EFFECT OF BOARD CHARACTERISTICS ON RISK TAKING BEHAVIOUR OF COMMERCIAL BANKS IN KENYA

By

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DECLARATION

This research proposal is my original work and has not been submitted for examination in any other university.

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The research proposal has been submitted for examination with my approval as the University Supervisors.

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DEDICATION
Dad & Mum

You did this I just made formal.

Kwash, Sara, Moraa, Nite, Fifi and G

Look at us now!

Levi,

You are a daily reminder that dad needs to keep going.

Purity,

For allowing me to take this path of self-actualization, and for always being there despite the challenges.

My Friends:

We continue on this great experience that is life

ABSTRACT

The primary goal of the research was to ascertain how board characteristics affected Kenyan commercial banks' risk-taking behaviour. Three theories—agency theory, stewardship theory, and resource dependency theory—served as the foundation for the study. The study also used a cross-sectional survey design and a correlation descriptive research approach. As of June 30, 2022, the study's sample included 41 commercial banks that were active in Kenya. The research used secondary data gathered from a range of sources, including reports submitted to the Central Bank of Kenya and audited financial statements of the relevant enterprises. Both descriptive and panel regression was used as the analyses' foundation. