic researchers. The voluntary nature of submission to the Beagle database does carry the potential for self-selection bias — with higher rated companies being more inclined to voluntarily disclose their B-BBEE scorecards than lower rated companies. A biased sample would therefore be positively skewed. However, the sample entities' overall B-BBEE scores reflect a negative Pearson coefficient of skewness of –0.452 which indicates symmetric data and the absence of self-selection

bias in the research sample.

3.2   Data sourcing, collection and sampling process

The B–BBEE data used as the independent variable in this study was obtained from the Beagle database. This study explores South African JSE–listed industrial firms for the financial year-ends falling between 1 January 2010 and 30 April 2015 which are contained in the aforementioned Beagle database. The research period was selected based on the availability of statistically comparable B–BBEE data on the Beagle database. The start of the research period corresponds with the issue date of the earliest uploaded B–BBEE scorecard on the Beagle database. The end of the research period was selected to avoid issues raised by variations in the calculation of the B–BBEE scores arising from piecemeal amendments to the B–BBEE Codes of Best Practice between May 2015 and November 2019, the introduction of the Employment Equity Amendment Bill in 2020 and amendments to the Preferential Procurement Regulations in 2022.

The BEE scorecard ratings are only usable as a reliable proxy for BEE corporate behaviour as long as they consistently measure the same BEE actions/activities undertaken over time, at the same scorecard rating over time. The aforementioned piecemeal BBEE regulatory/legislative amendments effected between May 2015 and January 2023 could result in the same BEE action/activity being awarded a different scorecard rating after each amendment. The BEE scorecard ratings awarded over that time period are thereby rendered unusable as they are incompatible with each other, as well as with pre–May 2015 and post–January 2023 scorecard ratings. The latest date of compatible B–BBEE data is therefore 30 April 2015, hence its selection as the end date of the research period for this study. The age of the research data is an unavoidable limitation in this study. It is suggested that the study be repeated in the future, for robustness, once sufficient comparably calculated B–BBEE data is available for the years beyond 2022.

A B–BBEE certificate is valid for 12 months from its issue date. A company's ability to gain improved or preferential access to business opportunities based on the scores in its B–BBEE certificate (and similarly its ability to lose such benefits based on the scores) begins immediately upon issue and extends until expiry. Therefore, it is considered appropriate to use contemporaneous data in the statistical analyses — comparing financial risk data in a financial year to the B–BBEE scores prevailing over the same period of validity.

The Industrials sector was selected as it is the largest of the three main sectors of the JSE — Industrials, Resources and Financial. The Industrials sector accounts for the majority of the JSE's market capitalization at approximately 66.2% (FTSE Russell, 2023). Similarly, industrial sector entities also account for most of the Beagle database submissions. Perhaps most importantly, the Industrials sector was emphasized as it is widely recognized that industrial development and sound industrial policies are crucial for a strong economy and sustainable economic growth (Goga and Avenyo, 2022). Furthermore, the Resources and Financials sectors have various special B–BBEE charters that distinguish their constituent entities' B–BBEE calculations and which may render statistical comparisons difficult or inappropriate.

The equity market data and financial statement data used to calculate the dependent and control variables, was obtained from the internationally-known IRESS Expert. Equity market data as at each financial year-end falling between 1 January 2010 and 30 April 2015; as well as annual financial statement data for each financial year ending between 1 January 2010 and 30 April 2015 was utilised. The first possible company year of any company in the research sample was therefore the financial year ended 31 January 2010 and the last possible company year of any company in the research sample was therefore the financial year ended 30 April 2015.

Although the research period covers the financial years ending 1 January 2010 to 30 April 2015, the research data does not represent an unbroken stretch of company data for that entire research period as some companies were not listed every consecutive year within that period (due to being

newly-listed or delisted) and may not have submitted B-BBEE scorecards to the Beagle database every consecutive year within that period. The statistical requirement of data completeness was addressed by restricting the research sample to a minimum of four time points, i.e. only companies with four or more consecutive years of complete data were included.

80 companies were listed on the JSE Industrials sector during the research period, giving a maximum of 335 potential company years over the research period. The research population obtained from the Beagle database consisted of 139 company years. The final research sample consisted of 73 company years. This coverage was considered satisfactory, given the voluntary nature of public disclosure of B-BBEE scores, the voluntary nature of submission to the Beagle database and that companies may not have been listed for the entire period. In light of the aforementioned regulatory changes, legislative changes and industry charter differences, the statistical benefits of restricting the sample industry and time period (to improve the comparability of the B-BBEE data) were considered to outweigh the disadvantages of reducing the sample size.

3.3   *Measurement of dependent variable - financial risk*

For the purposes of this study, financial risk has been defined as the risk of financial loss associated with the financial management of an enterprise (Johannesburg Stock Exchange, n.d.). From the literature review, it was evident that in risk theory and in corporate practice, there is no singularly dominant measure or combination of measures of financial risk. However, three common financial risk sub-categories were identified from prior literature — cash flow adequacy, liquidity and capital structure — which should all be represented in the formulation of a sound financial risk metric.

In the absence of 'best practice' when selecting proxies for each financial risk sub-category, the author looked to a global expert in financial risk measurement to provide assurance of the credibility of the proxies used to construct the measurement tool in this study. S&P Global is one of the top three largest international credit ratings agencies, whose risk analyses are widely-recognised and in everyday use across global financial markets. Their proprietary financial risk matrix (Standard and Poor's Ratings Services, 2012) is composed of quantitative and qualitative measures, including three commonly-known financial ratios which align with the previously-identified financial risk sub-categories — cash flow adequacy, liquidity and capital structure.

- – Funds from operations (FFO) represents the total cash earnings of a business. The lower an entity's FFO to its debt, the lower its cash flow adequacy and thus the higher its financial risk.
- – Earnings before interest, tax, depreciation and amortisation (EBITDA) is a reflection of an entity's operating income capacity. The higher an entity's debt to its EBITDA, the lower its expected liquidity and thus the higher its financial risk.
- – The higher an entity's debt to its total capital, the more highly geared its capital structure and thus the higher its financial risk.

These three proxies were used to derive a composite financial risk indicator (FRI) for the purposes of this study. Refer to Table 1 for the definition of the three constituent ratios of FRI.

Table 1. Defining the constituent ratios of the composite financial risk indicator (FRI)

Risk sub-category	Financial ratio	Definition
Cash flow adequacy	Funds from operations (FFO) / Debt	(Net income from continuing operations before depreciation and amortisation, deferred income taxes, and other non-cash items) ÷ (Long-term debt + current maturities + commercial paper, and other short-term borrowings)
Liquidity	Debt / Earnings before interest, tax, depreciation and amortisation (EBITDA)	(Long-term debt + current maturities, commercial paper, and other short-term borrowings) ÷ (Earnings from continuing operations before interest, taxes, depreciation and amortisation)
Capital structure	Debt / Capital	(Long-term debt + current maturities, commercial paper, and other short-term borrowings) ÷ (Long-term debt + current maturities, commercial paper, and other short-term borrowings + shareholders' equity + minority interest)

Source: Derived from Standard and Poor's Ratings Services (2006)

S&P Global's financial risk classifications, their benchmarks for the three constituent ratios, and the ordinal scale applied for the computation of FRI, are presented in Table 2. S&P Global's benchmarks in their financial risk matrix were used to delineate the incremental financial risk levels (i.e. from minimal to highly leveraged) for each of the constituent ratios. A six–point ordinal scale was then applied to assign a value to each financial risk level. Consequently, each company year in the sample was assigned three values ranging from one to six to represent the financial risk level of the three prevailing constituent ratios. These three values were then aggregated to derive the FRI for each company year, thereby allocating equal weightings to each sub–category of financial risk (Standard and Poor's Ratings Services, 2008; Ratshikuni, 2009). Based on this computation, the minimum FRI possible is three points and the maximum is 18 points.

Table 2. Computation of the composite financial risk indicator

Financial risk classification	Ordinal scale	Benchmarks		
		FFO / Debt	Debt / EBITDA	Debt / Capital
Minimal	1	Greater than 60%	Less than 1.5 times	Less than 25%
Modest	2	45 - 60%	1.5 - 2 times	25 - 35%
Intermediate	3	30 - 45%	2 - 3 times	35 - 45%
Significant	4	20 - 30%	3 - 4 times	45 - 50%
Aggressive	5	12 - 20%	4 - 5 times	50 - 60%
Highly leveraged	6	Less than 12%	Greater than 5 times	Greater than 60%

Source: Derived from Standard and Poor's Ratings Services (2012)

3.4   Measurement of independent variables - B-BBEE element and overall scores

The overall score on the B–BBEE scorecard is calculated as the total score of each of the seven individual elements, as described in Table 3.

Table 3. The Broad-Based Black Economic Empowerment (B-BBEE) scorecard

Element	Abbreviation	Generic weighting
Ownership	OWN	20 points
Management Control	MGT	10 points
Employment Equity	EMPL	15 points
Skills Development	SKILL	15 points
Preferential Procurement	PROC	20 points
Enterprise Development	ENTERP	15 points
Socio-economic Development Initiatives	SOCIO	5 points
Overall B-BBEE score	OVERALL	100 points

Source: Derived from Republic of South Africa (2007) and Morris (2018)

There is no negative scoring, as the minimum element score which may be awarded is zero. Actual element scores may exceed the generic maximum weightings due to bonus points and 'inflatable points' available to incentivise performance in certain B-BBEE elements. Companies were especially incentivised to boost black ownership and black management by rewarding them with OWN and MGT element scores 'inflatable' by a maximum 1.92 (Republic of South Africa, 2007).

3.5 Measurement of control variables

Microeconomic modelling encompasses the relationships between the underlying attributes of a specific entity and its level of risk. Potential for collateralisation, firm size, financial performance and the market-to-book ratio (Klock et al., 2005; Berk, 2006; Mitton, 2007; Van Binsbergen et al., 2010) were selected as control variables due to their pervasiveness in other risk studies, as noted in the literature review.

For the purposes of this study, the maximum potential for collateralisation (COL) was calculated by dividing the sum of inventory, property, plant and equipment by total assets (Van Binsbergen et al., 2010; Karjalainen, 2011; Achek and Gallali, 2015). Collateral refers to the assets a borrower is able to offer as security to a lender of debt financing. These tend to typically be tangible and easily saleable. The more of such assets the borrower is able to offer as a guarantee of repayment should they not be able to repay in cash, the more protection both the borrower and the lender have against default. Therefore, the higher a company's potential for collateralisation, the lower its expected financial risk. This intuitively inverse relationship was confirmed by Van Binsbergen et al. (2010), Karjalainen (2011) and Achek and Gallali (2015).

Firm size refers to the magnitude or scale of a business' operations. In the industrial sector, this is readily measured by the level of a company assets as industrial firms arguably tend to be more physical capital intensive than labour capital intensive. Therefore, in this study, firm size (SIZE) was calculated as the natural logarithm of total assets. Logarithmic transformation was preferred over using the absolute values to reduce the potential impact of outliers. The larger a business is, the greater its capacity for generating cash and income. As a result, larger companies are more easily able to finance projects and expenditure through internally-generated funds. Therefore, based on deductive reasoning, larger firms tend to need less external debt in their capital structure and consequently experience lower financial risk. In addition, their higher cash flow generating ability combined with lower debt levels results in larger firms having higher levels of cash flow adequacy and thus lower financial risk. Firm size is therefore expected to be negatively associated with financial risk. This expectation aligns with the findings of Klock et al. (2005) and Van Binsbergen et al. (2010).

Market-to-book ratio (MB) was defined as the number of ordinary shares in issue multiplied by the closing JSE share price (i.e., the market capitalisation), divided by the book value of total shareholders' equity. The book value of an entity's equity is purely based on its balance sheet, i.e.

the accounting record of its historic operations and financial position to date. Its market valuation, on the other hand, is based on the fair value that investors are willing to pay for the entity's equity shares. MB therefore reflects all of the investors' perceptions and projections about the company that are not reflected its historic accounting book value. A high MB could indicate that investors anticipate high future growth in the company, believe it has valuable unrecognised intangible assets or believe that its recognised assets are worth more than they are currently recorded. The higher the MB, the greater the proportion of the company's share price that is attributable to perceptions and projections – and the greater the chance of the company not meeting these investor and market expectations. Therefore, the higher the MB of an entity, the higher its expected financial risk. This deduction aligns with the positive relationships identified in prior literature between financial risk and both MB (Van Binsbergen et al., 2010) and a company's growth potential (Yang et al., 2015).

