The association between diversity within boards and company financial performance: A graphical time-series approach

Cobus C H Taljaard

92104313

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Abstract

Directors need to guide and govern companies on behalf of and for the benefit of shareholders and stakeholders (Adams, Hermalin, & Weisbach, 2010; "Duties of directors," 2011), but questions remain in academic literature (Carter, D'Souza, Simkins, & Simpson, 2010; Jhunjhunwala & Mishra, 2012; Nielsen & Nielsen, 2013) whether boards with higher levels of diversity amongst directors are better equipped to fulfil their fiduciary duty than boards with lower levels of diversity.

This research report set out to determine if increased levels of diversity within boards is associated with improved financial performance of companies. To accomplish that literature was reviewed to confirm the function of boards, determine dimensions of diversity that could affect board performance and to identify theoretical frameworks that could explain why increased diversity might lead to improved board performance. Share price, dividend payout and directors' demographic data was collected for a sample of 40 companies listed on the JSE from 2000 to 2013 and subjected to tests using Muller and Ward's (2013) investment style engine in a quasi-experimental design combining cross-sectional and longitudinal methodologies. Graphical time-series representations of cumulative portfolio market returns were analysed to determine if diversity dimensions tested were associated with improved company financial performance.

The results showed that for the selected sample, racial diversity within boards does not contribute to improved financial performance. Increased gender diversity and decreased average board age were shown to have strong associations with improved company performance.

Keywords
Boards, Diversity, Financial Performance

Declaration

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other University. I further declare that I have obtained the necessary authorisation and consent to carry out this research.

Signature: _____

Name: Cobus C H Taljaard

Date: 11 November 2013

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What a journey this has been.

I have enjoyed the two years immensely and have learnt so much; both on a personal and professional level. The amount of time I spent working on this report and my MBA studies was insane and I plan to embed what I have learnt: operating the same as before would be devaluing all the sacrifices made to get here.

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Chapter 1: Introduction to the research problem

The aim of this research is to investigate if company financial performance is influenced by diversity amongst company board members.

1.1. The need for the research

Economies need to grow sustainably in order to improve the quality of life for all and in market economies growth is primarily driven by company growth. Company growth is determined by companies' ability to implement value creating strategies (Ireland, Hoskisson, & Hitt, 2013, Chapter 1) and public companies' strategies are directly influenced by their appointed boards. If diversity amongst board members can be associated with improved value creating strategies and improved financial performance of public companies, it can guide decisions regarding board composition in order to improve the chances of company- and economic growth and quality of life for all. Uncovering associations between diversity within boards and company financial performance can also potentially serve as an investment style guide for investors.

Companies and businesses power the global economy by providing employment to households, providing products and services for household and government consumption, paying taxes to governments and providing investment opportunities for private and institutional investors (Colander, 2010, Chapter 3). To grow economies, more growing companies are needed. Both the classic growth model and the new growth theory (Colander, 2010, Chapter 9) includes investment as the second step in the economic growth process. Savings and technological improvements, and in turn investments, are made possible by households, companies and governments generating returns above what is needed for sustaining operations alone and investing funds for future gain.

Savings are generated by households that provide labour to companies or governments, by companies that generate retained earnings and by governments with budget surpluses. Advancements in technology are driven by investment in research and development and "shift the production possibility curve out" (Colander, 2010, p. 220), increases productivity and enables spillover effects triggering new ideas and further technological improvements and growth.

Economic growth is therefore driven by investment, which in turn is driven primarily by company performance and growth.

Growing companies contribute towards increased investment opportunities and economic growth that provide countries with the platforms needed for improving the quality of life of its citizens. Improving the quality of life for all has been set out as the aim of the United Nation's Eight Millennium Development goals (United Nations, 2012) and to achieve this goal, economies, and therefore companies, need to grow sustainably. The global economic downturn of 2008 and 2009 has however resulted in numerous companies experiencing slower growth, no growth, or even having to close, resulting in job losses and lower GDP growth rates (Kavoussi, 2012; Kganyago, 2010; Kirkup, 2008). Companies today need to grow in an environment of increasing competition and high levels of uncertainty and risk.

Companies that have implemented value creating strategies resulting in competitive advantages and above average returns, lowers the risk of uncertainty for investors (Ireland et al., 2013, p. 4) and contributes to economic growth as a result of, amongst other things, increased investments and job creation. A public company's board of directors is primarily responsible for determining and setting its strategic direction and putting adequate governance structures in place to ensure responsibility and sustainability ("Duties of directors," 2011, p. 4). Public companies therefore need effective boards to achieve sustainable above average returns. If diversity amongst board members improves the effectiveness of boards, then identifying specific diversity factors or dimensions within boards that can be associated with improved company performance could aid shareholders and company owners in evaluating potential limitations or areas for improvement in the composition of their boards.

This research aims to provide insights into the demographics of board composition and the potential impact thereof on company and the broader economy's performance. Confirming, contradicting or uncovering associations between diversity within boards and company financial performance could aid the current academic conversation and guide further research.

1.2. Evidence of the problem

There is no clear consensus in current academic conversations about whether increased levels of diversity amongst board members contribute to improved company financial performance. From a behavioural science- or psychological discipline point of view the inferences indicate that increased diversity would allow for a broader perspective and improved fiduciary role of boards, but the empirical evidence is not so clear. Certain studies have found links between increased diversity and improved company performance (Kim, Pantzalis, & Park, 2013; Nielsen & Nielsen, 2013), some have found no clear association (Jhunjhunwala & Mishra, 2012; Mahadeo, Soobaroyen, & Hanuman, 2012) and some indicate that diversity could be detrimental to company performance (Carter et al., 2010).

Further empirical study using a different methodology and an improved dataset would add to this academic discourse and contribute to the body of knowledge regarding the association between board diversity and company financial performance.

1.3. Relevance to South African business

South African companies are facing increased legislated levels of diversity. Soon after the first democratic general election in 1994 and subsequent formation of South Africa's government of national unity, legislation was put in place to redress discriminatory practices of the apartheid government. The Employment Equity Act, number 55 of 1998, prohibits unfair discrimination and instituted affirmative action. The Women Empowerment and Gender Equality Draft Bill published for public comment in August 2012 seeks 50% representation of women in all decision making structures of public and private companies ("Gender Equality Bill will empower women: Xingwana," 2012).

South African businesses and companies are increasingly diversifying their workforce, management and board composition in line with legislated requirements as well as with socially acceptable norms and practices, so as to reflect South Africa's demographics. Other than legal and moral obligations in the South African context, it would serve as positive affirmation for companies to

expedite diversity programmes if positive links between increased levels of diversity and company performance could be illustrated.

South Africa's Gini coefficient of 63.1, as measured in 2009, is amongst the highest in the World Bank's Gini index ("GINI index | Data | Table," n.d.). The Gini coefficient is a measure of inequality, with a value of zero indicating perfect equality and 100 indicating perfect inequality. The South African government has set the goal of eliminating poverty and reducing inequality by 2030 through its National Development Plan 2030 ("Key Issues," 2013). The reaching of said goals can only be achieved if the South African economy grows consistently and sustainably. Businesses and companies in South Africa therefore have a critical role to play in achieving above average returns, employing more people in better jobs, investing capital in growth and paying taxes to enable government to fulfil its public mandate.

1.4.   The research objectives

The objectives of this research report are to establish whether increased diversity amongst board members of listed companies can be associated with improved financial performance of companies and to determine what diversity factors or dimensions have the strongest association with improved financial performance.

In general, previous studies relied on limited data sets and company or industry specific analysis methods. This study employs both an improved methodology, as well as an extended dataset to determine, in a more robust manner than previous studies, if there is indeed an association between increased levels of diversity within boards and improved company financial performance. Should a positive link be found, specific dimensions of diversity could be ranked as indicators of company performance and could serve as guidance for board composition when appointing new or additional directors in order to improve chances of success to bolster investment potential and economic growth.

1.5. Relationship between the research problem and the research objectives

The research objectives directly address the research problem. The research problem asks whether increased diversity amongst board members of public companies influences company financial performance. The research objectives aim to answer exactly that, and in addition, comments in more detail about different diversity dimensions.

1.6. Scope of the research

This research report focuses on South African companies listed on the main board of the Johannesburg Stock Exchange (JSE). Total market returns comprising company stock prices and dividend payouts are used as a proxy for financial performance, based on the efficient market hypothesis. Company board members' demographic data is used to determine board diversity in terms of various criteria and analysed over time to determine if there is any association between board diversity and company financial performance.

Investigating if company financial performance is associated with diversity amongst board members has therefore been selected as a research topic. It has real world relevance both globally and in the South African context and will contribute to the current academic discourse on the subject.

Chapter 2: Literature review

Literature was reviewed to determine what factors could explain an association between diversity within boards and company financial performance. The supposition that there is an association between board diversity and company financial performance was used during the literature review, with references made to contrarian views where applicable. As a starting point, the accepted functions and responsibilities of boards were established. Secondly the definition of diversity with reference to board composition was ascertained and further expanded to identify factors or dimensions of diversity that might have had an association with company financial performance. Thereafter literature was reviewed and factors and theories that could explain if and why an increased ratio of diversity amongst directors could have been associated with improved company financial performance were determined. Lastly, previous empirical studies on the topic were reviewed to evaluate methodologies that could be used and to consider ways how this research study could add to the body of knowledge by addressing limitations or shortcomings.

2.1. Functions of boards

Before the association between diversity within boards and changes in company financial performance could be investigated, the functions of boards needed to be understood. Recent corporate scandals in South Africa have resurfaced the question as to what exactly the roles and functions of boards were. Some examples were the Fidentia case where R1.4bn funds administered by the firm went missing (Davis, 2013), the Cipla Medpro case where allegations surfaced of management team members that awarded themselves undisclosed loans and signed major business deals without board approval (Maake & Masote, 2013) and the recent construction industry price fixing and collusion scandal (Planting, 2013). One news article in the South Africa media poignantly noted that silence on corporate scandals followed "a trend observed in other JSE-listed companies ... despite the King corporate governance code requirement that companies be open, honest and transparent with all stakeholders" (Maake & Masote, 2013, para. 5).

Answers in literature to the question of what the roles and functions of boards were, ranged between only fulfilling legal requirements on the one side, up to

actively participating in managing and controlling corporations on the other (Adams et al., 2010; Van-Ness, Miesing, & Kang, 2010). From their comprehensive review of literature on boards of directors, Adams et al. (2010) summarised the main functions of directors as serving as advisors to the CEO and top management, setting strategy, assessing management performance, guiding appointment and retrenchment of management members and protecting the interests of shareholders. Their review was based on literature that focused on North-American and European companies' boards and might not be directly applicable to developing countries such as South Africa. The functions and responsibilities of boards in South Africa was found to be governed by legislation as well as published best practices and principles.

South African legislation that directed boards were the "Companies Act 71 of 2008, as amended by the Companies Amendment Act 3 of 2011, and the Companies Regulations 2011" that "came into effect on 1 May 2011" ("The Companies Act 71 of 2008," 2011, p. 2). The Companies Regulations, 2011 was published in terms of the requirements of the Companies Act, 2008 and announced matters related to regulating companies as well as the Companies Commission, the Companies Tribunal and the Takeover Regulation Panel (*Companies Regulations, 2011*, 2011). Topics covered in its 8 chapters were; formation, administration and dissolution of companies, enhanced accountability and transparency, offerings of company securities, fundamental transactions and takeover regulations, business rescue, complaints, applications and tribunal hearings, regulatory agencies and administration. Specific duties of directors were only covered in chapter 5 as concerned with fundamental transactions and takeover regulations and did not address general duties or functions and responsibilities of directors.

The amended Companies Act of 2008 addressed more specific duties of directors and set out, amongst other things, to define "the relationships between companies and their respective shareholders or members and directors" (*Companies Act 71 Of 2008*, 2011, sec. Opening). It defined a director as, "a member of the board of a company, as contemplated in section 66, or an alternate director of a company and includes any person occupying the position of a director or alternate director, by whatever name designated". An alternate director was defined as "a person elected or appointed to serve, as the occasion requires, as a member of the board of a company in substitution for a particular

elected or appointed director of that company" and a board as "the board of directors of a company" (*Companies Act 71 Of 2008*, 2011, sec. 1). In Chapter 2, part F, section 76, the Companies Act "effectively re-state a director's common law fiduciary duties and the duty of care, skill and diligence" ("The Companies Act 71 of 2008," 2011, p. 13). The act and regulations did not cover any duties or responsibilities related to specific company financial performance issues, but did state that, amongst other things, directors should act "in good faith and for a proper purpose ... in the best interests of the company" (*Companies Act 71 Of 2008*, 2011, sec. 76). South African legislation focused on the fiduciary duties of directors.

South African published best practices and principles guiding functions and responsibilities of directors and boards were updated in 2009 in the King III report and related practice notes. The first King Report was issued in 1994 by the Institute of Directors in Southern Africa (IoDSA). The IoDSA convened the King Committee on Corporate Governance lead by Professor Mervyn E. King to create a self regulatory corporate governance framework for business in anticipation of expected corporate social investment (CSI) related legislative changes after the democratisation of South Africa. The King II Report followed in 2002 and included a new section on integrated sustainability reporting. The King III Report was issued in 2009 and was aligned with the Companies Act no 71 of 2008, which became effective in 2011. Although compliance was voluntary, the Johannesburg Stock Exchange (JSE) requested that companies had to comply with the King II Report, and subsequently the King III Report. Where companies did not comply, they had to explain their reasons for non-compliance ("Corporate governance - King III report - Introduction and overview," n.d., "King Report | NGO Pulse," 2012, "King Report on corporate governance in SA," n.d.). The King Report set out an expanded framework of the roles and responsibilities of directors in South Africa and complemented the defined legislative structure.

The Practice Note on board charters issued with the King III Report advocated that boards had a number of duties ("Duties of directors," 2011). The Practice Note stated that:
  "The role and responsibilities of the board are to: -
      i.   act as the focal point for, and custodian of, corporate governance by managing its relationship with management, the shareholders and

other stakeholders of the Company along sound corporate governance principles.

ii. appreciate that strategy, risk, performance and sustainability are inseparable and to give effect to this by:

- Contributing to and approving the strategy.
- Satisfying itself that the strategy and business plans do not give rise to risks that have not been thoroughly assessed by management.
- Identifying key performance and risk areas.
- Ensuring that the strategy will result in sustainable outcomes.
- Considering sustainability as a business opportunity that guides strategy formulation.

iii. provide effective leadership on an ethical foundation.

iv. ensure that the Company is and is seen to be a responsible corporate citizen by having regard to not only the financial aspects of the business of the Company but also the impact that business operations have on the environment and the society within which it operates.

v. ensure that the Company's ethics are managed effectively.

vi. ensure that the Company has an effective and independent audit committee.

vii. be responsible for the governance of risk.

viii. be responsible for information technology (IT) governance.

ix. ensure that the Company complies with applicable laws and considers adherence to non-binding rules and standards.

x. ensure that there is an effective risk-based internal audit.

xi. appreciate that stakeholder's perceptions affect the Company's reputation.

xii. ensure the integrity of the Company's integrated report.

xiii. act in the best interests of the Company by ensuring that individual directors:

- adhere to legal standards of conduct.
- are permitted to take independent advice in connection with their duties following an agreed procedure.
- disclose real or perceived conflicts to the board and deal with them accordingly.

- deal in securities only in accordance with the policy adopted by the board

xiv. commence business rescue proceedings as soon as the Company is financially distressed

xv. elect a chairman of the board that is an independent nonexecutive director.

xvi. appoint and evaluate the performance of the chief executive officer" ("Practice notes, King III, chapter 2, board charter," 2009, pp. 2–3).

Together, the practise notes and King III Report emphasised that boards and directors were central to effective and appropriate governance of companies. In turn, effective and appropriate governance was seen to be fundamental to sustained performance of companies and included fiduciary, strategy and sustainability functions and responsibilities. The South African legal and best practice framework of board duties could therefore be seen to concur with Adams et al. (2010) in that directors' duties were mainly to serve as advisors to the CEO and top management, set strategy, assess management performance, guide appointment and retrenchment of management members and to protect the interests of shareholders. Additions from the South African context were to protect interests of all stakeholders equally and not only primarily those of shareholders, an emphasis on risk management and governance, greater focus on the importance of board independence as well as underscoring the importance of ethical codes and behaviours and the need to manage organisations with a focus on sustainability.

The rest of the literature and theory review explored what dimensions of diversity could contribute to effective board operation and superior company financial performance.

2.2. Definitions and dimensions of diversity

Hafsi and Turgut stated that "the precise meaning of boardroom diversity is still unclear" (2013, p. 463). They defined two constructs of board diversity, namely structural diversity amongst different boards and demographic diversity within boards. Diversity of boards referred to dissimilarities in board characteristics, for example "size, leadership structure (duality of chairman and CEO), founder

leader as director, the presence and number of international directors, nature and operations of board committees, board independence, director ownership, director tenure, and director compensation" (Hafsi & Turgut, 2013, p. 464). Dissimilarities between directors, or diversity within boards were the focus areas of this research report and literature review.

Diversity within boards, in terms of dissimilarities between directors, has been categorised between directly observable or demographic and less visible or cognitive dimensions (Erhardt, Werbel, & Shrader, 2003; Mahadeo et al., 2012; Marimuthu, 2008). Definitions of directly observable or demographic diversity dimensions included gender, age and ethnicity for example, and less visible or cognitive dimensions included dimensions like educational background and political ideology. The intent of this research report was to make use of secondary data, and analysis would therefore be limited to explicitly defined and available diversity dimensions, whether demographic or cognitive.

Various factors or dimensions of diversity within company boards have been identified in previous studies as possible contributors to- or indicators of company success. Results were varied, and some studies found links between increased diversity and company performance (Kim et al., 2013; Nielsen & Nielsen, 2013), some found no clear association (Jhunjhunwala & Mishra, 2012; Mahadeo et al., 2012) and some indicated that increased levels of diversity could be harmful to company performance (Carter et al., 2010). Various dimensions of diversity that could potentially be used as characteristics or variables to investigate the association between diversity within boards and company financial performance were accumulated from the review of a sample of previous studies.

Listed below in Table 1, in descending order from most frequently mentioned in the reviewed studies to the least, are the accumulated dimensions of diversity that could be considered for this research report.

Table 1: Dimensions of diversity from a sample of previous studies.

Dimension of diversity	Diversity construct	Referenced in
Gender	Diversity within boards: demographic	(Carter et al., 2010; Dezsö & Ross, 2012; Hili & Affes, 2012; Jhunjhunwala & Mishra, 2012; Larkin, Bernardi, & Bosco, 2012; Lückerath-Rovers, 2013; Mahadeo et al., 2012; Miller & del Carmen Triana, 2009; Nguyen, Locke, & Reddy, 2012; Shukeri, Shin, & Shaari, 2012; Van-Ness et al., 2010; Yasser, 2012)
Independence / Duality	Diversity amongst boards	(Dalton, Daily, Ellstrand, & Johnson, 1998; Dalton & Dalton, 2011; Mahadeo et al., 2012; Rhoades, Rechner, & Sundaramurthy, 2000; Shukeri et al., 2012; Van-Ness et al., 2010)
Race or Ethnicity	Diversity within boards: demographic	(Carter et al., 2010; Erhardt et al., 2003; Marimuthu, 2008; Miller & del Carmen Triana, 2009; Shukeri et al., 2012)
Age	Diversity within boards: demographic	(Jhunjhunwala & Mishra, 2012; Mahadeo et al., 2012; Van-Ness et al., 2010)
Tenure	Diversity amongst boards	(Jhunjhunwala & Mishra, 2012; Van-Ness et al., 2010)
Nationality	Diversity within boards: demographic	(Jhunjhunwala & Mishra, 2012; Nielsen & Nielsen, 2013)
Experience	Diversity within boards: cognitive	(Jhunjhunwala & Mishra, 2012; Van-Ness et al., 2010)
Educational background	Diversity within boards: cognitive	(Jhunjhunwala & Mishra, 2012; Mahadeo et al., 2012)
Political ideology	Diversity within boards: cognitive	(Kim et al., 2013)

As mentioned by Hafsi and Turgut (2013), one could see that diversity constructs were not always clearly defined or isolated for specific investigation in the various

studies. It was not deemed a problem, as long as the differences were acknowledged and incorporated in interpretations of results. Specific dimensions of diversity, as indicated above, were not singled out for this research study from the literature review conducted. Available data in terms of board diversity would be used to analyse as many as possible different board diversity dimensions and the impact on, or association with financial performance.

2.3. Why diversity could impact board performance

From literature, legislation and guidelines reviewed, it was concluded that directors were appointed in a fiduciary capacity. They had to ensure proper governance and risk management and had to define and implement value creating strategies for the benefit of all stakeholders in an ethical and sustainable manner. Next, the impact that various dimensions of diversity within boards potentially had on the functions and responsibilities of boards were investigated.

A variety of theories have been put forward in literature as to why diversity within boards could be associated with enhanced board- and company performance. Below in Table 2, listed in descending order from most frequently ascribed to the least, are the main theories encountered after a review of selected recent studies on board diversity and company performance. Each of these identified theories was discussed further in this research report.

Table 2: Theories regarding benefits of diversity

Theory	Referenced in
Agency theory linked to board independence and distinct viewpoints	(Bosner, 2007; Campbell & Mínguez-vera, 2008; Carter et al., 2010; Dalton et al., 1998; Dalton & Dalton, 2011; Hafsi & Turgut, 2013; Hili & Affes, 2012; Khan & Vieito, 2013; Kim et al., 2013; Mahadeo et al., 2012; Nguyen et al., 2012; Rhoades et al., 2000; Rodríguez-Domínguez, García-Sánchez, & Gallego-Álvarez, 2012; Shukeri et al., 2012; Van-Ness et al., 2010)
Resource dependency theory including consideration of company reputation and sensitivity to stakeholder needs	(Carter et al., 2010; Hafsi & Turgut, 2013; Hili & Affes, 2012; Larkin et al., 2012; Lückerath-Rovers, 2013; Miller & del Carmen Triana, 2009; Nguyen et al., 2012; Rodríguez-Domínguez et al., 2012; Srinidhi, Gul, & Tsui, 2011; Yasser, 2012)

Human capital theory with reference to improved information and decision making leading to increased innovation	(Carter et al., 2010; Dezsö & Ross, 2012; Erhardt et al., 2003; Hafsi & Turgut, 2013; Jhunjhunwala & Mishra, 2012; Lückerath-Rovers, 2013; Marimuthu, 2008; Miller & del Carmen Triana, 2009; Shukeri et al., 2012; Srinidhi et al., 2011)
Upper echelons theory	(Dezsö & Ross, 2012; Nielsen & Nielsen, 2013; Yasser, 2012)
Signalling theory	(Miller & del Carmen Triana, 2009)
Institutional theory	(Nielsen & Nielsen, 2013)
Behavioural theory of the firm	(Miller & del Carmen Triana, 2009)

To understand which of these theories might support the outcomes of the planned research, each was reviewed through relevant literature on the topic.

2.3.1. Agency theory

A recent paper commented on the value added by diversity amongst directors and indicated that "the positive relationship between board diversity and financial performance is predicted by both agency theory and resource dependence theory" (Nguyen et al., 2012, p. 5). Hafsi and Turgut (2013, p. 464) stated that "Agency theory has emphasized the board's control function, and prescribed in particular both independence of the board from management and leadership structure duality or separation of the functions of CEO and chairman of the board".

To understand the two statements above, agency theory was explained in terms of Bryant and Davis' (2012) description thereof. Agency theory stated that because an organisation's representatives or agents, for instance its management or employees, acted on behalf of the organisation and because the organisation's and agents' interests were never fully aligned, the agents would experience conflicts of interest in some situations and would act in their own self interest unless controlled or incentivised to act in line with the interests of the organisation.

From the above and earlier discussions, it could be seen that fiduciary functions have been introduced to counter the effects, as described by

agency theory, of misaligned interests between organisations and their agents. It could also be seen that independent boards, with balanced interests, were used to perform these fiduciary functions in order to govern decisions of strategic nature and counter misaligned interests of organisations' executives. Agency theory substantiated the argument for board independence to "reduce the likelihood that the agenda and initiatives will be dominated by the CEO" (Kim et al., 2013, p. 223). Diversity within boards was seen as a way of increasing board independence and ensuring a broad base of balanced interests.

Increased diversity within boards could therefore be seen as countering the agency effect as described by the agency theory, leading to improved performance from all stakeholders' perspective and not only the agents directly employed by an organisation.

2.3.2. Resource dependency theory

Together with agency theory, resource dependency theory was listed by Nguyen et al. (2012) as key to explaining the association between increased diversity within boards and improved financial performance. They stated that "According to resource dependence theory, it is argued that the security of firms' vital resources as well as the linkage between firms and their external environment, including prestige and legitimacy, will be able to be enhanced by increasing in the size and diversity of their board" (Nguyen et al., 2012, p. 5).

Bryant and Davis (2012) said that resource dependency theory asserted that organisations acted in ways relevant to their dependence on certain resources. Organisations responded to cues from their external environment in order to reduce their dependence on-, and maintain independence over relevant resources. Organisations that coped better with uncertainty and were able to reduce uncertainty for their stakeholders and which had control over scarce resources and over substitutability of their controlled resources, had a competitive advantage.

Expanding the view of resources and coping with uncertainty to include stakeholders, Hafsi and Turgut (2013, p. 464) stated that in terms of board composition, "diversity is desired by customers and other stakeholders for whom it is a demonstration of management sensitivity to stakeholders' preferences, aspirations, and concerns". This was echoed by Lückerath-Rovers in her statement that said, "the board of directors also serves as a linkage mechanism towards all relevant stakeholders" (2013, p. 507). Bryant and Davis (2012) indicated that diverse boards would have better access to information and networks to assist with achieving organisational goals in terms of the resource dependency theory by increasing "the ability to cope with uncertainty and minimize uncertainty" (2012, p. 6).

Increased diversity within boards could therefore be seen as increasing boards' access to information, reducing dependency on scarce resources and reducing uncertainty, leading to improved and sustainable performance.

2.3.3. Human capital theory

Carter et al. (2010) summarised that human capital theory referred to an organisation's view and utilisation of its employees' experience, skills and education for its benefit. The implication was that when diversity within boards was increased, it resulted in more directors "having unique human capital" (Carter et al., 2010, p. 398), because different individuals had different human capital attributes. Increased diversity within boards was therefore seen as a way to increase the chances of having a broader range of unique human capital aspects represented, leading to boards having enhanced decision making abilities and being more innovative (Hafsi & Turgut, 2013). When organisations targeted more diverse representation on their boards, they also increased the size of the talent pool available to them and increased the chances of finding and appointing directors with the required human capital.

Human capital theory was seen to fall under the, 'cognitive diversity within boards' grouping of diversity definitions. One of the demographic diversity dimensions often discussed in association with improved company

performance, was gender (Carter et al., 2010; Hili & Affes, 2012; Jhunjhunwala & Mishra, 2012; Larkin et al., 2012; Lückerath-Rovers, 2013; Mahadeo et al., 2012; Miller & del Carmen Triana, 2009; Nguyen et al., 2012; Shukeri et al., 2012; Van-Ness et al., 2010; Yasser, 2012). Gender could influence human capital, or cognitive diversity, in terms of propensity for risk, amongst other things.

2.3.3.1. Gender and risk

The Capital Asset Pricing Model linked share performance to risk (Fama, 1970), concluding that higher risk companies' shares achieved higher returns. Based on this, an extended conjecture in terms of diversity could be that boards that were less risk averse governed companies to higher share performance and boards that were more risk averse governed companies to lower share performance. The risk behaviour of genders could then be seen as an indicator of company performance.

One study of female risk behaviour in managerial settings did not find any significant difference between female and male risk behaviour (Maxfield, Shapiro, Gupta, & Hass, 2010). The authors of that study have admitted that results could have been warped by survivor bias. They stated that sample data collected could have been biased towards successful women in business, where these women could have adopted male risk behaviour to gain success in a male dominated environment, and not being representative of all women in business.

Some evidence has been gathered that linked levels of testosterone to risk behaviour, but similar results were found between sexes: higher levels of testosterone in both sexes correlated with lower levels of risk aversion (Sapienza, Zingales, Maestripieri, & Heckman, 2009). These results indicated that risk behaviour was not linked to biological sexes. Meier-Pesti and Penz (2008) argued that biological sex was not an indicator of risk aversion, but rather that the social construct of gender

was. Cultural differences in terms of gender have been illustrated (Franke, Hofstede, & Bond, 1991; Minkov & Hofstede, 2012) and it would seem that gender or culture had a bigger impact on risk behaviour than biological sex.

After reviewing a sample of available literature on the topic, gender or biological sex based risk aversion was deemed not to be an important influencing cognitive diversity factor. Gender diversity would then rather contribute to improved performance in terms of the resource dependency theory.

Having an increased number of viewpoints due to increased diversity amongst board members was said to enhance decision making abilities and innovation capabilities (Carter et al., 2010; Dezsö & Ross, 2012; Erhardt et al., 2003; Hafsi & Turgut, 2013; Jhunjhunwala & Mishra, 2012; Lückerath-Rovers, 2013; Marimuthu, 2008; Miller & del Carmen Triana, 2009; Shukeri et al., 2012; Srinidhi et al., 2011). One of the reasons why increased diversity within boards could have been related to better decision making and increased innovation could be due to a decline of groupthink.

2.3.3.2. Groupthink

Groupthink is a term that was coined by Irving Janis (1973). Janis described it as a "concurrence-seeking tendency, which fosters overoptimism, lack of vigilance" (1973, p. 20) in groups of people where the focus fell more on group cohesion than on optimal decision making. Review of empirical research on groupthink found that there was a "link between a lack of impartial leadership and groupthink and provides some support for the link between poor decision procedures and groupthink" (Esser, 1998, p. 133).

By having increasingly diverse boards, organisations could counter the effects of groupthink. There were however some

concerns about the validity of Janis' research and conclusions (Esser, 1998) and a potential exploratory study could be to further investigate how groupthink at board level is affected by different forms of diversity; both amongst and within boards.

2.3.4. Signalling theory

From the 28 articles reviewed related to the topic of company performance and board diversity, signalling theory was referred to only once (refer to Miller & del Carmen Triana, 2009), as shown in Table 2 on page 13 of this report. Signalling theory had its roots in economics and was used to explain conduct between two or more groups that had access to different information, also known as information asymmetry. Signalling theory primarily involved strategies and actions used to reduce information asymmetry between stakeholders (Connelly, Certo, Ireland, & Reutzel, 2011). Connelly et al. also mentioned that signalling theory was used to "explain how firms use heterogeneous boards to communicate adherence to social values to a range of organizational stakeholders" (2011, p. 40).

Signalling theory "posits that firms use visible signals to gain reputation and status among the public" (Miller & del Carmen Triana, 2009, p. 756) and that "due to information asymmetries, the public often uses both actions and symbols to judge a firm's reputation and quality" (Miller & del Carmen Triana, 2009, p. 762). Organisations therefore intentionally or even unintentionally signalled intent to the market, based on the composition of its board.

Signalling theory was found to be closely related to resource dependency theory and could be incorporated under that heading in literature. As mentioned earlier when resource dependency theory was discussed, Hafsi and Turgut (2013, p. 464) stated that in terms of board composition, "diversity is desired by customers and other stakeholders for whom it is a demonstration of management sensitivity to stakeholders' preferences, aspirations, and concerns".

Based on this conclusion, it could be argued that higher levels of diversity within boards were seen by an organisation's stakeholders as indicating the organisation's desire to incorporate diverse interests and opinions into its governance processes and ultimately its strategic and operational actions.

2.3.5. Institutional theory

Institutional theory was referred to in only one article (refer to Nielsen & Nielsen, 2013) from a review of 28 relevant articles, as shown in Table 2 on page 13 of this report. Institutional theory highlighted normative aspects of the context in which organisations operated. "By adopting structures that conform to institutional requirements, organizations demonstrate their conformity to social norms and thereby garner legitimacy for their operations" (Yang Yang & Konrad, 2011, pp. 12–13). Where signalling theory assumed organisations were sending signals to stakeholders by the composition of their boards, institutional theory assumed the opposite: stakeholders or institutions directly or indirectly pressurised organisations to conform to their requirements.

Yang Yang and Konrad (2011) referred to three types of institutions, namely regulative, normative and cognitive. Regulative included legal and regulatory institutions; normative included social and professional norms; and cognitive included ethics and culture. Three types of pressure were described, namely coercive, normative and mimetic. Coercive pressures happened due to "societal expectations and interorganization interdependence" (Yang Yang & Konrad, 2011, p. 12); normative from professionalisation and mimetic from ambiguity in the environment.

Nielsen and Nielsen (2013) used institutional theory to explain how cognitive diversity within boards related to the societal context of different countries and cultures. It was deducted from the literature review that institutional theory might have been addressed in other studies through an inclusive view of resource dependency theory and human capital theory. In both of those theories, education, skills and experience have allowed board members to incorporate learnings from their diverse networks to

cater to social and institutional requirements and reduce ambiguity or uncertainty.

It would seem that in terms of the association between diversity within boards and company financial performance, institutional theory did not provide reasons for having a competitive advantage. It seemed to rather have described necessary conditions for operating within a given environment; a ticket to the game as such.

2.3.6. Behavioural theory of the firm

Behavioural theory of the firm described the processes within firms and how interactions between various groups or individuals contributed to decisions (Gavetti, Greve, Levinthal, & Ocasio, 2012). Argote and Greve (2007, p. 339) stated that "Key concepts and mechanisms discussed in A Behavioral Theory of the Firm are bounded rationality, problemistic search, the dominant coalition, standard operating procedures, and slack search". They also said that the book referred to in their statement above (A Behavioral Theory of the Firm), did not introduce a theory of firm behaviour, but rather that it set the platform for researchers to develop various theories based on "different assumptions and deriving different predictions" (Argote & Greve, 2007, p. 337).

As with the previous two theories discussed, behavioural theory of the firm has only been encountered in one journal article relevant to this research (refer to Miller & del Carmen Triana, 2009), as shown in Table 2 on page 13 of this report, and could be deemed not to have added a significantly different theme to the diversity debate if read into the broader themes from the agency-, resource dependency- and human capital theories. In terms of how diversity within boards contributed to better decisions, one could also have referred to groupthink as discussed earlier.

One inference drawn from these theories was that boards with higher degrees of diversity within them would be better suited to perform all or most of the functions and responsibilities as defined earlier. The functions and responsibilities of

boards were found to be, advising top management, setting strategy, assessing management's performance, guiding the appointment and retrenchment of top management members, protecting the interests of shareholders and other stakeholders, managing risk, instituting proper governance and ethical management practices, maintaining independence and ensuring sustainability. Key themes exposed through the literature review in terms of associating increased diversity within boards with improved company financial performance could be grouped into increased independence and improved monitoring, increased number of diverse viewpoints, increased creativity, increased access to extended networks and greater access to information. Some authors however have noted that board effectiveness and company performance could be compromised by increased internal diversity if boards did not operate as effective functioning teams (Adams et al., 2010; Erhardt et al., 2003; Jhunjhunwala & Mishra, 2012; Lückerath-Rovers, 2013; Marimuthu, 2008; Miller & del Carmen Triana, 2009; Rodríguez-Domínguez et al., 2012). Rather than only increasing diversity within boards to meet some target at face value, the challenge lies in appointing diverse directors that worked together as a coherent team without compromising individual opinions for the sake of working together.

2.4. Previous master's studies

Recent master's studies were reviewed to understand methodologies applied, datasets used, results obtained and difficulties encountered.

Matlala's (2011) study of South African companies' financial performance in relation to board gender composition was limited to companies with 25% or more female representation from the Businesswoman's Association of South Africa's 2010 census report. The 32 companies selected from the 2010 census were compared to 32 similar companies from the JSE with less female representation and primarily the Tobin's Q financial ratio was used for the study's cross-sectional analysis. This methodology could have resulted in false negatives due to endogeneity as a result of the small dataset and survivor bias. Industry sector business cycles were also not accounted for.

Lehobo's (2011) study's limitations also included endogeneity, although it is noted and causality was not claimed. Companies listed on the JSE in 2008 were ranked according to turnover and the top 100 was selected as a sample. For this sample, the percentage- and average age of female directors were determined from 2004 to 2008 and compared to various standard financial ratios measures. All companies were compared against each other and in specific market sectors as well. This accounted for industry sector economic cycles and was seen to be an improvement when compared to Matlala's (2011) study. Lehobo's (2011) study found a negative correlation between increased female representation and corporate profitability.

Swartz's (2006) research is limited to data from company annual reports of 2003. 117 Companies were selected based on availability of key data points in terms of company financials and board composition. The research design accounted for company size and industry type. This cross-sectional analysis potentially suffered from survivor bias. Swartz (2006) employed comprehensive statistical models to test for association and found a positive, but negligible association between increased gender diversity and improved company performance. The research also investigated racial diversity and stated that "findings indicated a significant positive relationship between colour diversity and intellectual capital performance" (Swartz, 2006, p. 85), but concluded that "company performance when defined by intellectual capital performance is not largely dependent on board structure" (Swartz, 2006, p. 86).

The three studies reviewed all used company financial ratios to evaluate company performance in terms of board diversity. Two used only cross-sectional analyses and the one longitudinal study was limited to only 5 years of data. Results were mostly negative or inconclusive.

In conclusion, various behavioural theories could be linked to improved organisational financial performance based on progressive diversity amongst board members. To empirically prove that there is indeed improved financial performance, an investment style event study methodology is shown to be potentially most effective as it could overcome limitation from previous research reports.

Chapter 3: Research questions

The primary research question is whether company financial performance is influenced by the level of diversity amongst directors serving on boards. Various dimensions of diversity will be used to test what diversity dimensions are associated with improved company financial performance.

No propositions are stated, as the area of research is well established and interaction between board performance and company performance does not need to be established.

3.1. Hypothesis

Various hypotheses have been formulated to cater for different diversity dimensions and for combinations between various diversity dimensions. From literature reviews and available data, the following hypotheses are tested.

3.1.1. Gender

$H_{G+}0$: There is no association between the ratio of female representation on boards and company financial performance.

$H_{G+}1$: There is an association between the ratio of female representation on boards and company financial performance.

3.1.2. Race

$H_{R+}0$: There is no association between the level of racial diversity on boards and company financial performance.

$H_{R+}1$: There is an association between the level of racial diversity on boards and company financial performance.

3.1.3. Age

$H_{A+}0$: There is no association between the average age of boards and company financial performance.

$H_{A+}1$: There is an association between the average age of boards and company financial performance.

3.1.4. Gender and age

$H_{GA+}0$: There is no association between the level of combined gender and age diversity on boards and company financial performance.

$H_{GA+}1$: There is an association between the level of combined gender and age diversity on boards and company financial performance.

Chapter 4: Research methodology

As discussed in chapter 2, proving causality between diversity within boards and company financial performance has been elusive due to numerous influences that could not be accounted for or controlled in quantitative tests, leading to concerns regarding endogeneity. Some of these influences could have been attributed to market sector or industry performance and market events such as was seen during and after the global financial crisis of 2008. Dezsö and Ross (2012) stated that many studies on the topic did not "control for many observable factors that might influence firm performance" and "more importantly, fail to account for (a) the unobservable heterogeneity associated with particular firms or time periods that might simultaneously affect the level of female representation in top management and firm performance and (b) the related possibility of reverse causality" (2012, pp. 1073, 1074).

Overcoming or compensating for some of these factors was of concern in adopting a research methodology. The methodology used in this research report was based on Muller and Ward's (2013) investment style research methodology. The methodology used resulted in a quasi-experimental design and enhanced the results and supplemented methodologies utilised in previous studies to test for association between diversity within boards and improved company financial performance.

4.1. Research design

Saunders and Lewis (2012, Chapter 5) described research design as a multi-layered process starting with the selection of a research philosophy, then a research approach, -strategy, -method choice, -time horizon and techniques and procedures. Based on their 'research onion' model, this study's research design followed a pragmatic philosophy which stressed that "the most important determinant of the research philosophy adopted" were "the research question(s) and objectives" (2012, p. 107) and a deductive research approach was selected that involved "the testing of a theoretical proposition by using a research strategy specifically designed for the purpose of its testing" (2012, p. 108). A descriptive research strategy was selected based on mixed methods of experimental and archival research by examining company historical records from a know population to collect data for use in experiments where changes in dependent variables were observed due to observed changes in independent variables.

Mixed time horizons were used as cross-sectional and longitudinal analyses were combined to measure the impact of changes in selected variables over time to improve the validity and reliability of the results. The techniques and procedures selected are discussed further on in this research report.

According to the research design choices mentioned above, the design chosen for this study was seen to be quantitative in nature with the aim of moving from being purely descriptive towards indicating, but not proving, causality. Causality has been shown to be difficult to prove in these types of studies with numerous uncontrollable factors and this study instead focused on identifying associations between various diversity dimensions and company performance. The selected research design was quantitative in nature because of the sample size, considerable number of data points worked with and because no in-depth interviews or questionnaires were utilised. A quantitative design was chosen to facilitate the associative research design in order to test the hypotheses with improved methodologies and an expanded dataset, as compared to previous studies, and to provide replicable results.

This research design was not constructed to explain why diversity has benefits or not. The literature review in chapter 2 was used to explain the reasons and theoretical support for the potential expected positive association between diversity within boards and improved company financial performance. The research design was formulated to empirically corroborate or contradict the assumed beneficial association between diversity within boards and company financial performance. To improve the quality of the quantitative research and add a higher degree of certainty to the results, a quasi-experimental design, making use of time-series or longitudinal data was used. Time series used were share price data and company directors' data. Dimensions of diversity per director was captured and used in conjunction with company share prices to compare companies' performance and board diversity.

4.1.1. Investment style engine methodology

Muller and Ward's (2013) methodology constructed 5 ranked univariate portfolios of shares. Their ranked portfolios were reconstructed each quarter under investigation, based on changes in the ranking of the

variable under investigation. The 5 ranked portfolios were then subjected to daily cross-sectional analyses based on portfolio returns, which included both share price changes as well as dividend returns.

Classic, static cross-sectional analyses only provided descriptive results for a given point in time. Combined with longitudinal data and repeated portfolio reconstruction as described by Muller and Ward (2013), cross-sectional analyses were successfully used in quasi-experimental research designs and used to comment on the association of a variable under investigation and portfolio performance. For practical purposes this removed company-specific influences from results as each reconstructed portfolio contained companies in a specific period selected according to the variable being investigated. For this research the ratio or prevalence of various diversity dimensions within companies' boards were used to rank and construct univariate share portfolios. As portfolio performance was analysed as discussed above, the issue of whether, for example, female directors improve company performance or whether high performing companies appointed more female directors (Nguyen et al., 2012) was bypassed.

4.2. Population and sampling

A universe or population, also referred to in their text as a sampling frame, was defined by Saunders and Lewis as, "the complete set of group members" (2012, p. 132) from which a sample was selected in order to "enable the research question to be answered" (2012, p. 131). They defined a sample as, "a subgroup of the whole population" (2012, p. 132) and stated that samples were usually collected because researchers did not find it "practicable to collect data from the whole population" (2012, p. 133).

The research design called for time series data of share prices and directors' information and as a result, access to publically available secondary data. Based on the dataset that was available in the investment style engine database (Muller & Ward, 2013) the universe was initially defined as all companies listed on the JSE from 1985 up to 2013. For practical reasons the number of companies to work with was reduced and the target population or sample frame for this study

was re-defined as companies listed from 1985 up to 2013 on the JSE's All Share Index (ALSI). Companies listed on the ALSI represented "99% of the full market capital value" ("FTSE/JSE All-Share Index," 2012) and "companies falling outside of the ALSI are considered too small and too illiquid for most institutional investors" (Muller & Ward, 2013, p. 69).

No longitudinal secondary data of board members could be sourced however and for practical reasons a sample had to be selected from the population. Historical data regarding directors and board compositions had to be captured manually and for this research to be completed in time, the number of companies to work with and the resulting manual workload had to be reduced. The sample frame was restated as all companies in the ALSI that were trading continuously on the JSE from 2000 to 2013. This sample frame contained 104 companies (refer to Appendix 1). Typical case, purposive, non-probability sampling was used to select 40 companies from the population to alleviate the workload of manually capturing director data. This was done by ranking the list of 104 companies by market capitalisation as on 31 January 2005 in descending order and selecting the first 40. The database queried for market capitalisation only had data for market capitalisation from January 2005 onwards; otherwise the market capitalisation from January 2000 would have been used. The 40 companies selected as a sample are shown in Appendix 2.

Although a sample of 40 companies was selected from the population, the study could still produce acceptable results because the sample was found to be representative of the population as shown in Table 3 below.

Table 3: Relevance of sample in terms of market capitalisation distribution

Population of 104		Sample of 40	
JSE Sector Name	% Market Cap	JSE Sector Name	% Market Cap
Mining	34.0%	Mining	37.2%
Banks	15.1%	Banks	16.9%
Life Insurance	6.1%	Life Insurance	6.9%
Beverages	5.8%	Beverages	6.2%
Oil & Gas Producers	4.6%	Oil & Gas Producers	5.2%
General Financial	4.4%	Mobile Telecommunications	4.7%
Mobile Telecommunications	4.2%	Fixed Line Telecommunications	3.8%
Fixed Line	3.4%	General Financial	3.7%

Telecommunications			
General Retailers	2.7%	General Retailers	2.4%
General Industrials	2.0%	General Industrials	2.1%
Food Producers	2.0%	Support Services	1.6%
Industrial Transportation	1.9%	Media	1.5%
Media	1.7%	Industrial Transportation	1.4%
Food & Drug Retailers	1.6%	Forestry & Paper	1.2%
Support Services	1.5%	Food Producers	1.0%
Construction & Materials	1.5%	Household Goods	1.0%
Forestry & Paper	1.0%	Construction & Materials	0.8%
Real Estate	1.0%	Food & Drug Retailers	0.7%
Chemicals	0.9%	Health Care Equipment & Services	0.6%
Household Goods	0.8%	Pharmaceuticals & Biotechnology	0.5%
Health Care Equipment & Services	0.8%	Nonlife Insurance	0.5%
Electronic & Electrical Equipment	0.7%		
Travel & Leisure	0.5%		
Pharmaceuticals & Biotechnology	0.5%		
Nonlife Insurance	0.5%		
Technology Hardware & Equipment	0.3%		
Equity Investment Instruments	0.2%		
Software & Computer Services	0.1%		
Industrial Engineering	0.1%		
Leisure Goods	0.1%		
Automobiles & Parts	0.1%		
Industrial Metals	0.1%		

Matched Rank	70.3%	Matched Rank	76.9%
Comparable Rank	25.7%	Comparable Rank	23.1%
No Matched Rank	4.0%	No Matched Rank	0.0%

In Table 3 above, companies in the population of 104 and in the sample of 40 were grouped by JSE market sector and their market capitalisation expressed as percentage of the respective totals. The comparison showed that 96% of the population's ranked companies matched or was closely comparable in ranking to those of the sample, with only 4% of JSE market sectors, expressed in terms of market capitalisation, not being present in the sample. A further validation was based on a recent Accountancy SA report (Coppin, 2011) indicating that the top

100 companies listed on the JSE, as ranked by market capitalisation, accounted "for approximately 90% of the total market capitalisation of the JSE". The sample used for this research accounted for 89% of the population of 104 top ranked companies and therefore accounted for approximately 80% of JSE's market capitalisation in 2005, which is considered a significant and representative sample of the JSE's listed companies.

The redefinition of the sampling frame and the resulting sampling did introduce survivorship bias as only companies that were listed and traded continuously from 2000 to 2013 were considered. Due to the investment style methodology described by Muller and Ward (2013) where ranked portfolios were subjected to cross-sectional analyses, the portfolios being analysed were regularly reconstituted from a pool of companies trading at a given point in time: the JSE ALSI. As companies were moved in and out of portfolios based on the ranking of a chosen variable, no weighting was associated with any specific company's survival or failure. The same held for this research in that relative performance was used and as such it was deemed that the effects of diversity would still be observable and not overshadowed by the introduced survivorship bias.

4.3. Unit of analysis

The unit of analysis selected for this study was visual inspection of charted cumulative returns of ranked share portfolios. The charts were used to indicate relative, cumulative company market return performance based on selected board diversity criteria.

4.4. Data collection

Two sets of longitudinal data for the 40 selected companies from 2000 up to 2013 were needed for this research, namely company market returns and director data. Both sets of data and the collection process are described next.

Muller and Wards' (2013) style engine's database contained historical- and current records of all JSE listed companies' market return performance from 1985 onwards. Available secondary data in the database that was used for this

research included daily closing share price data as well as historical dividend payouts. No data collection beyond what was available in the database was needed for market return time series as required by the research design. The workings of the style engine are described in detail in the data analysis section of this document.

The intent was to source historical records regarding demographical information about directors and their representation on different boards from recognised data providers. At the outset of conducting this research, the only diversity dimension considered was gender, and the first data source considered was the Businesswomen's Association of South Africa (BWASA), as was done by a previous study (Matlala, 2011). They did not respond to an e-mailed request for assistance with data and the request was not followed up further because the research design was amended to cater for additional dimensions of diversity. Next the JSE was contacted, as they were providing data streams to data retailers, but they did not have detail historical records regarding directors. Thereafter I-Net Bridge and McGregor BFA were approached. Both confirmed that they did have records regarding directors, but that they did not keep historical records; they only had a list of current directors as per the latest annual reports of the various companies. The Institute of Directors in Southern Africa (IoDSA) were contacted next, but their COO indicated that they would not be able to provide the required information, failing to clarify it the data wasn't available or if they were not able to share it. The last data provider contacted was Profile Media. They were very accommodating, but after a meeting with their IT manager they also concluded that no historical records about directors' board representation were kept.

It was at this stage that the population was redefined and a smaller sample was selected as discussed in point 4.2 because all data regarding directors and historical board compositions had to be captured manually by the researcher.

A Microsoft Access database was created to store all the manually captured records of directors and their representation on different boards. The list of 40 companies contained in the sample was stored in one table and a list of current directors, received from I-Net Bridge, was stored in another. An intermediate table was created to link a company with a director on a specific date: the date of a company's annual report. A table containing standardised qualifications and

professional membership data was added and linked to directors via another intermediate table as shown below in Figure 1.

Figure 1: Design of database used for manually capturing directors' data
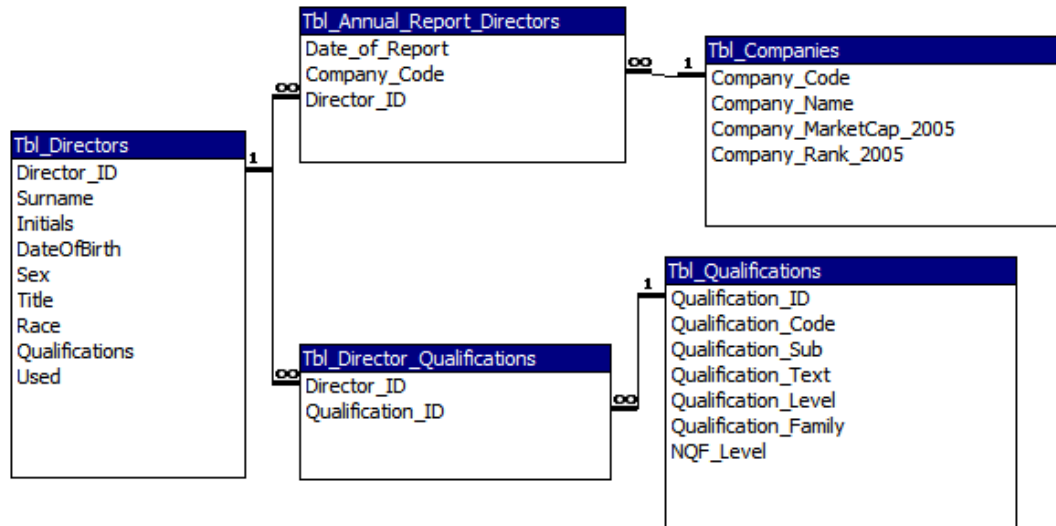
Annual reports from 2000 to 2013 were viewed directly from each company's website or annual report repository. Where companies did not provide online copies dating back to 2000, the McGregor BFA (http://www.mcgregorbfa.com/) Research Domain online library was used to retrieve older copies. The first 10 companies' annual reports were viewed online whilst capturing data, but to speed up the process, the remaining 30 companies' annual report were downloaded first and then processed. Each of the 523 annual reports retrieved were perused to extract the date of the report, the company code and the list of directors.

For the purposes of this study a company's board was assumed to stay the same from the date of one annual report to the next. When tests were done in periods between two annual reports of a company, the previous annual report's data was used. In other words, no director movements between annual reports were taken into account. Directors were captured for each annual report as listed and if a director appeared on the board in one annual report and not on the board in the following report, the resignation date was assumed to be on the date of that following annual report. The same was assumed for appointments. Where available, directors were selected from the list provided by I-Net Bridge and not manually registered in the database. The I-Net Bridge list was not complete, as it

did not contain historical records and after processing all of the annual reports, an additional 673 directors had to be added manually to the table of directors. A standard set of data was captured for each director, as shown in the left-most table in Figure 1 above.

Although it was a socially sensitive topic to address, directors had to be classified into population groups according to race for this research. Racial groups used, were those defined in the South African Census 2011 as presented on the South African Government Information web site ("About SA - South Africa's people," 2013) namely African, Coloured, Indian/Asian and White. Population groups that were captured in the database were based on actual data from annual reports and for completeness, Arab and Hispanic groups were added and the Asian/Indian group were split into separate categories. Directors' race was determined by photographs in annual reports in combination with interpretation of surname and country of origin or from the Internet using business directory searches. Sex or gender was verified in the same way as race, with additional information gleaned from directors' titles. Online business directories used were, www.whoswhosa.co.za and investing.businessweek.com, as mentioned in previous studies (Lehobo, 2011).

At the outset, qualifications were captured for each director as presented in the annual reports: in one long text field. This caused problems during data analysis and all qualifications had to be manually recaptured in a structured format. Each specific qualification or professional accreditation was captured and categorised in a new table according to South African qualification families and qualification levels. Qualification levels were registered according to South Africa's National Qualification Framework (NQF) levels ("NQF Levels," n.d., "South African Qualifications Authority," 2013, "Unisa Online - NQF levels," n.d.) and qualification families were based on the University of Pretoria's list of faculties and related qualifications ("Faculties > University of Pretoria," n.d., "University of Pretoria | Postgraduate Academic Programmes," n.d., "University of Pretoria | Undergraduate Academic Programmes," n.d.) and on general Internet searches for fellowships and other professional accreditations.

Table 4: Qualification and accreditation families used

Qualification Families
Economic and Management Sciences
Education
Engineering, Built Environment and Information Technology
Health Sciences
Humanities
Law
Natural and Agricultural Sciences
Theology
Veterinary Science
Professional: Accounting
Professional: Engineering
Professional: Financial
Professional: Governance
Professional: Humanities
Professional: Management
Professional: Medical
Professional: Mining
Professional: Natural and Agricultural Sciences
Professional: Vocational
Public Service Recognition

Table 5: NQF levels used to categorise qualification levels

NQF level	Qualification
10	Doctoral degree
9	Masters degree
8	Honours degree, Bachelors degree, Postgraduate diploma, Professional Qualifications
7	Bachelors degree, Advanced diploma, Professional Accreditation
6	Diploma, Advanced certificates
5	Higher Certificates
4	Grade 12, National Certificates level 4
3	Grade 11, National Certificates level 3
2	Grade 10, National Certificates level 2
1	Grade 9

Table 6 below summarises data captured regarding directors and boards after perusing the 523 annual reports of the selected 40 companies.

Table 6: Data captured in the research database

Item Logged	Available	Manual
Directors Registered	354	673
Qualifications Registered		304
Company - Annual Report - Director combinations		7 258
Director - Qualification combinations		2 247
Total	354	10 482

4.5. Data analysis

The collected data had to be processed and analysed to answer the research questions and meet the research objectives (Saunders & Lewis, 2012). The quantitative data collected for this research was categorical and descriptive in nature for items such as race and gender. Descriptive or nominal data was defined by Saunders and Lewis as, "categorical data that are grouped into sets (categories) that have no obvious rank or order" (2012, p. 167). Some portions of the data collected were discrete, numerical data, like the age of directors. In order to analyse the captured data for purposes of commenting on diversity within boards and its association with company performance, the descriptive data had to be processed into ranked data. Ranked data was defined as, "categorical data that are put into a definite order" (Saunders & Lewis, 2012, p. 166).

To run the tests as required by the research design, the different boards for each company and each annual report had to be ranked in terms of selected diversity dimensions. To rank diversity amongst different boards, diversity needed to be quantified in a standardised manner, and it was "defined as the collective amount of differences among members within a social unit" and "as the distribution of differences among the members of a unit with respect to a common attribute" (Solanas, Selvam, Navarro, & Leiva, 2012, p. 412).

Three types of diversity and related indices were identified, namely separation, variety and disparity, which were defined as follows: "separation, variety, and disparity are respectively understood as differences in attitude or position, differences in categorical characteristics, and differences in power or status hierarchy", where "Blau's index, standard deviation, and coefficient of variation

respectively correspond to measure diversity as variety, separation, and disparity" (Solanas et al., 2012, p. 412).

Table 7: Different types of diversity and related indices

Diversity Type	Examples	Diversity Index	Standard Formula
Separation	Age diversity	Standard deviation	$SD = \sqrt{\sum_{i=1}^{n} \frac{(x_i - \bar{x})^2}{n}}$
Variety	Racial diversity	Blau's index	$B = 1 - \sum_{i=1}^{k} p_i^2$
Disparity	Income inequality	Coefficient of variation	$V = \dfrac{\sqrt{\sum_{i=1}^{n}(x_i - \bar{x})^2 / n}}{\bar{x}}$

(Table based on Solanas et al., 2012, p. 413)

Several univariate diversity indices were constructed based on gender, age, race and qualifications.

4.5.1. Gender diversity index

For gender, a categorical data set with only two categories, the ranking of boards was based on the proportion of women directors on the different boards. Blau's index was calculated as well, but that did not change the ranking and for simplicity in setting up test runs in the style engine, the percentage of women was used to rank boards in terms of gender diversity.

4.5.2. Age diversity index

Some authors have quantified age diversity in terms of disparity with the coefficient of variation (Knight et al., 1999), but for this research, quantifying diversity or differences in the numerical data of directors' age

was done through calculating the standard deviation in ages of boards because it suits situations where "the particular feature can be expressed in a metric way, e.g. age or organizational tenure" (Bertolt, 2009, para. 1). Differences between boards' age were quantified by average age of the boards.

4.5.3. Racial diversity index

Quantifying racial diversity was done with Blau's index of diversity, because "If researchers wish to quantify the diversity of a group with regard to a nominal feature, such as ethnicity, gender, or education, they usually employ the Blau Index" (Bertolt, 2009, para. 2). Blau's index "measures the probability of two individuals chosen at random from the population being of different race or ethnicity" (Rushton, 2008, p. 446). Blau's index is a true measure of diversity, as it takes into account how many different groups there are as well as how many individuals there are in each group. If all directors from a specific board were from the same race, that board would have a Blau's index of 0%. If a board consisted of an equal number of directors from each of the seven races used in this study, the Blau's index would be 85.7%. Concerns raised in the use of Blau's index for racial diversity analysis (Rushton, 2008) did not apply to this research, as the purpose was not to contrast differences between specific racial groups, but rather to identify degrees of- and not the types of racial diversity within and between boards.

4.5.4. Educational diversity index

A recent study on educational diversity and group effectiveness used separation- and variety diversity indices to quantify educational diversity (Curseu, Raab, Han, & Loenen, 2012). For this study's data analysis, the researcher used a slightly modified approach, as there were more educational categories per group and per person as in the study referred to above. As mentioned in point 4.4, there were numerous directors that had multiple qualifications. To analyse this, two different approaches were followed. Firstly, similar to the Curseu et al. (2012) study, each director's

highest level of qualification was used to calculate the educational level separation within each board by calculating the standard deviation of those levels. Secondly, the educational variety for each board was calculated with Blau's index by creating categories for each unique combination of educational family and NQF level.

Multidimensional diversity indices were also constructed by combining different univariate diversity dimensions into unique combinations and calculating Blau's index values for those newly formed categories. Two combinations were gender and race, and gender, race, age and education.

4.5.5. Board stability quotient

Board stability was not included in the literature review and was not seen to form part of the study. While collecting and analysing the data, the researcher wondered if the number of new directors on a board would not influence a board's effectiveness and in essence also be a form of diversity. A cursory review of literature indicated that the number of new group members did in fact have an impact on group performance (Koźlak, Zygmunt, & Nawarecki, 2013; McCarter & Sheremeta, 2013). Tenure could not be calculated with data available, but board stability could. The stability of a group between two time periods was defined as the "quotient of the quantity of the set being the common part of the two sets which contain elements of this group in times t1 and t2 to the quantity of set being the sum of these sets" (Koźlak et al., 2013, sec. B. Group Dynamic).

The diversity indices and stability quotient were calculated with queries and/or Visual Basic for Applications (VBA) code in the Microsoft Access database or in Microsoft Excel from exported datasets. A detailed dataset containing all records was also exported for use in the style engine.

4.5.6. Style engine data analysis

Data was analysed and presented in graphical time series with Muller and Ward's (2013) style engine. Their style engine was created in Microsoft Excel and used VBA code to retrieve and process data from their style engine database. It allowed them to select a starting date, ending date, the number of portfolios, and a review period and enabled them to define, pick and rank variables for analysis. Their style engine's database contained share price data from 1985 up to the current date and included dividend- and scrip dividend receipts in the share returns, because dividend pay-outs represented a sizeable part of the returns investors received. They did not "account for share buybacks, on the grounds that these are a form of capital reduction, which only affect those shareholders who exit the company" and ignored "shares granted as compensation to managers" (Muller & Ward, 2013, p. 69).

For univariate data analysis they compiled equally weighted portfolios of shares, containing the same number of companies, after having ranked them according to the variable that was analysed. An example would be ranking companies by the percentage of women on their boards and then creating a predefined number of portfolios from these companies' shares in the order they were ranked. Below is an example of 40 companies divided into 2 portfolios according to the percentage of women that served on their boards.

More women	Less women
20 boards	20 boards

Bivariate data analysis was accomplished by ranking all the shares by each variable in turn and then selecting shares where variables were matched and opposed, resulting in four equally weighted portfolios, but not necessarily containing the same number of companies' shares. Below is an example of 40 companies ranked in terms of the percentage of women on their boards and then according to the average age of the boards. In this example there weren't an equal number of companies in each portfolio, although the number of companies per variable were equal; 20 in this example.

	More women	Less women
Older boards	15 boards	5 boards
Younger boards	5 boards	15 boards

The style engine calculated the returns of each share in each portfolio on a daily basis, and updated the value of each portfolio, having started all portfolios from a base of 1. The style engine ignored transaction costs that were related to the "re-balancing in each portfolio on the grounds that" it would "be approximately the same between portfolios and immaterial" (Muller & Ward, 2013, p. 69).

At pre-selected time intervals, the portfolios' values were retained and the shares within each portfolio re-selected according to the ranking methodology discussed. After rebalancing the portfolios, the daily portfolio value updating process continued, with each portfolio potentially containing a new set of ranked companies. The style engine repeated the whole process of portfolio rebalancing and portfolio valuation until the last day of the selected time period. Rebalancing of portfolios was done monthly for this research report, because companies in the sample had different year ends and new information that could affect the composition of portfolios had to be included when it was available.

This methodology removed effects of a static list of companies on portfolio performance and rather illustrated the effect companies selected dynamically based on specific variables had on portfolio performance. The style engine combined cross-sectional- and longitudinal research methodologies and aimed to move beyond being purely descriptive towards illustrating associations between selected variables and company performance.

Muller and Ward's (2013) approach differed from traditional approaches that evaluated results in terms of average returns per time period and tested for significance with t-tests. They viewed "the use of average monthly or quarterly returns as methodologically weak compared to cumulative returns, in much the same way as average abnormal returns reveal relatively little compared to cumulative abnormal returns in event

studies" and proposed "to plot the cumulative index (value) of each portfolio over the timeframe and to visually compare the results" (Muller & Ward, 2013, p. 70). To assist interpretation of the plotted results, they divided the highest ranked portfolio's value by the lowest and plotted the resulting data series as a price-relative line. When the slope of this price-relative was upwards, the highest ranked portfolio performed better than the lowest, and vice-versa. A flat slope indicated that performance of the highest- and lowest ranked portfolios were the same. As a supplementary benchmark they showed "the market capitalisation weighted ALSI total return index (J203T) in the graph, and also the price-relative of the highest ranked portfolio against this" (Muller & Ward, 2013, p. 70).

This combined approach of cross-sectional and longitudinal research methodologies was used to ensure rigorous testing and strong affirmation of illustrated associations.

4.6. Data limitations

The biggest limitation that affected the quality of the research was the lack of available secondary data about historical board compositions. This resulted in huge pressure on time frames, as close to 10 500 unique combinations of records had to be captured manually by the researcher. Due to this limitation, the targeted population of 160 companies could not be used and the sample frame had to be reduced to 104 companies, and from that a sample of only 40 were selected. Although still representative, as discussed in point 4.2, it has reduced the richness and validity of results.

The sampling methodology could also be improved upon, as the sample of 40 companies was selected on their market capitalisation as at January 2005. This was due to a limitation on the database used, having market capitalisation data only going back as far as 2005. The effect of this sampling limitation has not been explored, although as mentioned above the sample was still deemed a fair representation of the JSE in terms of size and composition.

Another data limitation was caused by time constraints as well as availability of secondary data. Board compositions and director data was captured from 2000 onwards only. This time limit was first of all imposed to reduce the manual workload, but during the process of retrieving annual reports, it was also noted that very few electronic records were seen for periods prior to that. If this research was to be expanded, by including data from annual reports earlier than 2000, it might be necessary to peruse printed- or other archival format annual reports. The availability of such formats was not investigated during this research.

Although this research did not degenerate into comparisons of race groups' performance against each other, it still relied on classifying people into different race groups. Literature reviews on racial profiling and classifying methodologies did not form part of this research and the superficial method of inspecting photographs might not have shown the necessary consideration for an area of life that still harbours deep routed feelings in South Africa. The specific racial groups or categories selected might be questioned, although the results might not be influenced that much, as on average, African and White directors accounted for over 90% of board members in the sample.

Another area of concern in terms of data accuracy was directors' qualifications or professional accreditations. Scores of annual reports did not list any qualification records, and those that did at times omitted qualifications between different years. Also worth noting was that due to time constraints, qualifications were captured as presented on the first annual report on which a director was listed and not updated to reflect qualification changes over time. Where noticeable additions were spotted, they were added, but again without any indication of when additional qualifications were achieved.

The research questions did not call for the investigation of board independence and no data was collected to indicate whether directors were independent or not.

Tenure was a diversity dimension that was identified during the literature review that could not be investigated due to a lack of data caused by the omission of relevant data in numerous annual reports in terms of appointment and resignation dates of directors. In a slightly similar theme, the issue of directors serving on multiple boards were recognised as data was captured, but due to working with a

sample and not a complete list of all companies the topic was not explored any further.

More tests were possible with the data captured, as there were multiple ways in which the various dimensions of diversity captured could have been combined. This was not a data limitation, but due to a time constraint.

Finally it is worth noting that the crude manner in which the construct of diversity was addressed through basic demographical classifications and groupings could never truly reflect the richness of individual differences amongst people. True differences between human beings are complex and not identifiable by superficial stereotyping based on observable characteristics only. As an example, a young White female might have more in common with a young Asian man than with an elderly White man and such an occurrence would not be reflected in this research.

Chapter 5: Results

Basic descriptive statistics were first used to analyse and describe the sample of 40 selected companies to gain some insight into what an average board looked like during the period under investigation.

5.1. Average board size and stability

Figure 2 below shows that the average size of boards in the sample increased from about 13 in 2000 to 14 in 2012. The standard deviation has decreased over this period, indicating that board sizes in the sample varied less over time. Overall board sizes in the sample have not changed significantly over the period, but it does seem like board sizes have declined slightly and then stabilised after the global economic downturn.

The left vertical axis represent the average number of directors per board and the right vertical axis the standard deviation of the number of directors per board: the same order the legend is presented in at the bottom of the chart.

Figure 2: Average board sizes

Figure 3 below indicates that the average number of new directors per board has declined from two per company in 2000 to about 1 per company in 2012. The number of new directors was calculated between consecutive years only and not between multiple years. Based on this statistic, an average board in the sample

of 40 could have replaced all directors about every 7 to 8 years. This statistic does not indicate that however, as the directors replaced in a following year might be the previous year's new directors, with a significant portion of directors being static for multiple years. Although there is a decline, the year-on-year number of new directors is fairly stable.

Figure 3: Average board stability
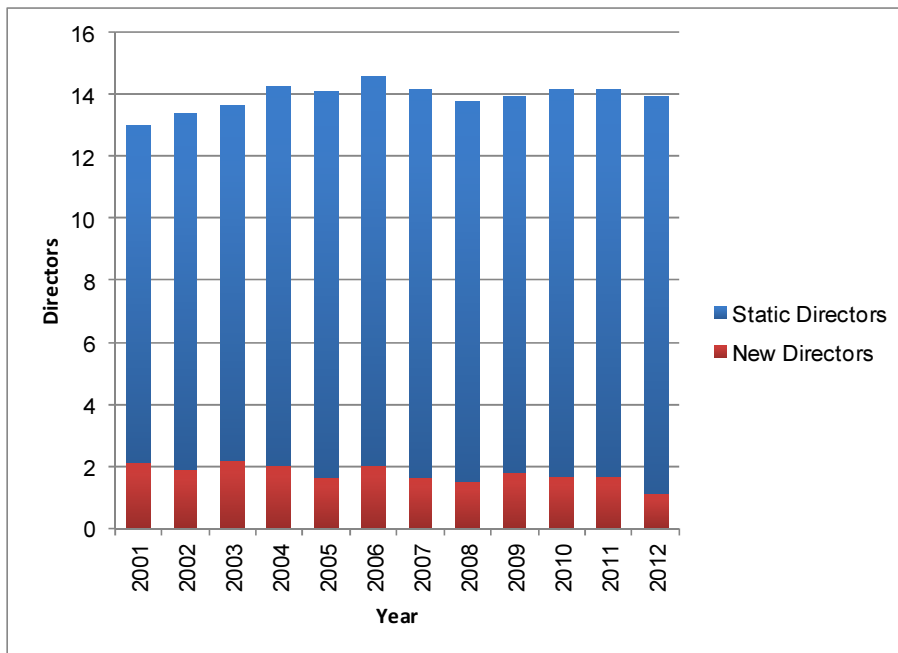

5.2. Average board age

Figure 4: Average board age
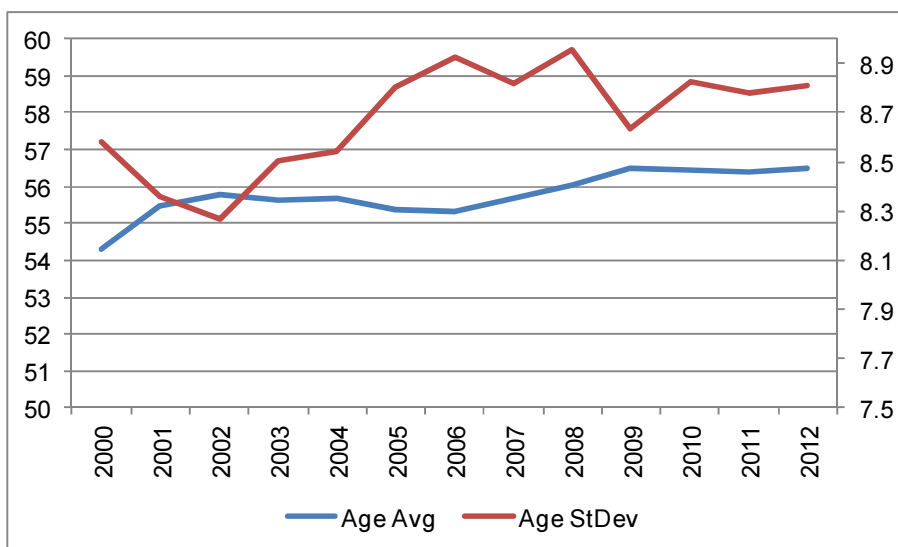
Figure 4 shows boards in the sample are ageing and that there is not a significant difference between the various boards' average ages. Figure 5 breaks the average board into decade age brackets for each year of the study period. It is interesting to note that the number of directors in their 70's is increasing. This could be explained by the high level of board stability.

Figure 5: Average board age composition
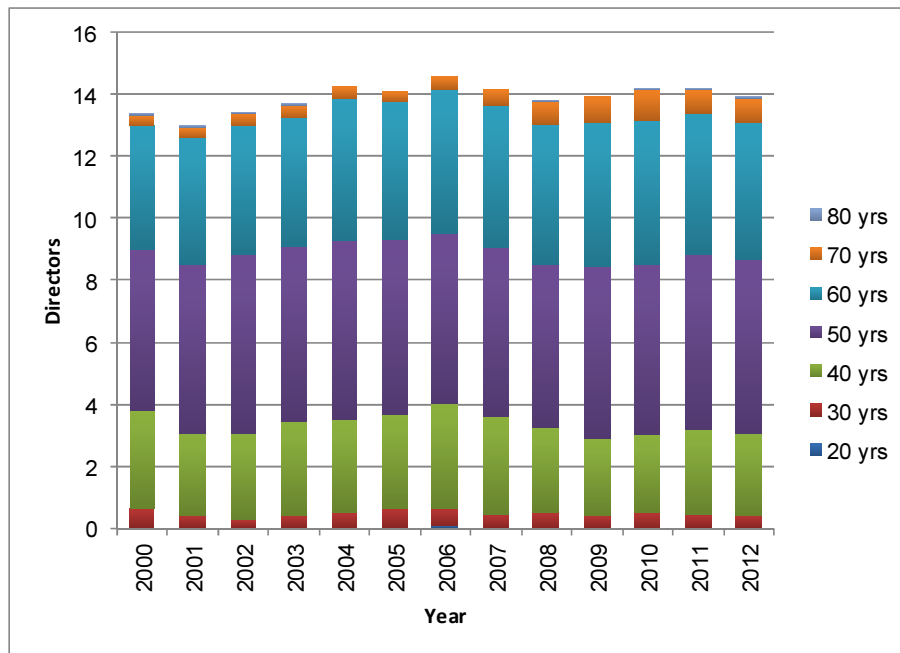
5.3. Average board educational- and professional qualifications

Figure 6 below was based on each director's highest qualification level, irrespective of the number of qualification per director. As mentioned in the data limitations section, there were concerns about the completeness and accuracy of educational and qualification data captured, but acknowledging that, it would seem as if the average board in 2012 was higher qualified than in 2000.

The high number of directors shown with an NQF level 4 qualification is misleading as directors with no educational or qualification data listed were captured as having at least an NQF 4 level qualification during capturing of the data. All other levels of qualification were however based on actual listed qualifications as provided in the annual reports.

Figure 6: Average board highest qualification levels
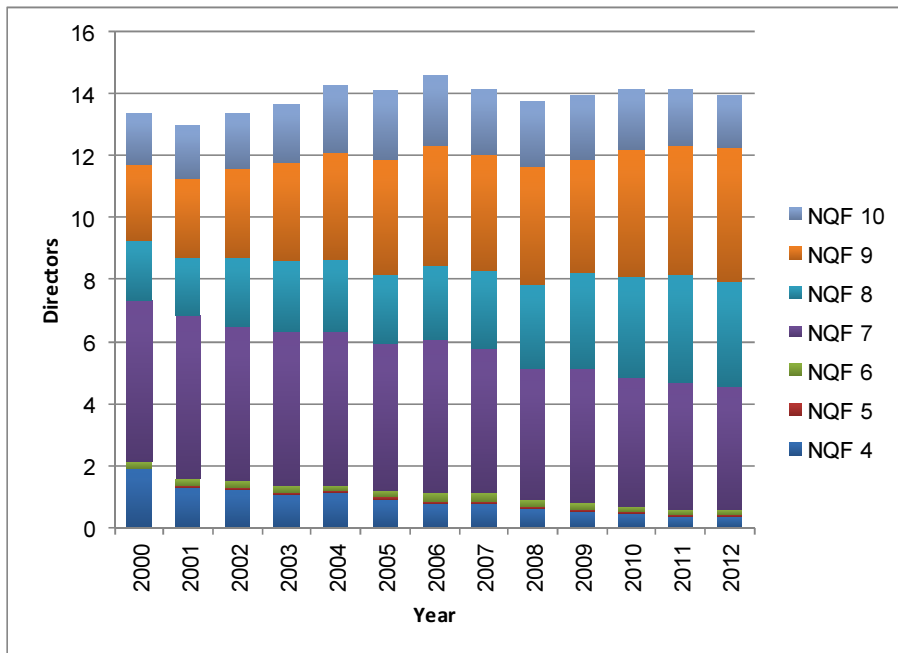
Figure 7 below indicates the average number of qualifications per board in the sample. For legibility, only qualifications constituting the top 90% of the total number of qualifications were charted and grouped per educational family. It is clear that the number of qualifications per board has increased and that the preferred qualifications for directors are in the economic and management sciences and accounting categories.

Figure 7: Average board qualifications
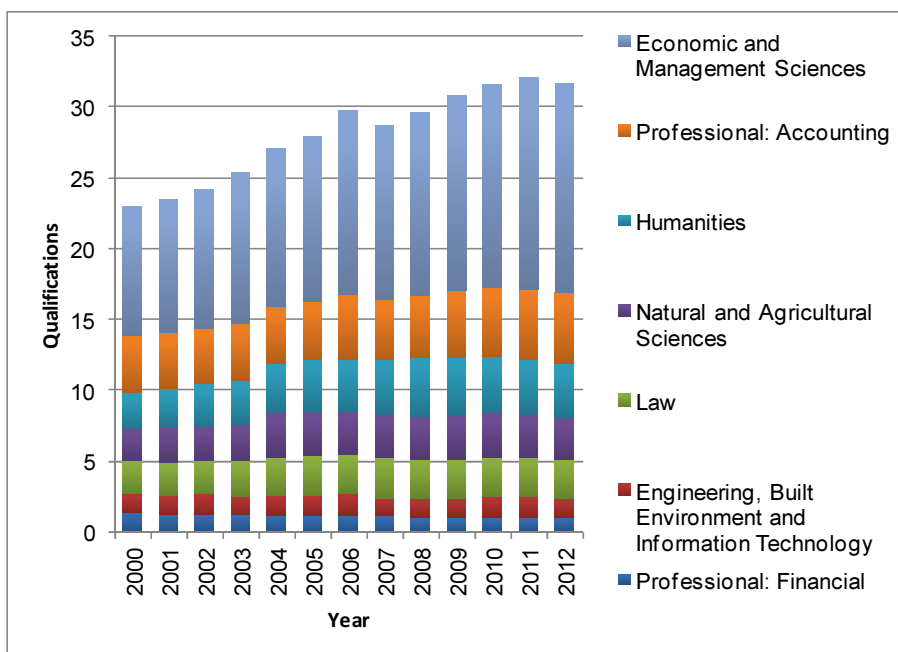
5.4. Average board racial and gender composition

There has been a steady decline in the number of white directors on boards in the sample examined, as shown in Figure 8 below. This reflects the effects of the regulatory and social environment of post-apartheid South Africa, but indicates the long road ahead as the average racial representation on the boards in the sample of 40 companies in 2012 is 60% White and only 30% African. Of interest is the increase in the number of coloured directors up to 2006 and the steady decline since.

Figure 8: Average board racial composition
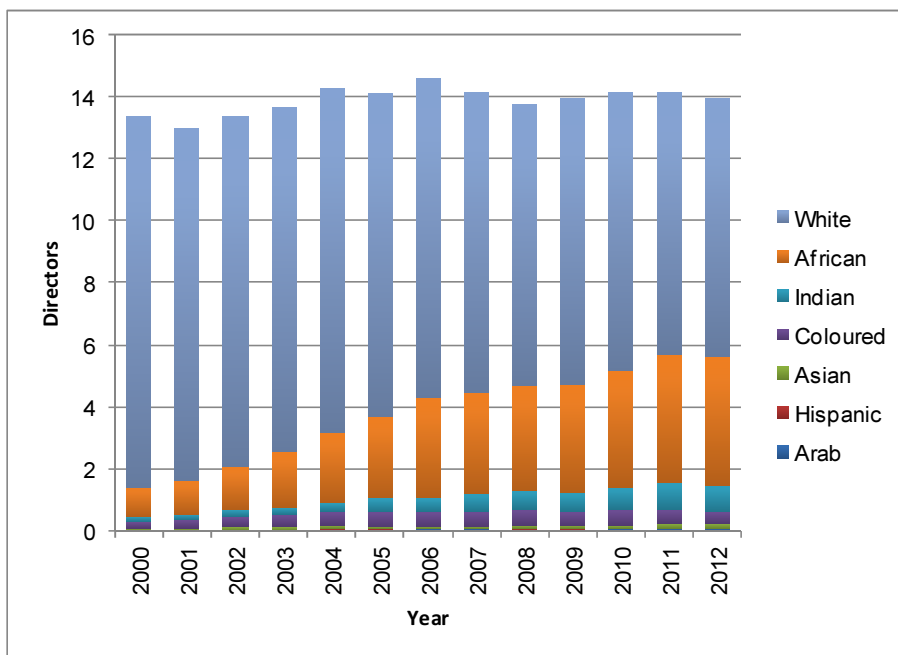
Figure 9 below illustrates a steady increase in the number of women serving on boards in the sample of 40 companies. The 2012 average of 2.8 women and 11.2 men however still equates only to an average female representation of 20% on the boards in the sample. Although based on a small sample, this is assumed to be representative in terms of the sampling methodology used and illustrates an even bleaker scenario than the racial imbalance on boards. There might well be a need for a Women Empowerment and Gender Equality Bill ("Xingwana," 2013).

Figure 9: Average board gender composition
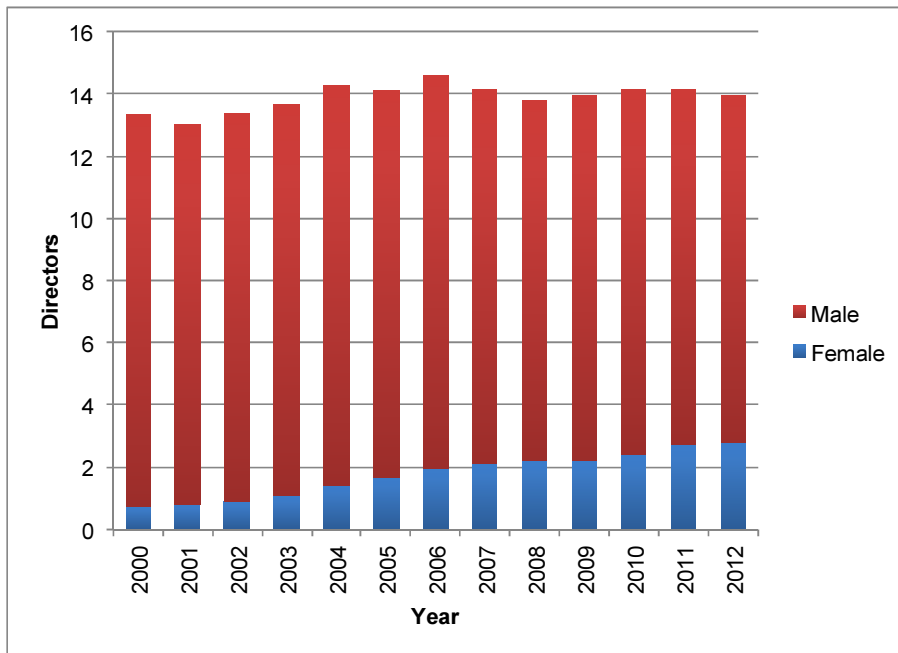
Figure 10 below combines the racial and gender composition data discussed above on one chart. Of note is the female representation on boards: the number of African women on boards has increased significantly, closely keeping pace with the number of African male directors while the number of White women serving on boards has been stable over the period.

Figure 10: Average board racial and gender composition
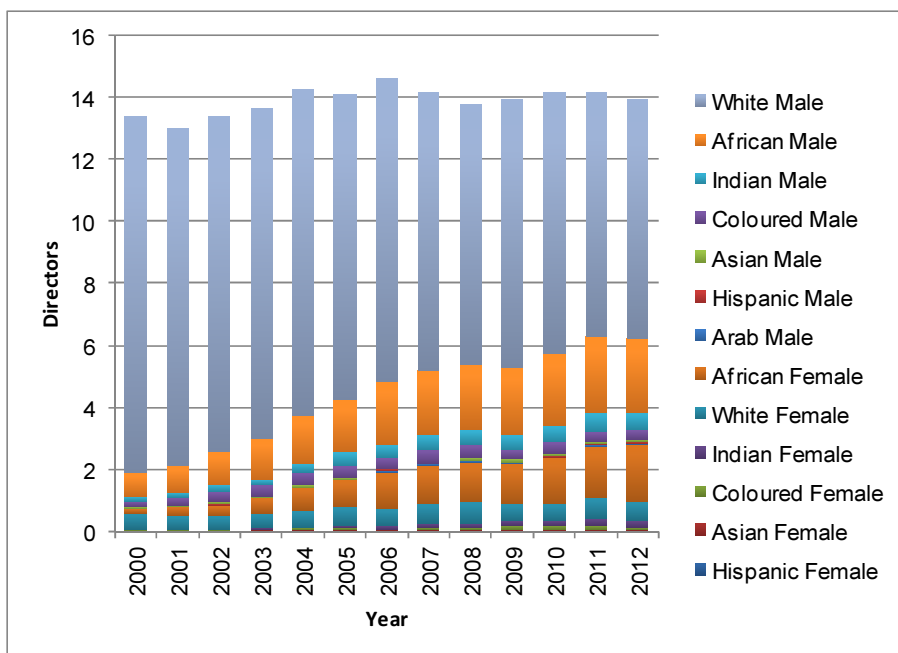
Basic descriptive analysis of the 40 selected companies clearly indicated that although boards were fairly stable and average board sizes and age did not change significantly, boards have been undergoing change during the period under review. Racial and gender diversity has increased, and along with it the level and number of qualifications. To interpret this change in terms of diversity indices and the association with company financial performance, a number of tests were conducted with Muller and Ward's (2013) investment style engine.

5.5. Racial diversity and company financial performance

Racial diversity was measured with Blau's index. Figure 11 below indicates that the average racial diversity within boards for the selected sample has increased steadily and that the level of racial diversity of the different boards is converging with more boards being increasingly racially diverse.

Figure 11: Average board Blau's index of racial diversity
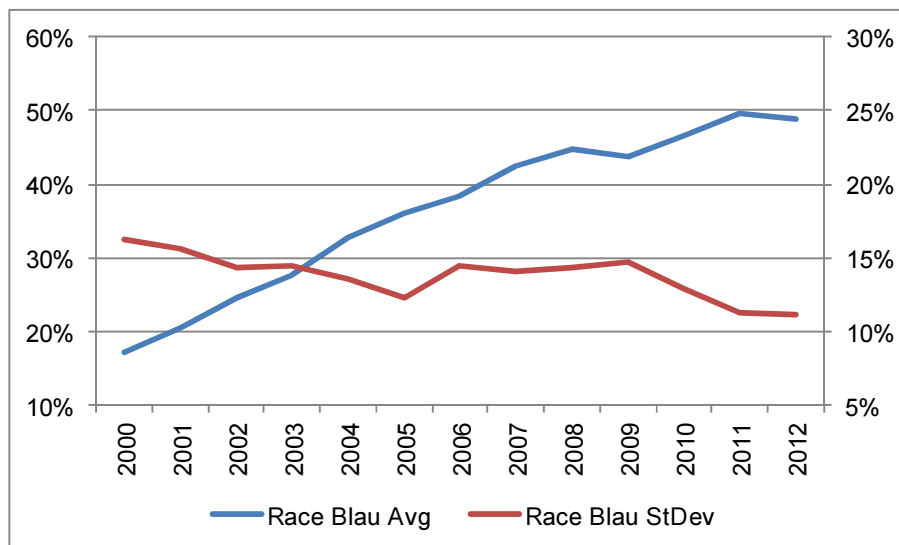
To test for association between racial diversity within boards and company financial performance, all boards of the selected 40 companies were ranked monthly in descending order according to their racial diversity indices. This ranked list of companies was then divided into quintiles, each containing eight companies. In any given month the first quintile always contained the eight companies with the highest level of diversity in that month, and the fifth quintile those with the lowest level of diversity.

Figure 12 depicts the results as generated by the style engine. As this is the first chart of its kind in this report, a brief explanation of its layout will be given before interpretation of the results.

Figure 12: Results of racial diversity style engine analysis
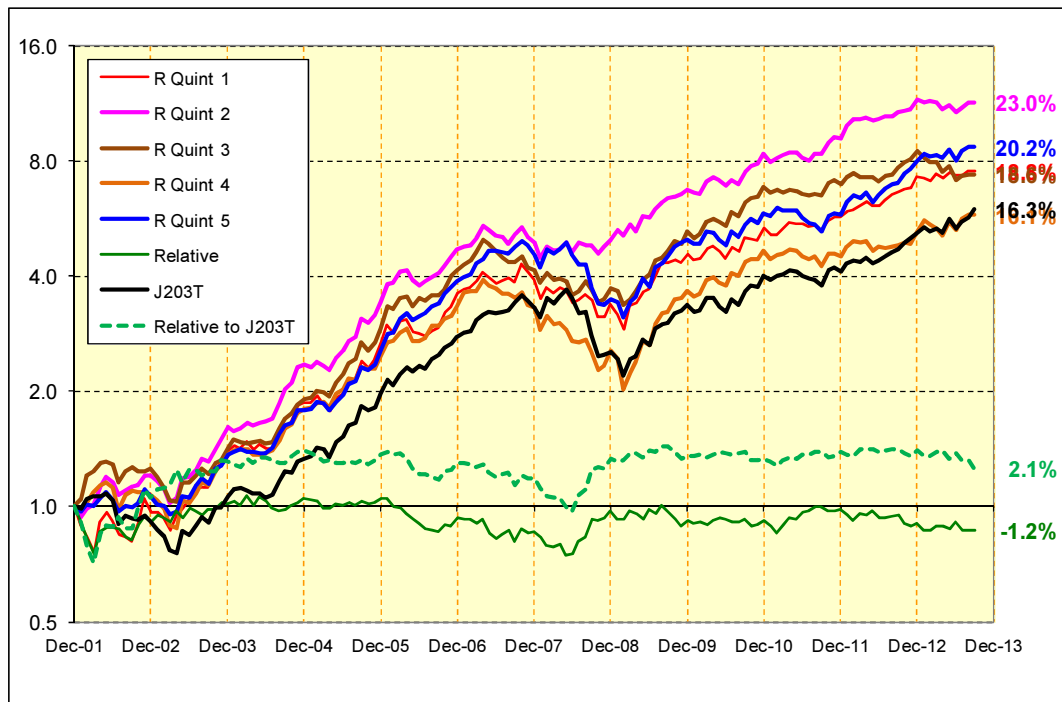
The horizontal axis indicates time and starts in 2001 because the different companies' annual reports were not all issued on the same date and allowance had to be made for all companies' results to be available at a starting date for analysis by the style engine.

The vertical axis indicates cumulative portfolio values on a logarithmic scale with a base of two.

Line graphs indicate quintile portfolios as discussed above, but also include the JSE's J203T or ALSI total return index in black. The two green line graphs are relative measures, the first comparing the first quintile portfolio's performance against the fifth quintile's and the latter comparing the first quintile's portfolio performance against the J203T's. All line graphs were rebased to 1.00 at the start of the period.

Data labels to the far right indicate the compound annual growth rate (CAGR) for each portfolio or line graph.

Interpreting the chart in terms of the association between the variable being tested and company financial performance is done by looking for noticeable differences in portfolio performance and at the order of the portfolios' in terms of performance. If each portfolio's performance is ranked in the same order as the ranked quintiles, then there is a strong association. Figure 12 above illustrates limited outperformance by some portfolios, but in a random order. This indicates no clear association between diversity within boards and company financial performance. This is confirmed by the two relative line graphs on the chart with both showing no clear trends and negligible performance differentials.

Figure 13 below illustrates the random racial diversity based quintile portfolio performances. Based on the results from the sample of 40 companies, boards in the second quintile portfolio performed best, followed by the fifth quintile's portfolio. The fifth quintile portfolio outperformed the first quintile portfolio; indicating that in the sample, boards with the least racial diversity outperformed those with the highest levels. There is no apparent pattern or trend in these results and the differences between the different portfolios are insignificant.

Figure 13: CAGR performance of racial diversity portfolios
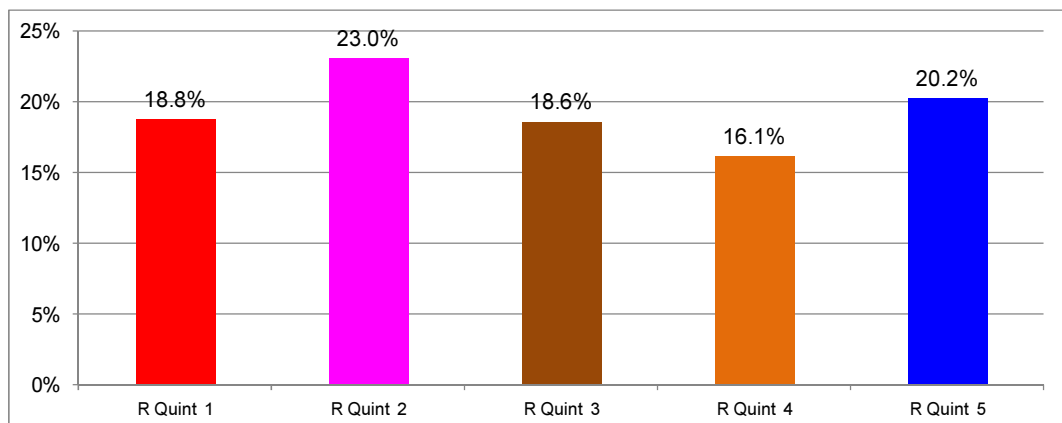
There is no association between racial diversity and company performance for the sample tested.

5.6. Gender diversity and company financial performance

To test for association between gender diversity within boards and company financial performance, all the boards in the sample were ranked monthly in descending order according to the level of female representation. This ranked list of companies was divided into two portfolios, each containing 20 companies. In any given month the first portfolio always contained the 20 companies with the highest level of female representation in that month, and the second portfolio those with the lowest level of female representation or gender diversity. Two portfolios with 20 companies each were selected, instead of five with as discussed previously, to first test if there would be any observable association between gender diversity within boards and company financial performance at a high level. This was done because previous studies using South African companies did not find significant associations between gender diversity and company performance. Based on the results, the described approach of using five portfolios would be used to investigate the high-level results in more detail if so required.

Figure 14 below indicates the average percentage of women on boards of the 40 companies in the sample. There is a clear upward trend, but also noticeable is the fairly high standard deviation, indicating that there are significant differences in the level of female representation between the boards in the sample, and that the differences are increasing.

Figure 14: Average board female representation
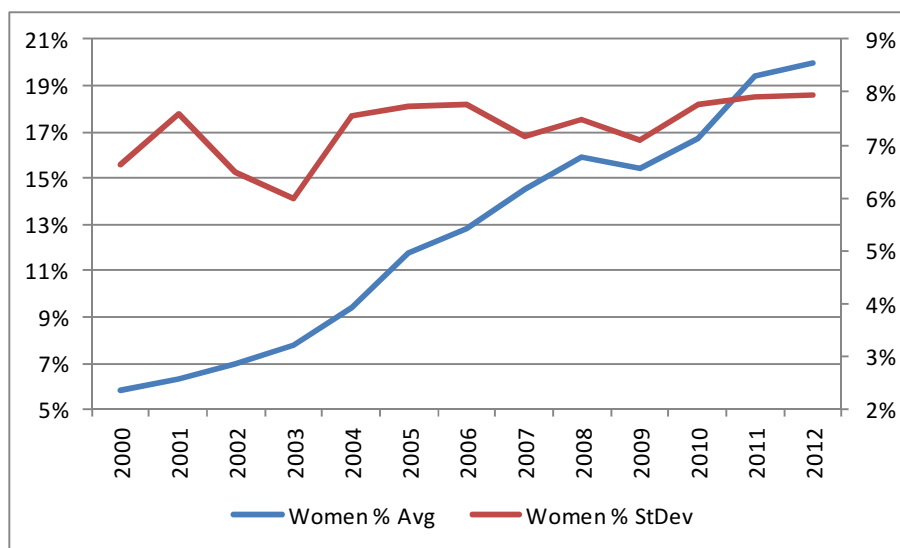
Figure 15: Results of gender diversity two-portfolio style engine analysis
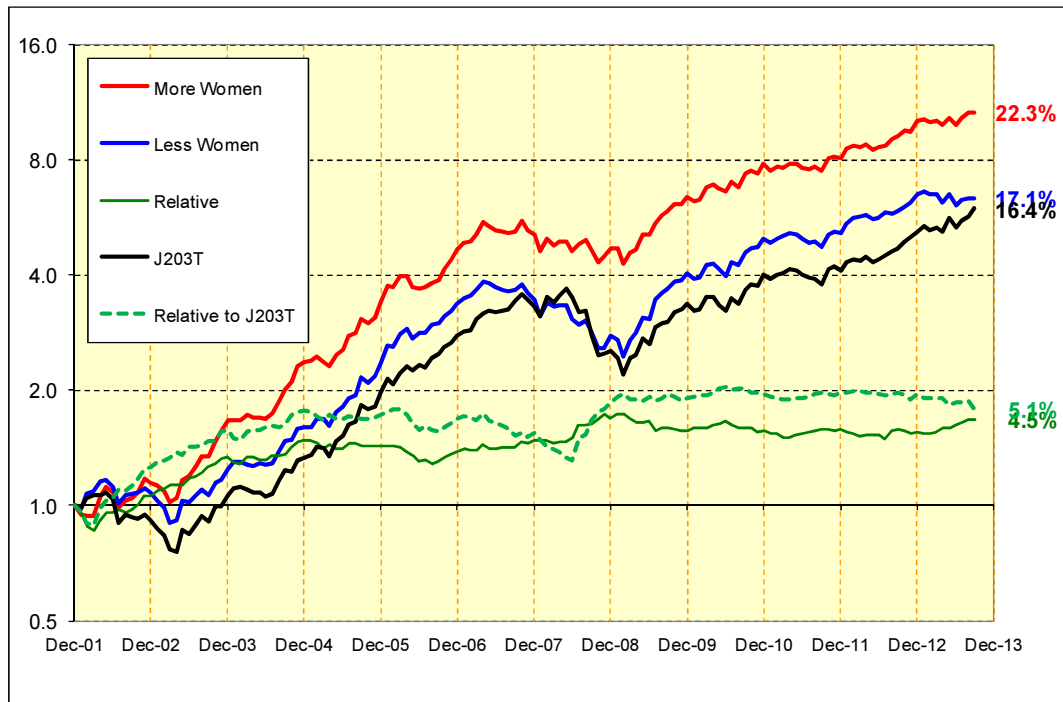
Figure 15 above shows the style engine results for the two ranked gender-based portfolios. There is clear outperformance observable of boards with higher levels of gender diversity as compared to those with lower levels. The two price relatives showed strong upward trends from 2001 to 2005 and then had modest upward slopes. The general trend was upwards, indicating noticeable outperformance of boards with higher levels of female representation.

To investigate the differences in performance in more detail, the 40 companies selected were ranked monthly in descending order based on the percentage of female representation on their boards. Five portfolios were constructed in the same manner as was done in the test for association between racial diversity and company financial performance.

Figure 16 below indicates the average percentage female representation in each of the five portfolios during the period under investigation.

Figure 16: Female representation within five gender-based portfolios
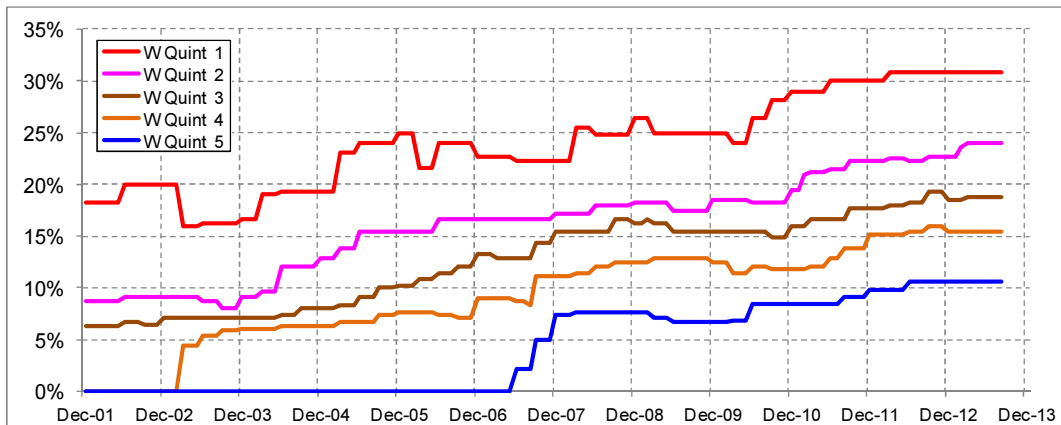
Figure 17: Results of gender diversity five-portfolio style engine analysis
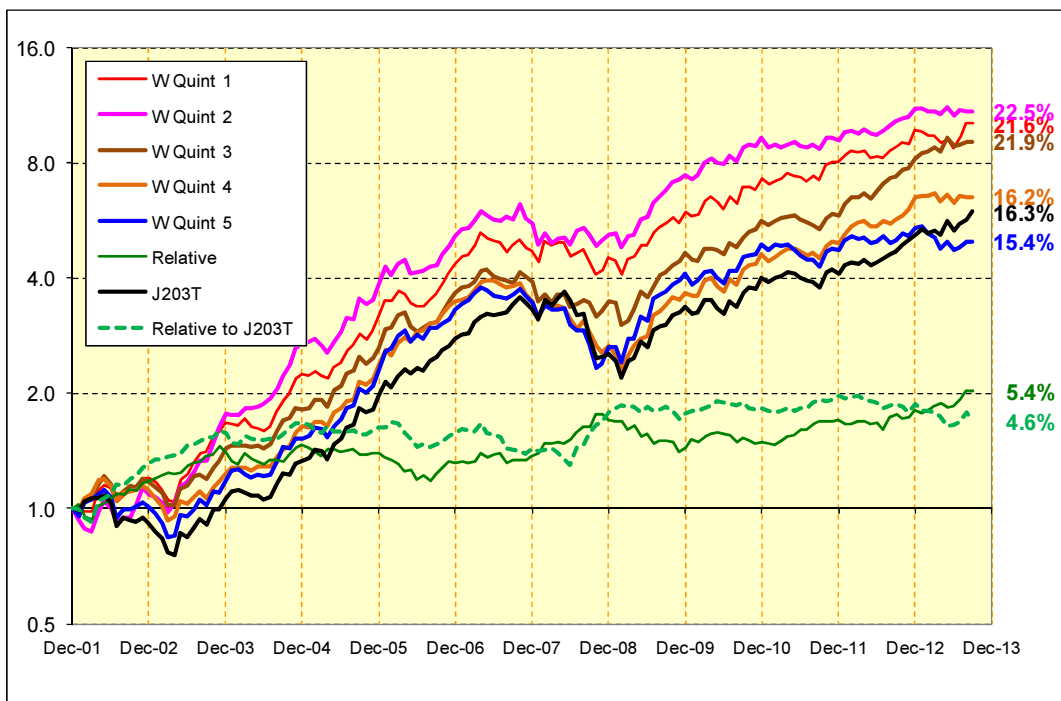
Figure 17 represents the results of analysing the five gender-ranked portfolios' performance. The results echo the basic, two-portfolio test's results and show two distinct groupings of ranked portfolio performance. A key difference lies in the green price relative line comparing the first and the last quintile portfolios: the CAGR is higher than in the previous test and the upward trend is more pronounced and consistent. Although the portfolios' performance ranking is not in the same order as the ranked variable, the two distinct groupings do indicate an association between gender diversity within boards and company financial performance.