Return on equity (ROE), was defined as net profit divided by average annual shareholders' equity. ROE was selected as the metric for financial performance as it measures a company's ability to generate income using the funds invested by its shareholders. The higher a company's income-generating capability, the greater its cash flow generating capacity and the lower its risk of defaulting on debt. Therefore, the higher an entity's ROE, the lower its expected financial risk. The findings of Klock et al. (2005), Berk (2006) and Mitton (2007) confirm the rationale that financial performance is inversely related to financial risk.

3.6   *The empirical models*

Time-series cross-sectional multivariate panel regressions were performed and the statistical techniques for validation of estimations are in line with those used in Morris (2018). A secondary regression was performed to estimate the relationship between the overall degree of B-BBEE compliance and financial risk - as an additional precaution to over-specification bias in the primary model examining the seven individual B-BBEE elements.

Based on deductive reasoning and the literature reviewed, it was postulated that the relationship between B-BBEE and financial risk differs by element. The independent variables for the Ownership, Management Control, Preferential Procurement and Enterprise Development ratings were anticipated to have positive beta coefficients. The independent variables for the Employment Equity, Skills Development and Socio-economic Development ratings were expected to present negative beta coefficients. With the expectations for the underlying elements being mixed in Model 1, but more positive than negative, the variable for the overall B-BBEE rating was hypothesised to have a positive beta coefficient in Model 2.

The control variables for potential for collateralisation, size and financial performance were expected to be negatively associated with financial risk, and thus display statistically significant negative beta coefficients. Market-to-book ratio was expected to be positively associated with financial risk, and consequently have a statistically significant positive beta coefficient.

The final empirical models used to investigate the hypothesised relationship between financial risk and B-BBEE element scores (Model 1) or overall B-BBEE scores (Model 2) are stated mathematically as:

$$FRI_{it} = \alpha + \beta_1 OWN_{it} + \beta_2 MGT_{it} + \beta_3 EMPL_{it} + \beta_4 SKILL_{it} + \beta_5 PROC_{it} + \beta_6 ENTERP_{it}$$
$$+ \beta_7 SOCIO_{it} + \beta_8 COL_{it} + \beta_9 SIZE_{it} + \beta_{10} ROE_{it} + \beta_{11} MB_{it} + \mu_{it} + \varepsilon_{it} \qquad (1)$$

$$FRI_{it} = \alpha + \beta_1 OVERALL_{it} + \beta_2 COL_{it} + \beta_3 SIZE_{it} + \beta_4 ROE_{it} + \beta_5 MB_{it} + \mu_{it} + \varepsilon_{it} \qquad (2)$$

where α is the intercept, μ is the between-entity error and ε is the within-entity error of *entity$_i$* in *year$_t$*.

Hausman's test for fixed versus random effects (Greene, 2012) resulted in p-values of <0.0001 for both models, and were thus statistically significant at 1%. The fixed-effects model was therefore the

preferred specification. The one–way or individual fixed–effects model was preferred as it estimates within–entity effects in the panel data which are time–invariant. Ultimately, after fitting various alternative models, the one–way fixed–effects model was selected as it offered the best fit for the research data.

4.   Results and discussions

4.1   Descriptive statistics of the research sample

Table 4 displays the descriptive statistics of the dependent, independent and control variables in the research sample.

Table 4. Descriptive statistics of the research sample

Variables	N	Mean*		Median*		Standard deviation	Minimum	Maximum
Dependent								
FRI	73	6.000		7.381		4.323	3.000	18.000
Independent								
OWN	73	18.450	(92.25%)	16.462	(82.31%)	6.469	0.000	24.800
MGT	73	5.100	(51.00%)	5.300	(53.00%)	2.995	0.000	18.010
EMPL	73	4.860	(32.40%)	5.151	(34.34%)	2.623	0.000	13.900
SKILL	73	9.410	(62.73%)	8.292	(55.28%)	4.306	0.000	15.000
PROC	73	17.750	(88.75%)	16.519	(82.60%)	3.032	7.530	20.000
ENTERP	73	15.000	(100.00%)	13.427	(89.51%)	3.798	0.000	15.000
SOCIO	73	5.000	(100.00%)	4.727	(94.54%)	1.044	0.000	8.000
OVERALL	73	71.200	(71.20%)	69.878	(69.88%)	12.421	30.050	93.950
Control								
COL	73	0.519		0.484		0.214	0.011	0.861
SIZE	73	14.580		14.876		1.659	11.061	18.210
ROE	73	0.130		0.125		0.207	-0.922	0.954
MB	73	1 422.487		1 707.187		1 096.810	118.436	4 330.608

* Mean and median B-BBEE scores have been expressed in absolute terms, and also as a percentage of the generic weighting in brackets.

FRI ranges from 3.000 to 18.000, with a mean of 6.000 and a standard deviation of 4.323. Industrial companies therefore displayed fairly high variability in financial risk during the research period, with relative standard deviation (i.e., standard deviation divided by mean) at 72.05%. This financial risk exposure corresponds with the fluctuating growth rate of South Africa's gross domestic product over the research period, which fluctuated between a poor 3.04% per annum in 2010 and a dismal 1.194% per annum in 2015 (World Bank, n.d.).

The highest scores possible for OWN (38.4 points), MGT (19.2 points) and consequently OVER–ALL (127.6 points) are inflated beyond the generic weightings reflected in Table 3, due to the black ownership and management incentives applied in the transitional year of the B–BBEE Act. Only seven entities were incentivised by inflated MGT scores to increase black management, while 51 companies took advantage of the black ownership incentives and had inflated OWN scores. The potential skewing effect of bonus SOCIO points awarded only to forestry companies under the Forestry Charter (Republic of South Africa, 2009) was deemed minimal as only seven bonus points were awarded across the entire sample. Despite six of the seven B-BBEE elements reflecting a minimum score of zero, it is encouraging that this apparent reluctance to implement specific B-BBEE elements was restricted to only 12 entities across the research sample of 44 entities.