These results concur with the previous test's and further indicates at what level of female representation companies are seeing improved performance.

Figure 18: CAGR performance of five gender-based portfolios
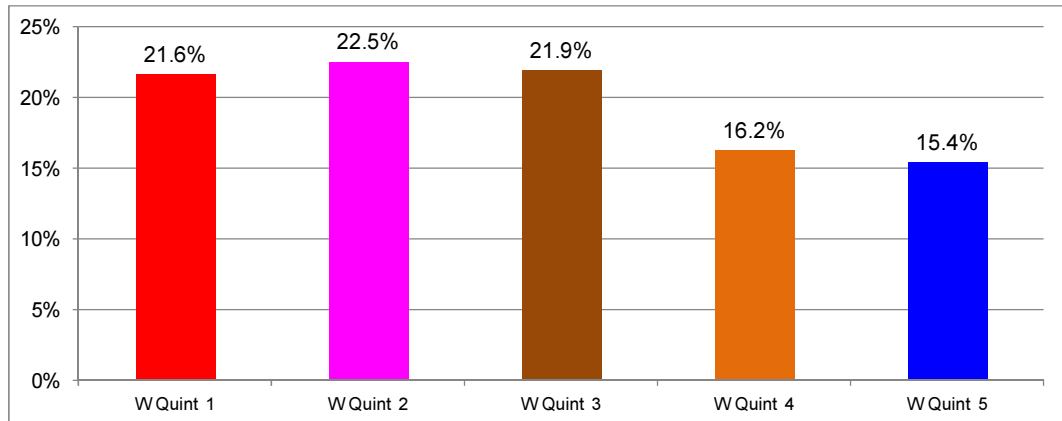
Figure 18 depicts the CAGRs of the five gender-based, ranked portfolios and highlights the observation of two distinct performance groupings. Ranked in terms of female representation on their boards, the top 60% in the sample outperformed the bottom 40% with about a 6% CAGR. Boards in the sample with more women in their boards outperform those with less: there is an association between gender diversity within boards and company financial performance.

5.7. Age diversity and company financial performance

Age diversity is measured with the standard deviation of a group's age, but during the testing procedure another approach was adopted by the style engine operator. The average age of boards were chosen to create portfolios. This was done in light of further tests described later on in this report and for reviewers to relate more easily to the results. This deviated from the initial intent of the research, as the average age of boards indicated diversity between boards and not within boards. However, combined with other variables in bivariate analyses, the average age of boards could be used to illustrate certain diversity aspects' association with company performance.

Five portfolios were created in the same manner as in previous tests, by ranking the 40 selected companies in descending order each month, based on the average age of their boards. The first quintile portfolio contained the eight

companies that had the highest average board age in any given month and the fifth portfolio the eight companies with the lowest average board ages. Figure 19 displays a significant difference between the first- and last quintile portfolios: the fifth quintile portfolio outperforms the first quintile portfolio by a CAGR of about 8%. Another interesting result is the marked grouping in performance results between the fourth and fifth quintile portfolios and the first to third quintile portfolios.

Figure 19: Results of board age style engine analysis
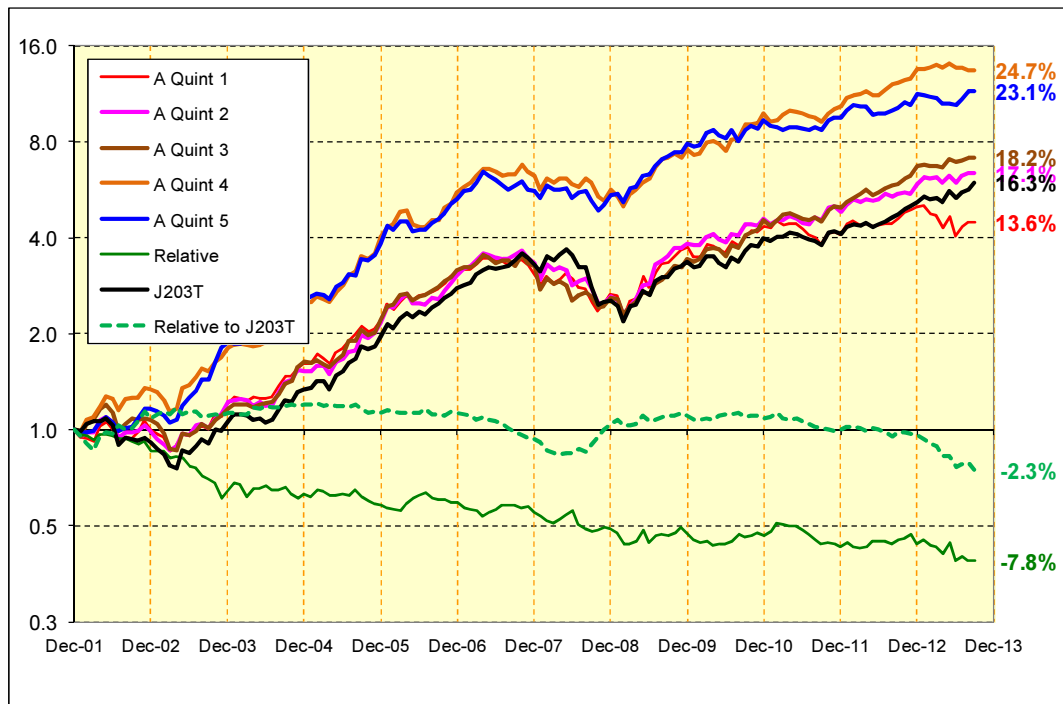
Figure 20: CAGR performance of five age-based portfolios
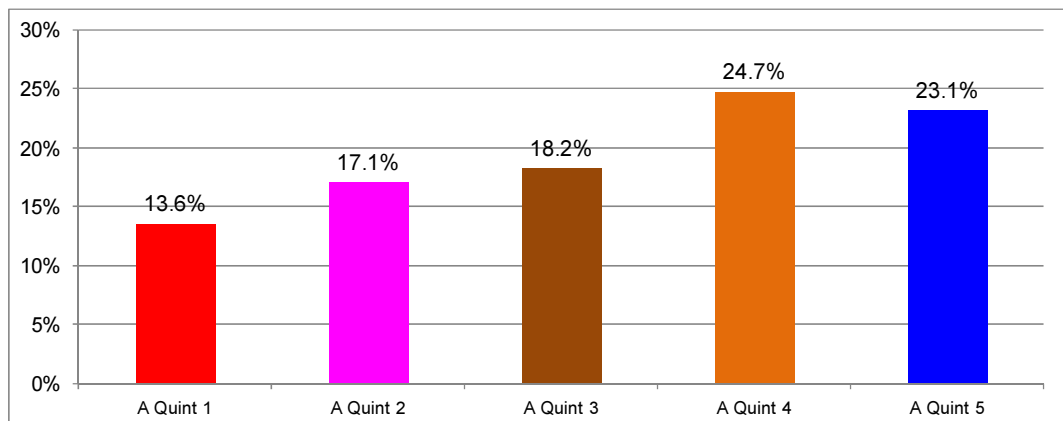
Figure 20 displays the CAGR results and indicates a strong association between average board age and company performance. The ranked portfolios' performance mostly matches the variable's ranking and younger boards perform better than older boards. This finding contradicts the notion that boards with more experience, indicated by higher average tenures or age, performs better.

5.8. Age and gender diversity and company financial performance

Combining gender and age variables into a bivariate cross-sectional analysis was the final test done with the style engine. Due to data limitations in captured qualifications and accreditations, no tests were done incorporating those variables.

Figure 21: Results of style engine testing of gender diversity and board age
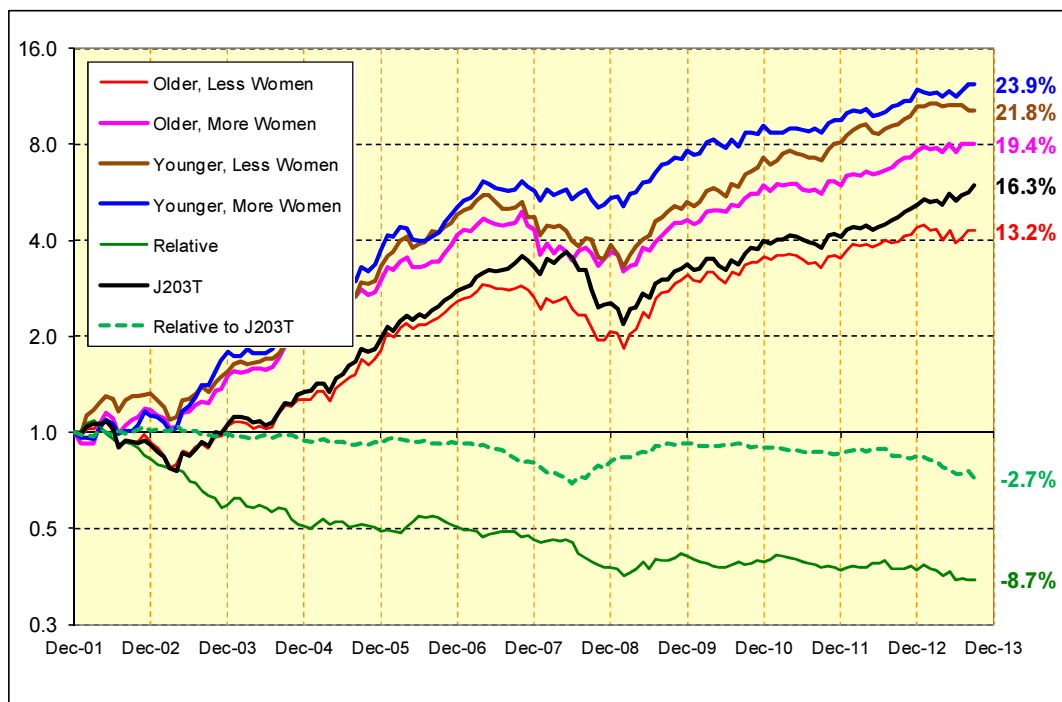
The style engine independently ranked all companies every month in terms of the percentage female representation on their boards and the average age of the boards. For each variable, the companies were split into two portfolios as discussed in point 5.6 and then combined into four distinct portfolios. The number of shares in each portfolio was not the same, as discussed in point 4.5.6. The four portfolios created and updated monthly were: older boards with less

women, older boards with more women, younger boards with less women and younger boards with more women.

Figure 21 above illustrates noticeable performance differences between the different portfolios with the best performing portfolio outperforming the worst by nearly 9% CAGR, as indicated by the green price relative line. This test also confirms the results from previous tests of gender- and age diversity with younger boards with more female representation performing better than older boards with less female representation. The results are significant due to the order of the portfolios' performance ranking; it echoes the expected ranking perfectly.

Figure 22 below illustrates the portfolios' performance and it is evident that there is an association between gender and age diversity and company financial performance. The results also indicate that age has a stronger association with company performance than gender, but that the combined variables of gender and age have the strongest association of all variables tested.

Figure 22: CAGR performance of four gender- and age-based portfolios
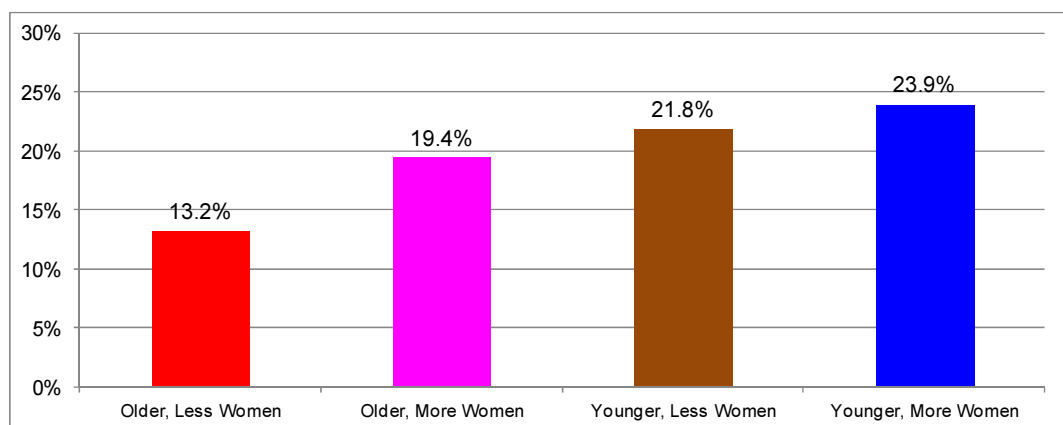
Chapter 6: Discussion of results

Results of the data analysis and tests done are discussed in this chapter and follow the same structure as set out in chapter 5. Research findings are interpreted in terms of literature reviewed and the research questions asked. The results are related to previous studies and the implications of the results are considered in terms of the research objectives set out in chapter 1.

6.1. Basic descriptive statistics

The 40 selected companies' boards were analysed over a period of 13 years, from 2000 up to 2013. Only three company annual reports were available for 2013 and statistics were calculated for all annual reports only up to the end of 2012. Although the sample was found to be representative of all companies listed on the JSE in terms of market capitalisation and industry sectors, it should be noted that due to the small size of the sample the descriptive statistics cannot be seen as representative of all boards of JSE listed companies.

6.1.1. Average board size and stability

The average board size in the sample of 40 companies remained stable and increased marginally from 13.4 in 2000 to 13.9 in 2012. During this period the standard deviation declined from 4.3 in 2000 to 3.1 in 2012. The companies represented in the sample were selected because they have been in existence for multiple years and have large market capitalisations. One would assume that these 'blue chip' companies would govern themselves in mature and responsible ways to ensure continuance of their longevity and market success and therefore fairly stable board sizes and compositions are expected. The stable and mature nature of their boards is further emphasized by the high level of stability with the average number of new directors per year decreasing from 2.1 to 1.1. It is observed across all boards in the sample, with the standard deviation of the average number of new directors per board decreasing from 2.4 in 2000 to 1.3 in 2012.

Histograms of board sizes in 2000 and in 2012 clearly illustrate the change in board sizes with the average increasing slightly whilst the standard deviation decreased. The largest board during the period was that of Bidvest Limited during 2004 and 2005 at 33.

Figure 23: Histogram of board sizes in 2000
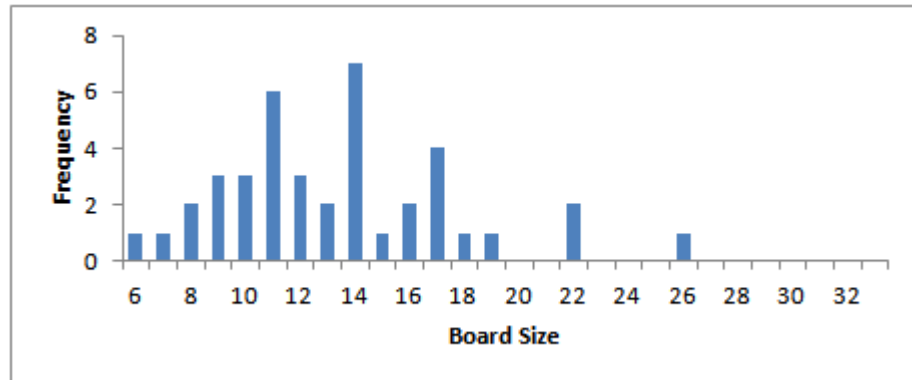
Figure 24: Histogram of board sizes in 2012
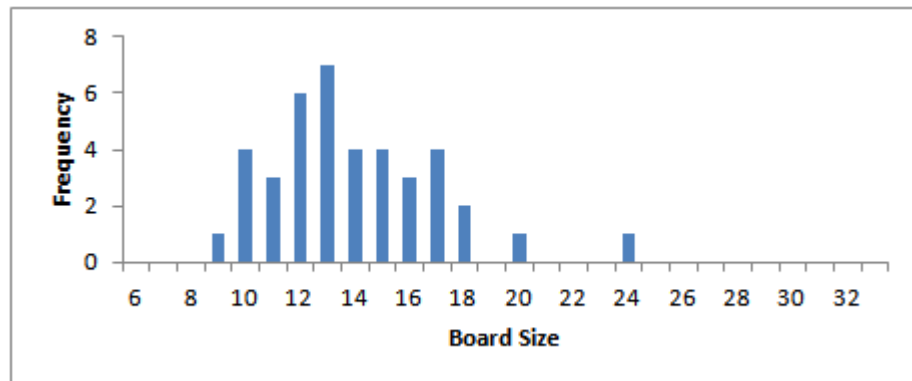
Figure 25 below is a histogram of all board changes per year for the period from 2000 to 2012. It indicates the number of new directors per board between any two consecutive years. There are some boards that had major restructuring, but those are limited to corporate actions like mergers and acquisitions. For the most part, three or less directors were changed per board per year as indicated by the descriptive statistics mentioned earlier.

Figure 25: Histogram of new directors per board
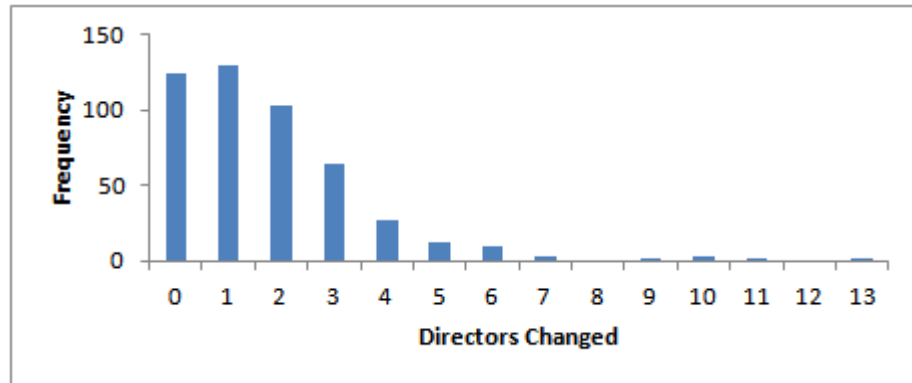
The advantage of bigger boards is that there could be a higher propensity to appoint directors from diverse groups, but bigger groups are more difficult to manage which might explain some of the findings discussed further in the document. Companies would not want to change too many directors at once as it would disrupt team effectiveness and reduce the level of knowledge about the company and it specific strategic issues.

6.1.2. Average board age

Average board age for the sample also corroborates the mature nature of the 40 companies as discussed above; the average age in 2000 was 54.3 and ended at 56.5 in 2012. During this period the standard deviation increased from 8.6 to 8.8. Ageing boards indicates that either older directors are being appointed, or that board members are not replaced frequently and boards age as board members age. This would seem to be the reason as boards in the sample were shown to be stable with less than 2 new directors appointed per board per year.

Of interest is the fact that when the average age is unfurled to differentiate between genders in Figure 26 below, one can see that female directors' average age has decreased from 52 in 2000 to 50 in 2004 and then remained fairly stable at about 51 years for the rest of the period. It would seem that new, younger female directors are being appointed, whilst male directors either remain or older male directors are being appointed.

Figure 26: Average age per gender
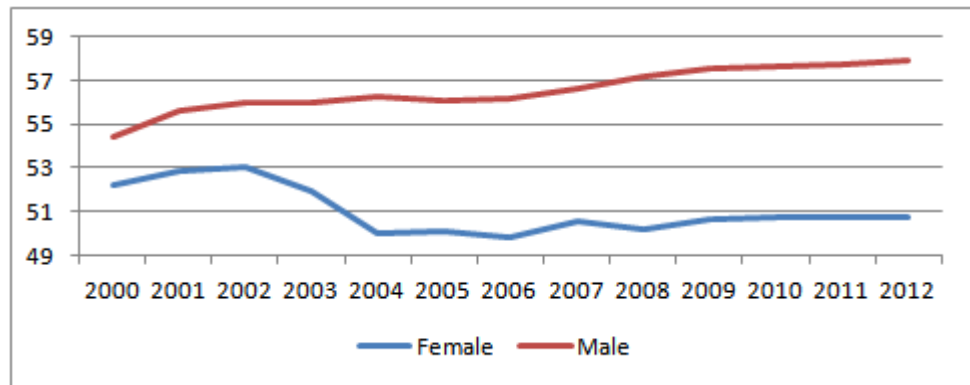
A possible explanation could be the rapid increase in female representation on the boards in the sample; 383% from 29 in 2000 to 111 in 2012. Many new female directors were appointed from a limited pool which leads to new, young female directors being appointed. Male director numbers reduced from 505 in 2000 to 446 in 2012, having the opposite effect.