The mean and median B–BBEE scores have been presented both as absolute values and as a percentage of the generic weightings (shown in brackets) in Table 4, for better analysis of performance across the differently weighted B–BBEE elements. The median OVERALL of 69.878 (69.88%) indicates a reassuringly high degree of B–BBEE compliance in the industrial sector. However, closer examination by B–BBEE element of the true source of the performance reveals clear areas for improvement. The good performance in OVERALL is driven by the exceptionally high median performance in OWN, PROC, ENTERP and SOCIO (in particular), ranging from 82.31% to 94.54% of maximum weightings. Industrial firms therefore appear to place greater emphasis on transformation through corporate social responsibility spending, increased equity ownership by black shareholders and supplier and enterprise development through careful selection of who they purchase goods and services from. In contrast, the medians of MGT, EMPL and SKILLS are far lower and range from only 34.34% to 55.28%. Industrial companies are therefore considerably deficient in their employee-related empowerment practices — inadequate black representation at various managerial levels and amongst non-management personnel, and insufficient expenditure on training and upskilling black staff in scarce and critical skills.

The median ROE of 12.5% indicates solid financial performance in the industrial sector, as the average yield on five-year South African retail savings bonds was 7.97% over the same period (RSA Retail Bonds n.d.). ROE has a negative minimum return due to the inclusion of loss-making entities in the sample. The median COL of 0.484 reflects a surprisingly lower potential for collateralisation than one might expect of industrial firms, which traditionally tend to be physically capital intensive. The lower-than-expected COL may be a consequence of the transition of the industrial sector to smart production and manufacturing through the adoption of innovative digital technologies in Industry 4.0 (Berger, 2020). Furthermore, according to the median MB, the median market valuation of the sample companies was over 1 700 times higher than their accounting value. The high median MB implies that there are excessive uncapitalised intangible assets (i.e., relational, structural and human capital) that are excluded from the balance sheets of industrial entities (Lev and Radhakrishnan, 2003).

The normal probability plots of the residuals for Model 1 and Model 2 are presented in Figure 1 and Figure 2 respectively. These probability plots are approximately linear, indicating that there were no substantive departures from normality - thus supporting the condition that the error terms are normally distributed. Over-specification of statistical outliers was addressed by winsorising to three standard deviations from the mean (Tsay, Pna and Pankratz, 2000) - only MB required such winsorising.
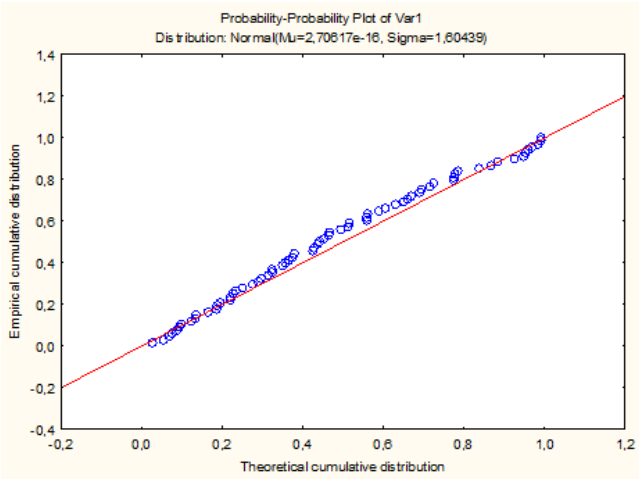

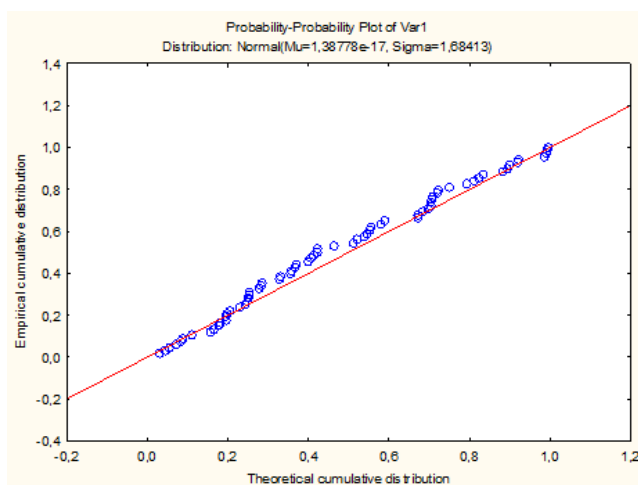**Figure 1.** Normal probability plot for Model 1

Figure 2. Normal probability plot for Model 2

4.2 Results of the panel regressions

The results of the panel regression and other statistics for Model 1 relating to the B–BBEE element scores and Model 2 relating to the overall B–BBEE scores are presented in Table 5 and Table 6 respectively. These regressions' data was based on a minimum of four consecutive company years of data, denoted by T≥4.

Table 5. Results for Model 1 relating to the B-BBEE element scores

Variables	Coefficient	p-value	Tolerance
Independent			
OWN	0.003	0.971	0.828
MGT	0.029	0.875	0.535
EMPL	0.174	0.314	0.772
SKILL	-0.074	0.451	0.804
PROC	0.095	0.535	0.603
ENTERP	-0.008	0.971	0.418
SOCIO	-0.624	0.198	0.426
Control			
COL	-40.839	0.000	0.408
SIZE	1.311	0.470	0.579
ROE	-4.960	0.065	0.497
MB	-0.000	0.930	0.434
F-value	3.860	0.001	
R-squared	0.500		
Hausman test	34.610	0.000	
Breusch-Pagan statistic	24.020	0.520	
Durbin-Watson statistic	2.170	0.740	

Table 6. Results for Model 2 relating to the overall B-BBEE scores

Variables	Coefficient	p-value	Tolerance
Independent			
OVERALL	0.013	0.750	0.583
Control			
COL	-37.901	0.000	0.658
SIZE	0.820	0.578	0.774
ROE	-4.886	0.027	0.541
MB	-0.000	0.985	0.521
F-value	7.910	0.000	
R-squared	0.450		
Hausman test	49.700	0.000	
Breusch-Pagan statistic	24.440	0.180	
Durbin-Watson statistic	2.0300	0.510	

Due to the short research period and the availability of consecutive company years of complete data, the time series components were insufficient (i.e. too short) for sensible stationarity tests. A tiered redundancy analysis was performed to simultaneously detect interdependence between the variables and address any potential over-fitting bias in the regression model. First, a tolerance in excess of 0.2 was confirmed for the regressors in both models — therefore, per Lin (2008) and Tabachnick and Fidell (1996), no multicollinearity was detected. Secondly, homoskedasticity was confirmed as the Breusch-Pagan test statistic for heteroskedasticity (Birau, 2012) was not statistically significant at 10% for either model. Finally, no serial correlation was detected using the Durbin-Watson test.

COL and ROE displayed negative beta coefficients which were statistically significant in both models – COL at 1% and ROE at 10%. However, none of the other independent variables – neither SIZE, ROE, nor any of the B-BBEE variables - presented results which were statistically significant at the 10% level. Therefore, the regression results could not provide conclusive evidence of the explanatory power that a company's overall and B-BBEE element scores, its size and market-to-book ratio hold for its financial risk.

When compared to Chin (1998)'s critical values, the R-squared of 0.500 in Model 1 and 0.450 in Model 2 indicated moderate collective explanatory power of the independent regression variables. The F-value for both models was statistically significant at 1%, offering comfort with respect to the degree of precision within the panel regressions. The statistical power of the regressions to detect significant relationships was very low, nonetheless – presenting a strong indication that the sample size of 73 company years was too small to be reliable.

To improve the robustness of the research results, the regressions for Model 1 and Model 2 were re-performed after increasing the sample from 73 to 109 company years by including companies with only three consecutive years of complete data. The data for the re-performed regressions therefore displayed a minimum of three time points, denoted by $T \geq 3$. These more robust regressions are named Model 1B and Model 2B, to more easily distinguish them from the original regressions. The results of Model 1B and Model 2B are presented in Table 7 and Table 8 respectively.

Table 7. Results for Model 1B relating to the B-BBEE element scores

Variables	Coefficient	p-value	Tolerance
Independent			
OWN	0.090	0.306	0.865
MGT	0.350	0.040	0.647
EMPL	-0.083	0.560	0.784
SKILL	-0.147	0.102	0.711
PROC	0.250	0.100	0.635
ENTERP	0.106	0.484	0.678
SOCIO	-0.156	0.652	0.623
Control			
COL	-16.983	0.020	0.687
SIZE	3.808	0.100	0.591
ROE	-8.099	0.000	0.588
MB	0.002	0.000	0.566
F-value	4.040	0.000	
R-squared	0.420		
Breusch-Pagan statistic	9.670	0.470	
Durbin-Watson statistic	2.120	0.790	

Table 8. Results for Model 2B relating to the overall B-BBEE scores

Variables	Coefficient	p-value	Tolerance
Independent			
OVERALL	0.023	0.568	0.815
Control			
COL	-13.569	0.050	0.972
SIZE	4.186	0.058	0.792
ROE	-7.753	0.000	0.638
MB	0.001	0.044	0.647
F-value	6.640	0.000	
R-squared	0.330		
Breusch-Pagan statistic	5.340	0.250	
Durbin-Watson statistic	2.030	0.610	

The tolerance values for Model 1B and Model 2B confirmed the absence of multicollinearity in the T≥3 models. Similarly, no heteroskedasticity was detected by the Breusch–Hagan test and no serial correlation was detected by the Durbin–Watson test. The R-squared of 0.420 for Model 1B and 0.330 for Model 2B compared favourably to Chin (1998)'s critical values, reflecting moderate goodness–of–fit. Confidence could be placed on the degree of model precision as the F–values for both Model 1B and Model 2B were statistically significant at 1%.

The actual R-squared and F–values should not be compared between the T≥4 and T≥3 models, however, due to the different in sample size. The increased statistical power of the T≥3 models may instead be evidenced by the fact that all the control variables (which one would a priori expect to reflect a statistically significant relationship with financial risk) became statistically significant in Model 1B and Model 2B – as expected. Therefore, the remainder of the discussion surrounding the regression results will focus only on the more robust regressions, i.e. Model 1B and Model 2B, as presented in Table 7 and Table 8.

COL displayed negative beta coefficients which were statistically significant at 5% in both models. ROE reflected a negative relationship with FRI which was statistically significant at 1% in both Model 1B and Model 2B. The beta coefficients for MB were positive and statistically significant at 1% in Model 1B and 5% in Model 2B. SIZE surprisingly also displayed positive beta coefficients, which were statistically significant at 10% in both models.

MGT and PROC presented positive beta coefficients which were statistically significant at the 5% and 10% level respectively. Despite the increase in sample size in the T≥3 models, there was no improvement in the statistical power of the remaining B–BBEE variables. The beta coefficients for OVERALL, OWN and ENTERP were positive, while the EMPL, SKILL and SOCIO beta coefficients were negative. None of these B–BBEE independent variables presented statistically significant results at the 90% confidence level. Therefore, the regressions could not conclusively confirm whether OWN, EMPL, SKILL, ENTERP, SOCIO and OVERALL have a meaningful relationship with FRI.

The statistically insignificant results in describing the relationship between FRI and OWN, EMPL, SKILL, ENTERP, SOCIO and OVERALL in Model 1B and Model 2B may have resulted from a number of possible reasons:

- Poor statistical modelling (the favourable goodness–of–fit of the R-squareds and the degree of precision of the F–values offer evidence to the contrary)
- Low statistical power because the sample size is still too small (an inherent constraint in quantitative B–BBEE research which has already been addressed as far as possible, by increasing the sample size to T≥3)
- The results simply reflect real-world murkiness in the relationship between these B–BBEE elements and financial risk.

According to the American Statistical Association in their statement on the interpretation of statistical significance and p-values, as long as there is full reporting and transparency, neither scientific conclusions nor the importance of results for business and policy decisions should be measured by the size of their p-value or the comparison of their p-value to a specific cut–off (American Statistical Association, 2016). Furthermore, inferences based on the statistical significance of p-values alone are controversial (Wasserstein and Lazar, 2016). Therefore, in the interests of dynamic discourse, both the statistically significant and statistically insignificant beta coefficients will be discussed in the next section – with full transparency about the potential conclusiveness of the results.

4.3   Discussion of the regression results

The regression results of the control variables in Model 1B and Model 2B will be discussed briefly first. The more detailed discussion of the regression results for the statistically significant B–BBEE

variables will follow thereafter, ending in the discussion of the statistically insignificant B–BBEE variables.