Figure 27: Average age per race group
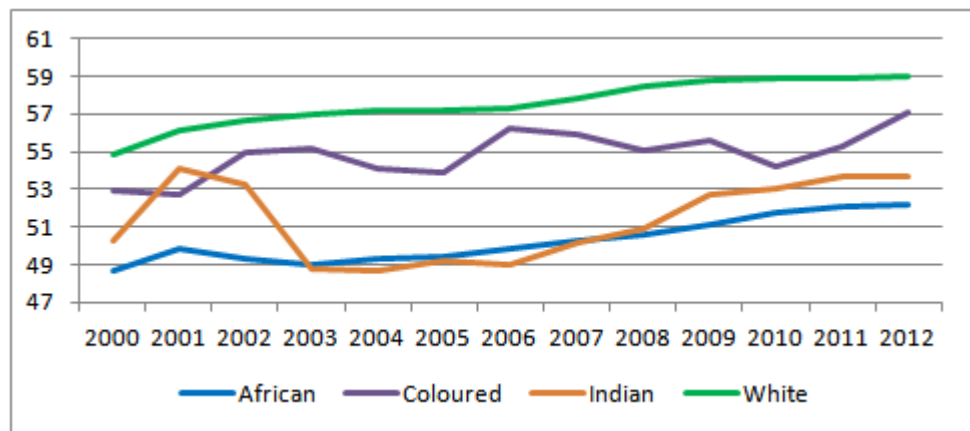
Figure 27 above indicates average age per race group. The race groups presented on the chart constitute 98% of board members and the rest were left out to improve legibility. As one would expect in South Africa, White directors' average age is the highest, with younger directors more often coming from previously disadvantaged racial groups. The average age of all race groups in the sample are increasing, possibly reflecting the pressure on the sizeable, established companies to appoint from a pool of proven and know directors. This might not be the case for a larger sample

of companies that would include more companies of different sizes and life cycle stages.

The effect of gender and racial diversity on average board age was considered to be a factor that could have influenced the results, but scatter plots of the relationship between these variables in Figure 28 and Figure 29 below revealed low coefficients of determination indicating no significant association between either gender or racial diversity and average board age in the sample.

Figure 28: Relationship between Gender diversity and Board Age
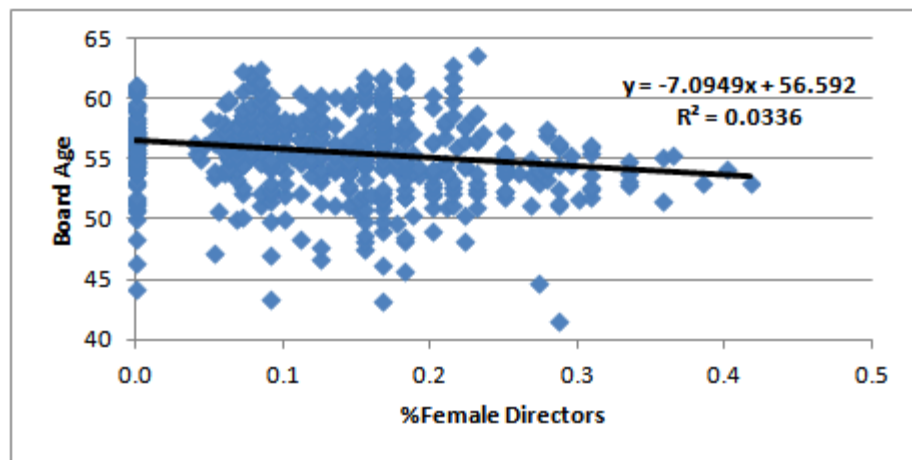
Figure 29: Relationship between Racial diversity and Board Age
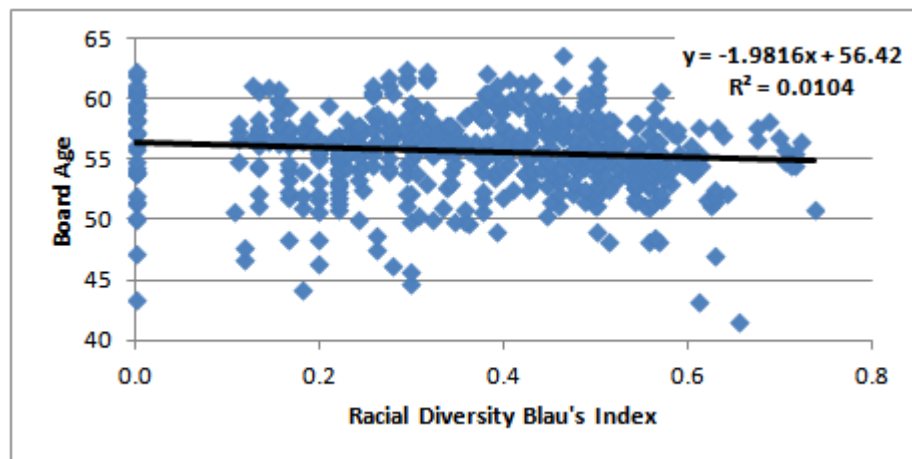
The next two histograms presented below illustrate the changes in average board age of the selected 40 companies. In 2000 there were 11 boards with an average age of 52 years or less and only 5 with an average age of 60 or more. In 2012 there were only 4 boards with an average age

of 52 or less and 13 of 60 or more. One explanation for this shift in age demographics of the boards in the sample could be that the exuberance of the early 2000s has been replaced by pragmatism after the global financial crisis. It seems that the high profile companies in the sample are seeking out, and appointing mature directors and retaining the services of older directors.

Figure 30: Histogram of sample board average age in 2000
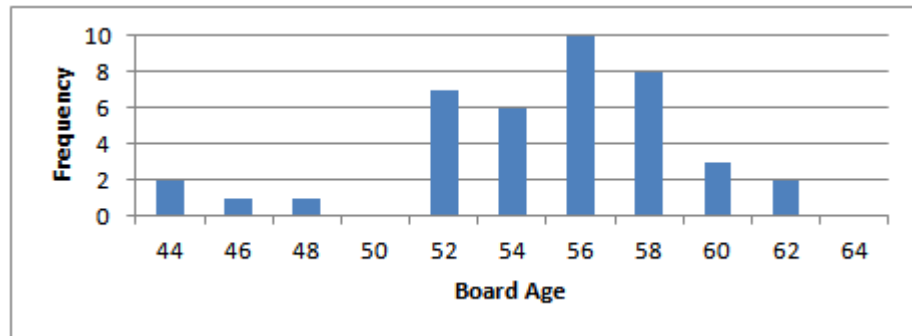
Figure 31: Histogram of sample board average age in 2012
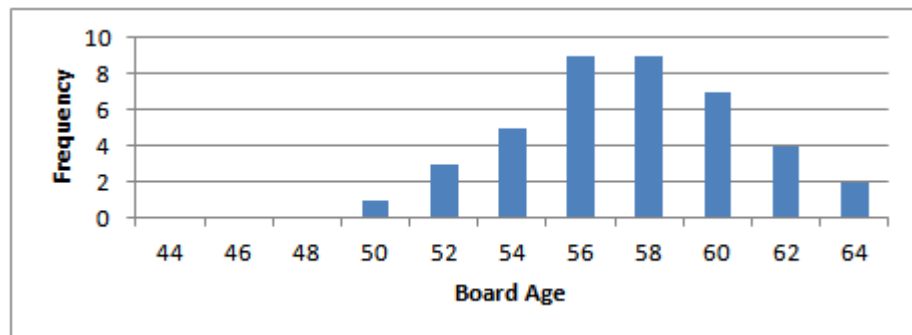
6.1.3. Average board educational- and professional qualifications

During the period from 2000 to 2012 the average number of qualifications per director has increased by 20% from 2.0 to 2.4. The average maximum level of educational qualifications also increased from 7.4 to 8.1. Keeping with the assumption that a person appointed as a director has for the most part completed their studies due to their age and career phase, the majority of the changes seen in average board qualifications can be attributed to new appointees. It then seems as if companies in the sample are appointing new directors with more and higher qualifications than the directors being replaced. This is seen as another indication of the

pragmatic approach to board transformation. Due to South Africa's historical oppression based on racial groups there are still a limited number of highly experienced, older directors available from previously disadvantaged racial groups. Companies seem to opt for education as a risk mitigation strategy to compensate for possible lack of experience.

In this sample increased diversity can be linked with increased human capital and the human capital theory would be applicable in explaining the benefits of increased diversity.

6.1.4. Average board racial and gender composition

Racial diversity has received a lot of attention in South Africa and it is clearly visible in the sample of 40 companies investigated in this study. Average racial diversity descriptive statistics quoted earlier disguises the magnitude of change that has been achieved. Figure 32 and Figure 33 below indicates the number of boards and the associated percentage of white directors in 2000 and 2012 respectively.

Figure 32: Histogram of % White directors per board in 2000
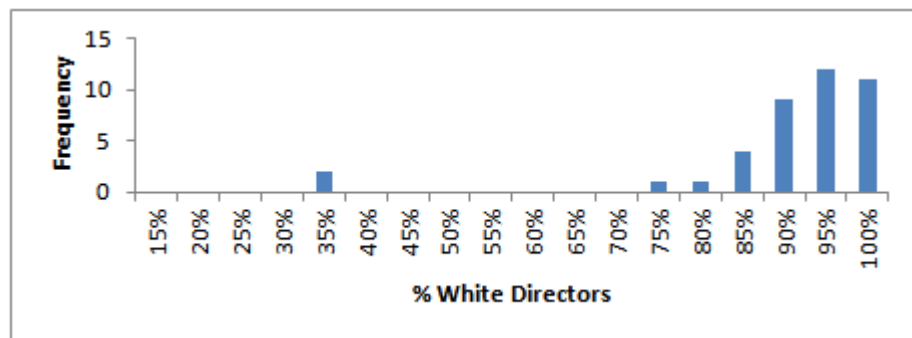
In 2000, the bulk of the companies had more than 90% White directors on their boards. By 2012 the picture has changed significantly with many companies having 65% or less White directors.

Figure 33: Histogram of % White directors per board in 2012
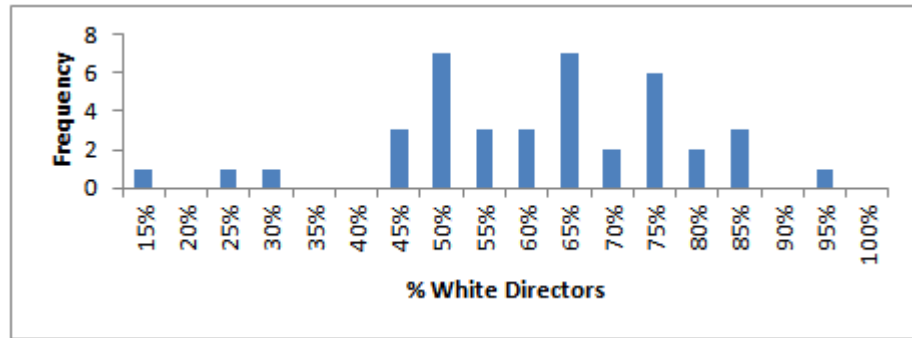
Although the change has been creditable, average board composition is still a far way of from reflecting South Africa's racial demographics. Whether forced by legislation or societal pressure or due to reasons provided by signalling- and institutional theory, South African boards are progressively appointing directors representative of the country's demographics. The same trend is seen in terms of gender diversity of boards.

In 2000 the majority of companies in the sample had 10% or less female directors serving on their boards, with 18 companies having no female directors at all.

Figure 34: Histogram of % female directors per board in 2000
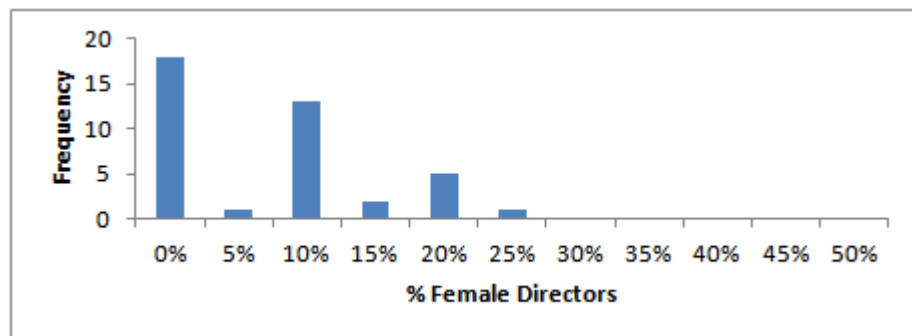
By 2012, all companies had more than 5% female directors serving on their boards, with the majority having 20% or more female directors. The percentage of female directors in the total sample in 2012 is 20%, indicating that some of the bigger boards have less female representation when read in conjunction with Figure 35.

Figure 35: Histogram of % female directors per board in 2012
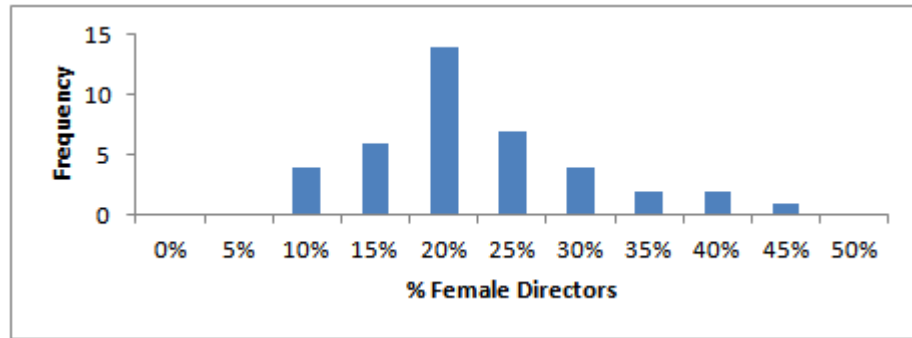
The association between gender and racial diversity within boards was a factor that could have influenced results and a scatter plot of the relationship between these variables in Figure 36 below exposed a coefficient of determination indicating a noticeable association between gender and racial diversity in the sample.

Figure 36: Relationship between Gender- and Racial Diversity

$$y = 1.1629x + 0.2176$$
$$R^2 = 0.3408$$
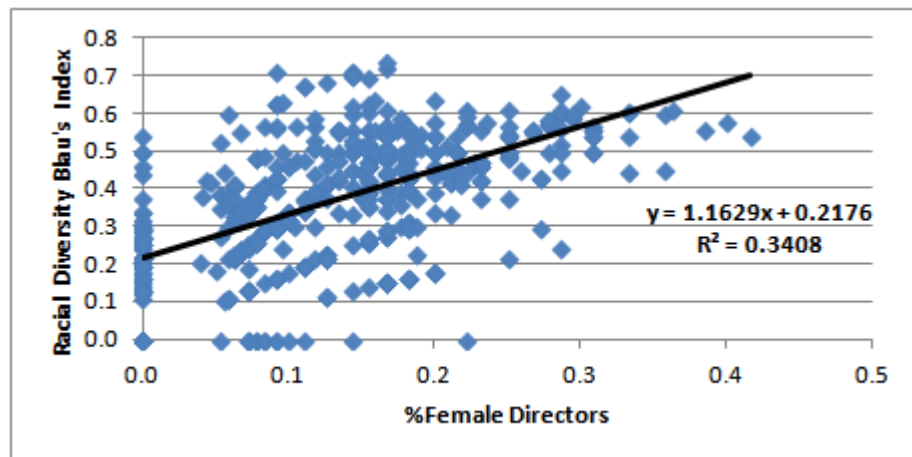
Boards of the 40 companies in the sample have been transforming with resulting increases in diversity along many diversity dimensions, for example race, gender, age and education. Other than being compelled by social and political pressures, why are companies purposefully increasing the level of diversity of their boards? Are there real business benefits to this practise? This research report investigated the issue and the tests conducted have delivered mixed results in terms of the benefits of increased diversity. The next section will discuss the results in terms of the descriptive statistics mentioned above as well as the academic literature reviewed.

6.2. Research questions

The primary research question, whether company financial performance is influenced by the level of diversity within boards, was investigated by identifying and testing for association between various diversity dimensions and company financial performance using Muller and Ward's (2013) graphical time series approach. Four hypotheses were selected and tested, based on literature reviews, available data and time. Each is discussed below at the hand of the results and interpreted in terms of literature reviewed and the research objectives.

6.2.1. Gender

Results from the style engine analysis over the period, measured in terms of compound annual growth rates of total market returns, indicated that boards with more women outperformed those with fewer women by 5.4%. The outperformance was evident over the whole period, with companies with more women on their boards also outperforming the JSE's All Share Index by a CAGR of 4.6%. Dynamic portfolios constituted from the sample by monthly reselection of gender-ranked companies showed that the top three quintiles, or the top 60% companies of the descending ranked list of companies, outperformed the lowest 40% companies over the period investigated. The association found was positive, with increased levels of female representation on boards linked with increased company financial performance.

The null hypothesis, $H_{G+}0$, that there is no association between the ratio of female representation on boards and company financial performance, is therefore rejected. Test results showed a significant association between increased levels of gender diversity and increased company financial performance and the alternative hypothesis, $H_{G+}1$, that there is an association between the ratio of female representation on boards and company financial performance, is accepted.

This result adds to the current academic discourse. The literature review uncovered mixed findings and of the 11 academic articles and three

masters' studies commenting on board gender diversity and company performance, five found a positive link between increased gender diversity and company performance (Larkin et al., 2012; Lehobo, 2011; Mahadeo et al., 2012; Miller & del Carmen Triana, 2009; Nguyen et al., 2012), seven found no significant association (Carter et al., 2010; Hili & Affes, 2012; Matlala, 2011; Shukeri et al., 2012; Swartz, 2006; Van-Ness et al., 2010; Yasser, 2012) and two found slight negative associations (Jhunjhunwala & Mishra, 2012; Lückerath-Rovers, 2013). Negative associations were explained by expanding on the difficulties of managing effective teams when increased diversity leads to increased differences in "attitudes and viewpoints" which "increases conflicts, reduces cohesion and hinders communication and coordination within the team" (Jhunjhunwala & Mishra, 2012, p. 78). Gender-specific behaviour were also considered with one researcher contemplating that "companies with female directors pay-out relatively lower dividends than companies without female directors" (Lückerath-Rovers, 2013, p. 503). Results showing no significant associations were also attributed to increased team inefficiencies; "valuable resources provided to the firm by women and ethnic minority directors may have been offset by the socialpsychological dynamics of the board such as exclusion or conflict" (Carter et al., 2010, p. 411).

Positive associations between increased gender diversity and company performance are predicted by the theoretical frameworks of the agency-, resource dependency-, human capital- and signalling theories. As per the agency theory, increased levels of female representation can lead to increased board independence and improved governance if female directors act independently from their male counterparts, either by choice or due to inherent societal structures and norms. According to the resource dependency theory, increased diversity allows a broader network of different views to be incorporated with resultant effects on board decisions and company decisions. Human capital theory can be linked to the effect seen in this test, as descriptive statistics have shown that together with an increase in the number of female directors, there were also an increase in the level- and number of qualifications. More so, the lower average age of female directors and the increase in female directors indicate that new thoughts and work methods are brought into the boardroom by female directors in South Africa.

The results support the research objectives as it clearly shows that one of the diversity factors, namely gender, has a positive association with improved company financial performance.

6.2.2. Race

The test done on racial diversity did not produce a result as expected and no association was found between increased levels of racial diversity and company performance. The different dynamic racial diversity quintile portfolios showed limited periods of out- and underperformance, but for the most part showed no relative difference in performance. The different quintile portfolios' performance over the period was not consistent, with the portfolios' performance ranking changing numerous times over the period. The end result in terms of CAGRs was random with no pattern or trend in the rank of racial diversity portfolio performance evident. The result was however not negative: increased racial diversity was not associated with decreased company performance.

The null hypothesis, $H_{R+}0$, that there is no association between the level of racial diversity on boards and company financial performance, is not rejected. Test results did not show any association between increased levels of racial diversity and increased company financial performance and the alternative hypothesis, $H_{R+}1$, that there is an association between the level of racial diversity on boards and company financial performance, is not accepted.

Five academic articles and one master's study commented on associations between racial diversity and company performance. Out of the six sources, five (Erhardt et al., 2003; Marimuthu, 2008; Miller & del Carmen Triana, 2009; Shukeri et al., 2012; Swartz, 2006) found a positive link between racial diversity and company performance and only one (Carter et al., 2010) found no link. Positive associations were primarily explained by resource dependency- and human capital theory; increased racial "diversity broadens knowledge, idea and experience through the range of information resources of different cultural background among the

board members" (Shukeri et al., 2012, p. 122). Lack of positive results was ascribed to the "offsetting effects of having women and ethnic minority directors" and because "innovation and creativity in decisions might be nullified by group conflict" (Carter et al., 2010, p. 411). The result from the test on racial diversity and company performance done in this report supports the view that increased racial diversity does not increase the effectiveness of boards and company performance.

It is interesting to note that separate, univariate diversity analysis of race and gender resulted in different findings. Referring back to the descriptive statistics section, it was noted in Figure 10 on page 50 that 65% of all female directors in 2012 were African and only 22% White: with increased female representation also comes increased racial diversity. The coefficient of determination in Figure 36 confirms this. A question to be asked is why increased racial diversity then does not also result in improved performance, because it is linked to gender diversity in the South African context.

Although not a positive result, it still contributes towards the research objectives. For the selected sample of companies over the period examined, racial diversity was shown not to be associated with improved company performance.