A negative relationship between COL and financial risk was confirmed at the 99% confidence level in Model 1B and Model 2B. The hypothesis was accepted that potential for collateralisation is negatively associated with financial risk. The higher the level of collateral a company is potentially able to offer, the lower its financial risk. This finding is supported by intuitive reasoning and concurs with studies by Achek and Gallali (2015) and Van Binsbergen et al. (2010).

ROE observed a negative relationship with financial risk which was conclusive at the 99% confidence level in Model 1B and Model 2B. The hypothesis was accepted that financial performance is negatively associated with financial risk. The higher a company's financial performance, the lower its financial risk. These results therefore echo those of Berk (2006) and Klock et al. (2005).

A positive relationship was confirmed between MB and financial risk, with 99% confidence in Model 1B and 95% confidence in Model 2B. The hypothesis was thus accepted that the market-to-book ratio is positively associated with financial risk. The higher the market-to-book ratio, the higher the company's growth potential and the lower its financial risk. These results therefore correspond with Van Binsbergen et al. (2010) and Yang et al. (2015), but contradict those of Mitton (2007).

SIZE was found to be positively related to financial risk and the relationship could be confirmed to exist at the 90% confidence level in Model 1B and Model 2B. The hypothesis for size was therefore rejected. The larger the size of a company, the higher its financial risk. The finding adds further dissent within an already mixed body of research which points to either a positive (Yang et al., 2015; Mitton, 2007) or negative (Klock et al., 2005; Berk, 2006; Van Binsbergen et al., 2010) relationship. Larger industrial firms would be expected to have a higher potential for collateralisation (which is associated with lower financial risk), but less need for debt financing due to their capacity for internally-generated funding (which also reduces financial risk). Lenders would be prepared to lend these large low–risk firms higher debt amounts at a lower cost of debt than they otherwise would for smaller companies. Therefore larger industrial firms appear to be choosing debt financing anyway, resulting in higher gearing in their capital structure and higher financial risk.

Of the B–BBEE variables examined, only the regression results for the Management Control element and Preferential Procurement element were statistically significant and thus definitively conclusive. The Management Control element relates to board participation by blacks, as well as the extent of black executive leadership, senior management, middle management and junior management. MGT was found to be positively related to financial risk and the relationship could be confirmed to exist at the 95% confidence level. The hypothesis was therefore accepted that Management Control ratings are positively associated with financial risk. The results corroborate the intuitive thinking that having black management may increase a company's financial risk, as blacks are more willing to take financial risks (Dickason and Ferreira, 2018) and may do so in their financial decision-making as managers (Martens and Rittenberg, 2020). In reality, companies with black management control tend to enjoy higher equity market performance (Van der Merwe and Ferreira, 2014). The findings therefore point to the existence of a risk-return trade-off, where the equity market benefits are enjoyed at the cost of higher financial risk attached to black management control. One possibility is that this higher financial risk arises from a lower quality of management and leadership delivered by black managers, executives and directors. However, no literature was found to directly support this racially biased argument – other than the tangential argument that blacks have poorer access to quality education (Arendse, 2019). The higher financial risk of black management control might be linked to the high labour turnover experienced amongst black managers, as their career development requires job-hopping to build their competencies and skillset (Nzukuma and Bussin, 2011). Another theory is that the higher financial risk speaks to the risks surrounding the origins of black management control, rather than their efforts. Acemoglu et al.

(2007)'s sectoral analysis of cronyism on the boards of JSE firms supports this supposition, as they highlighted the dominance of black politically connected board members. Tangri and Southall (2008) also criticise the implementation of B–BBEE ownership and management, pointing out how it unduly benefits the politically-connected elite. Companies can reduce the financial risk associated with black management control by improving their human resource retention strategies (to reduce the turnover in black executives) and tightening the screening process for new appointments (to deter cronyism and private-regarding).

PROC was found to be positively related to financial risk and the relationship could be confirmed to exist at the 90% confidence level. The hypothesis is therefore accepted that Preferential Procurement ratings are positively associated with financial risk. The Preferential Procurement element incentivises companies to give preferential selection to suppliers based on their B–BBEE credentials. The findings supports the theory that supply chain management based primarily on factors other than the company's operational, logistical and costing needs is both operationally and financially detrimental (Ketokivi and Mahoney, 2020; McCleskey, 2020; Moyano-Fuentes et al., 2021). Furthermore, the higher financial risk associated with higher Preferential Procurement ratings aligns with Pike et al. (2019)'s contention that B–BBEE promotes tender corruption. It confirms the risk-return trade-off that companies are willing to engage in unfavourable (and possibly unscrupulous) business practices in order to be eligible to participate in lucrative government tender processes. Government departments and state-owned enterprises follow similar preferential public procurement policies when awarding public sector contracts and the competition is intense, especially in the face of bribery and nepotism (Shai et al., 2019). The Public Procurement Act was promulgated in July 2024 to resolve the corruption problem in public procurement, as recommended in the State Capture Commission Report (Arcangeli, 2024). Companies should attempt to minimise their financial risk attached to earning higher Preferential Procurement ratings by following industry-accepted best practice in their supply chain management, while considering B–BBEE credentials merely as a secondary factor when choosing their suppliers. The government can assist in reducing suppliers' financial risk through sustainable public procurement reform and by relaxing their preferential procurement requirements to make participation in the public procurement process more accessible.

The remainder of the discussion will address the regression results of Model 1B and Model 2B which were statistically insignificant. Their statistical insignificance does not mean that the B–BBEE variables and financial risk have no relationship, nor does it mean that the research hypotheses should definitely be rejected for these variables. It merely means that, although relationships were identified by the regressions, the observed relationships could not be definitively confirmed. However, these observed relationships are still worthy of discussion as their statistical insignificance does not necessarily render them meaningless for business decision-making and formulating policies (American Statistical Association, 2016).

OVERALL was found to display a statistically insignificant positive association with financial risk. The higher turnover (Busse et al. 2023), profitability (Mathura, 2009) and share performance (Kleynhans and Kruger, 2014; Mehta and Ward, 2017) derived from B–BBEE compliance appears to come at the cost of incremental financial risk. The trade-off cost of higher financial risk implies that B–BBEE compliance may have become yet another 'cost of doing business in South Africa' (Milovanovic, 2010, cited in Ramlall, 2012:277). Moreover, the higher financial risk associated with B–BBEE compliance could be a strong indication that transformation no longer needs the Big Push of B–BBEE. B–BBEE was intended to be a transitional policy of redress for the inequality caused by the Apartheid past, yet there is no proposed end date for B–BBEE on the horizon. It may be that B–BBEE has outlived its economic need and has become more of a political tool and an opportunity for rent-seeking (Acemoglu et al., 2007), resulting in higher financial risk for participants. The findings of the current study suggest that, after all these years, it may be time for policymakers to abolish or institute a 'sunset' clause on B–BBEE.

OWN was found to display a statistically insignificant positive association with financial risk. The results agree with the deductive reasoning that having black shareholders may increase a company's financial risk, as they are more willing to take financial risks (Dickason and Ferreira, 2018) and the company may echo this shareholder risk appetite (Martens and Rittenberg, 2020). The Ownership element refers to the degree of economic interest and exercisable voting rights in the company held by blacks, either directly or through an ownership scheme. The findings suggest that it may also be that the mechanics of the B–BBEE schemes and structures used to effect black ownership are the underlying source of the financial risk observed. Historically, blacks have both lacked the capital to and have been denied access to participate in equity and commercial markets – this is the very impetus of B–BBEE. In order to facilitate blacks' economic participation, companies seeking higher Ownership ratings generally give financial assistance to potential B–BBEE shareholders – either by reducing the cost of acquiring the company's shares through a discounted purchase price or by providing a funding arrangement to purchase the shares at a market-related price (Transcend, 2020). The dilutive effect of the value discount given to B–BBEE shareholders, as well as the default risks inherent in the B–BBEE funding structures, increases the company's financial risk. Furthermore, these B–BBEE shareholding schemes usually preclude direct managerial involvement by the shareholders, which lowers their degree of institutional and executive ownership, increases their agency costs and contributes to the higher financial risk associated with B–BBEE ownership (Stepanova and Rabotinskiy, 2014; Klock et al., 2005). In this sense, the findings coincide with the expectation inferred by Klock et al. (2005). An alternative argument is that the financial risk related to B–BBEE ownership lies in who the B–BBEE shareholder is – an argument supported by the fact that it is mostly politically-connected wealthy blacks who have benefited from B–BBEE ownership (Tangri and Southall, 2008). To mitigate the possible financial risks attached to B–BBEE ownership, the findings suggest that companies should establish a culture of transparency and communication with shareholders, strong corporate governance policies and practices, and take specific care in managing B–BBEE stakeholder interests.

EMP and SKILL were both found to display a statistically insignificant negative association with financial risk. These elements have been discussed jointly, as their practical implementation is inextricably intertwined within human resource management. The Employment Equity element pertains to a company's initiatives to promote fair treatment, diversity, inclusion and the redress past inequities in the workplace, for the benefit of its black employees. The Skills Development element concerns corporate expenditure on developing the skills base of blacks through training and learning programs, learnerships, apprenticeships and internships. The observation of an inverse relationship between financial risk and both employment equity and skills development corresponds with the deductive reasoning that creating fair, equal and inclusive opportunities for employees and investing in their occupational training and learning, is beneficial to companies. The results align with the value-in-diversity perspective (Herring, 2009) and confirm the financial risk management benefits of employee training (Oyelakin and Abdullahi, 2022). The results also concur with the cross-risk impacts identified by De Jongh (2024) which suggest that human resources practices that are taken by a company to reduce its social risk – such as affirmative action, employment equity, worker training and occupational education initiatives – are also associated with lower financial risk. Moreover, in South Africa, employment equity and skills development requirements are entrenched in legislation in the Employment Equity Act and Skills Development Act respectively. Therefore corporate non-compliance comes with financial risk, as it can result in financial penalties. The negative relationship observed between financial risk and both Employment Equity ratings and Skills Development ratings appears to be driven more by the positive 'people' impact of the company's initiatives, rather than specifically because it is directed at 'black people'. Companies should therefore carefully consider who their desired target audience should be when implementing employment equity and skills development initiatives. Extending them to both black and non-black participants

does not seem like it would be detrimental to the entity's B–BBEE ratings, but it may hold positive consequences for the company's financial risk.

ENTERP was found to display a statistically insignificant positive association with financial risk. The positive relationship observed aligns with expectations based on intuitive reasoning. The Enterprise Development element measures the extent to which a company engages with entities outside their own supply network, for the purpose of developing and enhancing the sustainability of those entities. The end goal of this B–BBEE element is ultimately supplier diversity, giving small black businesses a foot in the door to participate in the value chain. While there may be wider economic benefits to forcing supplier diversity, it does not deliver a positive effect on the buyers' profitability in the long-term (Richard, Su, Penga and Miller, 2015). Companies are nevertheless obligated to provide development assistance and financial assistance in support of this practice, in order to be B–BBEE compliant - constraining their own financial decision-making and flexibility in the process, and limiting their own ability to avoid financial distress (Gamba and Triantis, 2008). Therein lies the observation of higher financial risk associated with higher Enterprise Development ratings.

SOCIO was found to display a statistically insignificant negative association with financial risk. The Socio-economic Development element is associated with a company's monetary and non-monetary charitable contributions to the upliftment of black individuals and black communities. The findings accord with the intuitive logic that charitable contributions and corporate social investment have a positive effect on the company's corporate image and reputation – which mitigates financial risk (Gatzert and Schmit, 2016) – regardless of which race it is directed at. Socio-economic development, as envisioned by B–BBEE, also falls within the ambit of the social aspect of corporate social responsibility. Firms who display higher levels of corporate social responsibility experience lower financial risk, and the risk reduction is directly due to socially responsible behaviour (Benlemlih and Girerd-Potin, 2017). Therefore it is understandable why firms who make a greater contribution to black socio-economic development, may experience lower financial risk. The negative relationship observed between financial risk and Socio-economic Development ratings aligns with De Jongh (2004)'s conclusion about the cross-risk implications of social risk management. The corporate actions taken to earn higher Socio-Economic Development ratings benefit society as a whole by reducing social risk, and also benefit the company through lower financial risk. To minimise their financial risk, companies are encouraged to approach the pursuit of higher Socio-economic Development ratings as part of their wider corporate strategy to improve corporate social responsibility, rather than merely as part of their B–BBEE strategy.