6.2.3. Age

The style engine analysis of board age over the selected period provided a significant result and showed that younger boards outperformed older boards by 7.8% compound growth annually. Similar to the result of the gender diversity test, the board age test showed that outperformance was evident over the whole period and the best performing board age portfolios significantly outperformed the JSE's All Share Index as well. Dynamic portfolios of monthly reselected age-ranked companies showed that the top three quintiles, or the top 60% companies of the descending ranked list of companies, performed poorer than the lowest 40% companies over the period investigated. The association found was negative, with higher ages of boards linked with reduced company financial performance. This result

is also more pronounced than the gender diversity test result and indicates that age is more important than gender when appointing new board members.

The null hypothesis, $H_{A+}0$, that there is no association between the average age of boards and company financial performance, is rejected. Test results showed a significant association between the average age of boards and increased company financial performance and the alternative hypothesis, $H_{A+}1$, that there is an association between the average age of boards and company financial performance, is accepted.

Only three academic articles that commented on the effect of board age on company performance were included in the literature review. Two (Jhunjhunwala & Mishra, 2012; Van-Ness et al., 2010) indicated no association between board age and company performance and only one (Mahadeo et al., 2012) found an association. The positive association was attributed to the fact that a younger board "can consider the various strategic and operational aspects in a more effective way and this is translated in terms of a significantly positive relationship between age diversity and performance" (Mahadeo et al., 2012, p. 384). The same reasons are given for the lack of positive results as mentioned in the previous sections in point 6.2, namely increased difficulties to manage and align teams with increased levels of diversity.

The result of this test supports the resource dependency- and human capital theories. It might also link back to signalling theory: the market accepts younger boards as being more innovative and willing to take risks and enabling higher growth rates in future. This result supports the research objectives by showing that gender has a positive association with improved company financial performance.

6.2.4. Gender and age

Combining the two diversity dimensions that showed significant associations with improved company performance in one test delivered expected results, confirming the strong association of both age and gender diversity dimensions with company performance. The end-state ranked portfolios confirmed the order of magnitude impact of the two diversity dimensions: age contributes more towards company performance than gender. The result showed that younger boards with more women performed better than older boards with fewer women. The portfolio comprised of companies with fewer women on their boards and of older boards performed visibly worse than the JSE's All Share Index – the only portfolio in all the tests to do so.

The null hypothesis, $H_{GA+}0$, that there is no association between the level of combined gender and age diversity on boards and company financial performance, is rejected. Test results showed a significant association between increased levels of gender and age diversity and increased company financial performance and the alternative hypothesis, $H_{GA+}1$, that there is an association between the level of combined gender and age diversity on boards and company financial performance, is accepted.

No literature that addressed this combined diversity scenario was included in the review, but results can be deducted from theories and explanations given for the two separate dimensions, as discussed above, and will not be repeated here.

The result of the last test proved that for the selected sample for the period from 2000 to 2013, decreased age and increased gender diversity were associated with improved company financial performance and that age had the strongest association.

The test results contribute to the current academic discussion on diversity within boards and its association with company performance. None of the results contradict previous findings, but the robust methodology employed gives further credence to the body of knowledge and prompts further investigation. The

findings addressed the research objectives and answered the questions posed: can increased diversity be associated with improved company performance and if so, what dimensions of diversity has the strongest association.

For the selected sample of 40 companies it was shown that increased racial diversity has no association with improved company performance, increased gender diversity has a positive association with company performance and increased board age has a negative association with company performance. It was also shown that the association between board age and company performance was stronger than the association between gender diversity and company performance.

Chapter 7: Conclusion

The final chapter provides a summary of the research report and discusses research limitations encountered and provides suggestions for future research. It also includes recommendations to stakeholders and managerial implications based on the research findings and provides recommendations for future research.

7.1. Summary

The objective of this research report was to determine if there was an association between increased levels of identified diversity dimensions within boards and improved company financial performance.

Globally and in South Africa economies need to grow in order to reduce poverty and unemployment and to improve the quality of life for all. It is primarily growing companies that drive economic growth in market economies, and to grow, companies need to formulate and execute strategies that will give them a competitive advantage. Growth at any cost is not acceptable however and responsible, sustainable economic activity needs to be ensured to satisfy the needs and requirements of all stakeholders.

Boards are appointed in a fiduciary capacity with the explicit purpose of guiding management teams in a responsible manner. Boards are responsible for overseeing proper company governance and for ensuring that strategies providing competitive advantages are formulated and executed in order to achieve sustainable growth. Independent boards are needed to negate agency concerns and ensure executive management teams act in the best interest of all stakeholders. Boards guide and approve strategies, approve appointment and retrenchment of executive managers and assist with risk management. To execute all of these functions effectively, boards need to consistently combine many different viewpoints and inputs in a creative manner. Improved board performance is therefore a key aspect of facilitating company and country growth.

Various frameworks, including agency-, resource dependency-, human capital-, upper echelons-, signalling and institutional theories as well as the behavioural theory of the firm, link increased diversity with improved team performance. In

post-apartheid South Africa there is a restorative focus on diversity with the aim of achieving gender equality and racial representation in line with the country's demographics. Legislated requirements as well as societal pressure are compelling companies to appoint increasingly diverse directors to their boards. Boardroom diversity is not well defined and Hafsi and Turgut's (2013) construct of demographic diversity within boards is used in this report. Dimensions of demographic diversity compiled from literature and applicable to boards are gender, independence or duality, race or ethnicity, age, tenure, nationality, experience, educational background and political ideology.

The study employs share prices, dividend payouts and directors' demographic data of 40 listed companies from 2000 to 2013 in Muller and Ward's (2013) style engine to create and evaluate dynamically reconstituted stock portfolios' cumulative market returns. Companies are ranked monthly in terms of a selected diversity dimension and portfolios created by allotting companies in descending order to different portfolios: companies in the first portfolio always have the highest levels of the selected diversity dimension and those in the last portfolio have the lowest. Portfolio market returns are calculated at the end of each month and added to the previous period's returns. Time series test results are represented graphically and associations determined based on the portfolios' compound annual growth rates and the rank of the respective portfolios' performance.

Share price and dividend payout historical data was available in the style engine's database. Longitudinal demographical data of directors was not available from any source and had to be captured manually from company annual reports. This limitation restricted the sample size and depth of demographic data available for tests. Although the dataset is limited, the robust methodology and results are seen as a valuable addition to the current academic discourse on the topic.

The style engine's graphical time series outputs were used to test for association between increased levels of age, gender and racial diversity and improved company financial performance. Strong associations between increased gender diversity as well as decreased board age and improved company performance were found. No association between increased racial diversity and company performance were found however.

Positive results are mainly attributed to agency-, resource dependency, human capital- and signalling theories. Increased diversity is seen to bolster independence and to lessen agency problems. Rising diversity levels enlarges boards' external networks, allowing diverse stakeholders' needs to be accommodated and limiting dependence on strategic resources. Human capital is increased as the collection of different skills and experiences grow when more diversity is introduced within boards. The diversity within a board is interpreted in different ways by different stakeholders and changes in diversity levels is also seen as a signal to the market, with, for example, the appointment of younger directors being seen as a company becoming more innovative and competitive. The result showing no benefit is attributed to the increased effort of managing highly diverse teams and the resultant loss in alignment and teamwork.

The results and interpretations of findings do not contradict previous studies on the topic, but is valuable as it provides additional data and a new, robust methodology. The identified diversity dimensions shown to be associated with improved company performance can be used to guide future board appointments or investors' share selections. Younger boards do lead companies to be more competitive and the strong association shown between increased gender diversity and company financial performance strengthens the case for equal gender representation ("Xingwana," 2013). Although the same support for increased racial diversity was not found, the opposite is also not true and notwithstanding the legal requirements; the moral and social reasons for increasing racial diversity on boards in South Africa remain enough of a reason to pursue it.

7.2. Research limitations

Although a robust methodology was employed, the study still suffers from possible endogeneity. As stated in one journal article, "It is still questionable whether greater gender diversity on the boardroom may generate higher firm performance, or on the contrary, better-performing companies will appoint more female directors on their boardroom" (Nguyen et al., 2012, p. 16). The main reason for this is thought to be due to shortcomings in the sampling methodology as it introduced survivorship bias and only included companies with the largest market capitalisation.

Due to time- and data limitations not all possible tests were done. An extensive list of diversity dimensions were identified during the literature review, but not all the relevant data could be captured due mainly to time constraints. More tests can however be done with the captured data.

As discussed in the data limitations section, the result would have had higher validity if more companies' data could have been sourced. Unavailability of relevant secondary data and the time consuming manual data capturing process limited this research to a sample of 40 companies. Although the companies selected were a good proxy of the sample frame, the resulting board demographics might not have been representative of all boards in the sample frame.

The tests were not performed in order to determine optimal levels of diversity. All tests were done by ranking companies according to selected diversity dimensions and then selecting portfolios based on the ranked list of companies. It would be valuable to determine at what levels of diversity the association with improved company performance is the highest and vice versa.

The unit of measure was limited to compound annual growth rates of market returns and none of the encountered previous studies have used the same. It could be useful to extend the range of units of measure to include comparable company financial performance indicators.

Specific factors like, but not limited to, market events, company size and industry cycles were not considered and might have impacted the results. Due to the robust methodology employed it is not deemed a major flaw, but the results and study findings' validity will be greatly enhanced if some of these factors could be isolated and accounted for.

7.3. Suggestions for future research

Based on the findings and limitations of this completed research, some suggestions for future research were compiled.

Firstly, it would be highly beneficial for future research to build upon the dataset captured for this study to increase the number of companies and add more longitudinal data. This would improve the validity and also increase the representivity of the board composition statistics. Companies added to the database should be sampled randomly and not only be selected from the list of surviving companies.

A future study building on this one with the added benefit of additional data would do well to compensate for market, industry and company effects as mentioned in the previous section.

Thirdly, an extended battery of test of dimensions- and combinations of dimensions of diversity should be run to extend the results set of this research report and to explore the potential magnifying or cancelling effect combinations of the different dimensions of diversity.

Another area to explore further, would be to investigate in more detail the effect that different levels of diversity has on company performance and to determine if there is a saturation point beyond which an increase in diversity starts to impede performance.

Extending the units of measure to include financial performance ratios used in other studies and comparing the results will improve the validity of the results and might uncover additional findings: different diversity dimensions might be linked to improved performance in different financial performance areas for example.

An aspect that begs further study is the finding that increased racial diversity is not associated with improved company financial performance. It might be a topic for a qualitative study to interview boards with different levels of diversity based on selected diversity dimensions, including racial diversity, in order to determine what the effect on team effectiveness is and how it links back to board and company performance.

A further research suggestion related to the one above question to be asked is why increased racial diversity does not also result in improved performance. As discussed, increased gender diversity in the South African context is directly linked to increased racial diversity as most female directors appointed are African

or Indian and an increase in the number of female directors showed a strong positive association with company financial performance.

Another potential future study could utilise event study methodologies to determine what the effect of the appointment of directors with selected demographical diversity dimensions have on company financial performance.

A final suggestion for future research would be to investigate the reverse: is there an association between company size and performance and diversity within boards. Additional longitudinal data would be required to include a wider variety of companies and a possible time lag between the release of company results and registering the degree of diversity within the respective boards would be needed.

7.4. Concluding remarks

In post-apartheid South Africa, increased diversity is a legal requirement and expected by society at large as a curative measure to redress wrongs of the past. Mounting pressure from stakeholders compels companies to pursue increased diversity within boards not only to comply with legislation, but also to remain relevant in order to cater for changing consumer needs.

Supporting empirical research can aid and potentially speed up the progression of increased diversity within boards. This research contributes to this process and shows that increased gender diversity and reduced board age is associated with improved company financial performance.

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Appendices

Appendix 1: Population of 104 Companies

Rank	Code	Name	Market Cap (Rm Jan 2005)	JSE Sector Name
1	AGL	Anglo American plc	2 061	Mining
2	BIL	BHP Billiton plc	1 800	Mining
3	SAB	SABMiller plc	984	Beverages
4	SBK	Standard Bank Group Ltd	876	Banks
5	SOL	Sasol Limited	812	Oil & Gas Producers
6	MTN	MTN Group Ltd	748	Mobile Telecommunications
7	FSR	Firstrand Ltd	748	Banks
8	TKG	Telkom SA SOC Ltd	605	Fixed Line Telecommunications
9	OML	Old Mutual plc	549	Life Insurance
10	ANG	Anglogold Ashanti Ltd	518	Mining
11	ASA	ABSA Group Ltd	500	Banks
12	AMS	Anglo American Plat Ltd	469	Mining
13	REM	Remgro Ltd	457	General Financial
14	SLM	Sanlam Limited	349	Life Insurance
15	GFI	Gold Fields Ltd	337	Mining
16	IMP	Impala Platinum Hlgs Ltd	333	Mining
17	NED	Nedbank Group Ltd	287	Banks
18	RMH	RMB Holdings Ltd	255	Banks
19	BVT	Bidvest Ltd	255	Support Services
20	BAW	Barloworld Ltd	236	General Industrials
21	NPN	Naspers Ltd -N-	235	Media
22	IPL	Imperial Holdings Ltd	222	Industrial Transportation
23	HAR	Harmony GM Co Ltd	194	Mining
24	SAP	Sappi Ltd	182	Forestry & Paper
25	TBS	Tiger Brands Ltd	162	Food Producers
26	LON	Lonmin plc	152	Mining
27	SHF	Steinhoff Int Hldgs Ltd	150	Household Goods
28	INP	Investec plc	131	General Financial
29	PPC	PPC Limited	127	Construction & Materials
30	PIK	Pik n Pay Stores Ltd	116	Food & Drug Retailers
31	JDG	JD Group Ltd	112	General Retailers
32	WHL	Woolworths Holdings Ltd	106	General Retailers
33	DSY	Discovery Ltd	101	Life Insurance
34	NPK	Nampak Ltd	98	General Industrials
35	NTC	Netcare Limited	87	Health Care Equipment & Services
36	LBH	Liberty Holdings Ltd	85	Life Insurance
37	APN	Aspen Pharmacare Hldgs Ltd	84	Pharmaceuticals & Biotechnology
38	MSM	Massmart Holdings Ltd	83	General Retailers
39	TRU	Truworths Int Ltd	83	General Retailers

40	SNT	Santam Limited	82	Nonlife Insurance
41	AVI	AVI Ltd	81	Food Producers
42	AFX	African Oxygen Limited	81	Chemicals
43	ABL	African Bank Inv Ltd	80	General Financial
44	SUI	Sun International Ltd	79	Travel & Leisure
45	INL	Investec Ltd	76	General Financial
46	SHP	Shoprite Holdings Ltd	73	Food & Drug Retailers
47	RLO	Reunert Ltd	67	Electronic & Electrical Equipment
48	PWK	Pik n Pay Holdings Ltd	56	Food & Drug Retailers
49	ARI	African Rainbow Min Ltd	54	Mining
50	GRT	Growthpoint Prop Ltd	53	Real Estate
51	MDC	Mediclinic Internat Ltd	50	Health Care Equipment & Services
52	DST	Distell Group Ltd	49	Beverages
53	AFE	AECI Limited	48	Chemicals
54	MUR	Murray & Roberts Hldgs	48	Construction & Materials
55	ALT	Allied Technologies Ltd	48	Technology Hardware & Equipment
56	SPG	Super Group Ltd	48	Industrial Transportation
57	CAT	Caxton CTP Publish Print	47	Media
58	AEG	Aveng Group Limited	45	Construction & Materials
59	SPP	The Spar Group Ltd	38	Food & Drug Retailers
60	LEW	Lewis Group Ltd	37	General Retailers
61	GND	Grindrod Ltd	37	Industrial Transportation
62	HCI	Hosken Cons Inv Ltd	35	Equity Investment Instruments
63	ATNP	Allied Elec Corp Pref	34	Electronic & Electrical Equipment
64	ILV	Illovo Sugar Ltd	28	Food Producers
65	MPC	Mr Price Group Ltd	26	General Retailers
66	ARL	Astral Foods Ltd	26	Food Producers
67	ITE	Italtile Ltd	25	General Retailers
68	SYC	Sycom Property Fund	25	Real Estate
69	TRE	Trencor Ltd	24	Industrial Transportation
70	ASR	Assore Ltd	24	Mining
71	AQP	Aquarius Platinum Ltd	22	Mining
72	HYP	Hyprop Inv Ltd	22	Real Estate
73	OMN	Omnia Holdings Ltd	22	Chemicals
74	RBW	Rainbow Chicken Ltd	22	Food Producers
75	AFR	Afgri Limited	21	Food Producers
76	NHM	Northam Platinum Ltd	19	Mining
77	DRD	DRD Gold Ltd	19	Mining
78	EMI	Emira Property Fund	19	Real Estate
79	KGM	Kagiso Media Ltd	16	Media
80	ILA	Iliad Africa Ltd	16	Support Services

81	ATN	Allied Electronics Corp	16	Electronic & Electrical Equipment
82	TSX	Trans Hex Group Ltd	16	Mining
83	RDF	Redefine Properties Ltd	15	Real Estate
84	CML	Coronation Fund Mngrs Ld	15	General Financial
85	WBO	Wilson Bayly Hlm-Ovc Ltd	15	Construction & Materials
86	CLH	City Lodge Hotels Ltd	15	Travel & Leisure
87	VKE	Vukile Property Fund Ltd	15	Real Estate
88	OCE	Oceana Group Ltd	14	Food Producers
89	APK	Astrapak Limited	13	General Industrials
90	BCX	Business Connexion Grp Ltd	13	Software & Computer Services
91	KAP	KAP Industrial Hldgs Ltd	13	General Industrials
92	DTC	Datatec Ltd	12	Software & Computer Services
93	AMA	Amalgamated App Hldgs Ltd	12	Leisure Goods
94	MTA	Metair Investments Ltd	12	Automobiles & Parts
95	CPL	Capital Property Fund	12	Real Estate
96	GRF	Group Five Ltd	12	Construction & Materials
97	RES	Resilient Prop Inc Fund	12	Real Estate
98	BAT	Brait SE	12	General Financial
99	HDC	Hudaco Industries Ltd	10	Industrial Engineering
100	MST	Mustek Ltd	10	Technology Hardware & Equipment
101	IVT	Invicta Holdings Ltd	10	Industrial Engineering
102	CPI	Capitec Bank Hldgs Ltd	10	Banks
103	PAM	Palabora Mining Co Ltd	10	Industrial Metals
104	DLV	Dorbyl Ltd	10	Construction & Materials

(The data set used was sourced from BFA McGreggor)

Appendix 2: Sample of 40 Companies

Rank	Code	Name	Market Cap (Rm Jan 2005)	JSE Sector Name
1	AGL	Anglo American plc	2 061	Mining
2	BIL	BHP Billiton plc	1 800	Mining
3	SAB	SABMiller plc	984	Beverages
4	SBK	Standard Bank Group Ltd	876	Banks
5	SOL	Sasol Limited	812	Oil & Gas Producers
6	MTN	MTN Group Ltd	748	Mobile Telecommunications
7	FSR	Firstrand Ltd	748	Banks
8	TKG	Telkom SA SOC Ltd	605	Fixed Line Telecommunications
9	OML	Old Mutual plc	549	Life Insurance
10	ANG	Anglogold Ashanti Ltd	518	Mining
11	ASA	ABSA Group Ltd	500	Banks
12	AMS	Anglo American Plat Ltd	469	Mining
13	REM	Remgro Ltd	457	General Financial
14	SLM	Sanlam Limited	349	Life Insurance
15	GFI	Gold Fields Ltd	337	Mining
16	IMP	Impala Platinum Hlgs Ltd	333	Mining
17	NED	Nedbank Group Ltd	287	Banks
18	RMH	RMB Holdings Ltd	255	Banks
19	BVT	Bidvest Ltd	255	Support Services
20	BAW	Barloworld Ltd	236	General Industrials
21	NPN	Naspers Ltd -N-	235	Media
22	IPL	Imperial Holdings Ltd	222	Industrial Transportation
23	HAR	Harmony GM Co Ltd	194	Mining
24	SAP	Sappi Ltd	182	Forestry & Paper
25	TBS	Tiger Brands Ltd	162	Food Producers
26	LON	Lonmin plc	152	Mining
27	SHF	Steinhoff Int Hldgs Ltd	150	Household Goods
28	INP	Investec plc	131	General Financial
29	PPC	PPC Limited	127	Construction & Materials
30	PIK	Pik n Pay Stores Ltd	116	Food & Drug Retailers
31	JDG	JD Group Ltd	112	General Retailers
32	WHL	Woolworths Holdings Ltd	106	General Retailers
33	DSY	Discovery Ltd	101	Life Insurance
34	NPK	Nampak Ltd	98	General Industrials
35	NTC	Netcare Limited	87	Health Care Equipment & Services
36	LBH	Liberty Holdings Ltd	85	Life Insurance
37	APN	Aspen Pharmacare	84	Pharmaceuticals &

		Hldgs Ltd		Biotechnology
38	MSM	Massmart Holdings Ltd	83	General Retailers
39	TRU	Truworths Int Ltd	83	General Retailers
40	SNT	Santam Limited	82	Nonlife Insurance

(The data set used was sourced from BFA McGreggor)