To summarise the main findings on B–BBEE, the research study confirmed the presence of a statistically significant positive relationship between Management Control ratings and financial risk, as well as a statistically significant positive relationship between Preferential Procurement ratings and financial risk. However, no statistically significant relationships could be confirmed between financial risk and the overall B–BBEE ratings or any other of the B–BBEE elements. These findings offer valuable corroboration to Dreyer et al. (2021) and align with Morris (2018)'s conclusion that B–BBEE has no statistically significant relationship with business risk.

5.   Conclusions, limitations and recommendations

B–BBEE encompasses a variety of socio-economic government strategies across seven elements – Ownership, Management Control, Employment Equity, Skills Development, Preferential Procurement, Enterprise Development, and Socio-economic Development - to enhance the economic transformation and upliftment of black South Africans. B–BBEE compliance has been shown to offer financial, equity market and performance benefits for South African corporates - yet they are reluctant to embrace it. B–BBEE is perceived to be detrimental to the overall health of the South African commercial sector (Krüger, 2014), possibly in light of its apparent ineffectiveness.

The research problem of this study focused on evaluating the validity of the negative perceptions surrounding B–BBEE. The research objective was to empirically examine the relationship between the seven elements of B–BBEE and corporate financial risk.

The study explored firms listed in the Industrial sector of the JSE for the financial year-ends falling between 1 January 2010 and 30 April 2015. One-way fixed effects regressions were performed using time-series cross-sectional multivariate panel data. A composite financial risk indicator was compiled using proxies for three sub-categories for financial risk – cash flow adequacy, liquidity and capital structure. These proxies were derived from the proprietary financial risk matrix of S&P Global, one of the top three largest global credit ratings agencies. The B–BBEE ratings were obtained from the Beagle database, while financial statement and equity market data was obtained from IRESS Expert. Potential for collateralisation, firm size, financial performance and the market-to-book ratio were used as control variables.

The study delivered mixed results on the interaction between B–BBEE and financial risk. The findings confirmed that both Management Control and Preferential Procurement have a statistically significant positive relationship with financial risk. Positive, but statistically insignificant, relationships were observed between financial risk and Ownership and Enterprise Development. Similarly, negative but statistically insignificant relationships were observed between financial risk and Skills development, Employment Equity, Socio-Economic Development and overall B–BBEE ratings. Potential for collateralisation and financial performance were found to have a statistically significant negative association with financial risk, while size and the market-to-book ratio have a statistically significant positive association with financial risk.

The findings confirmed that higher Management Control ratings are associated with higher financial risk, possibly due to higher turnover in black executives, cronyism and private-guarding of new appointments. Companies can reduce the financial risk associated with black management control by improving their human resource retention strategies and tightening the screening process for recruitments and new appointments.

It was also confirmed that higher Preferential Procurement ratings are associated with higher financial risk. Companies should attempt to minimise their financial risk attached to earning higher Preferential Procurement ratings by following industry-accepted best practice in their supply chain management, while considering B–BBEE credentials merely as a secondary factor when choosing their suppliers. The government can assist in reducing suppliers' financial risk through sustainable public procurement reform and by relaxing their preferential procurement requirements to make participation in the public procurement process more accessible. The promulgation of the Public Procurement Act in July 2024 is a first step in the right direction to resolving the risks surrounding the corruption problem within public procurement.

The study makes a valuable contribution to the limited body of extant literature on the risk implications of B–BBEE, by offering new insight into the relationship between Management Control and financial risk and the relationship between Preferential Procurement and financial risk. Although the relationships observed between financial risk and the other B–BBEE variables could not be definitively confirmed, they were still considered worthy of discussion as their statistical insignificance does not necessarily render them meaningless for business decision-making and formulating policies (American Statistical Association, 2016).

The results suggest that, to mitigate the possible financial risks attached to B–BBEE ownership, companies should establish a culture of transparency and communication with shareholders, strong corporate governance policies and practices, and take specific care in managing B–BBEE stakeholder interests. Companies should carefully consider who their desired target audience should be when implementing employment equity and skills development initiatives. It seems that extending them to both black and non-black participants would not be detrimental to a company's B–BBEE ratings, but it might hold positive consequences for the entity's financial risk. To minimise their financial

risk, companies are encouraged to approach the pursuit of higher Socio-economic Development ratings as part of their wider corporate strategy to improve corporate social responsibility, rather than merely as part of their B–BBEE strategy.

Although the relationship could not be confirmed conclusively, higher overall B–BBEE ratings were observed to be associated with higher financial risk. It may be that B–BBEE has outlived its economic need and has become more of a political tool and an opportunity for rent-seeking (Acemoglu et al., 2007), resulting in higher financial risk for participants. Government interventions should always be transitory and impermanent to maintain a sustainable and free economic market (Acemoglu et al., 2007). A lesson to be learnt from the failed empowerment initiatives of other emerging economies – such as Malaysia's NEP and Zimbabwe's ZIP – is that empowerment initiatives are unsustainable in the absence of economic growth (Sartorius & Botha, 2008). South Africa's level of income inequality remains one of the highest in the world, persistently increasing since 1996, alongside dismal economic growth (World Bank, 2019). In its current form, B–BBEE also threatens South Africa's global competitiveness by impeding foreign direct investment from the European Union, the country's largest trading partner (Gules, 2018). The findings of the current study suggest that, after all these years, it may be time for policymakers to implement a clear phase-out strategy or institute a 'sunset' clause with a foreseeable end date for the termination of B–BBEE.

The lack of availability of more recent research data is an unavoidable constraint to this study, due to data inconsistency issues arising from changing B–BBEE regulations and legislature since 2015. Access to corporate B–BBEE scores is another constraint inherent to this study, due to the voluntary nature of public disclosure of B–BBEE ratings. The consequence of these limitations was a small sample size, which may hold unfavourable implications for the statistical power of the research and the reliability of the results. It is suggested that this research be replicated for the post-2022 period (standalone, or as a comparative study to this one) once sufficient time has passed to generate a longer time-series of consistently calculable B–BBEE data. Furthermore, it is recommended that the study be replicated in the Resources and Financial sectors to test for robustness of the research findings across non–industrial sectors.

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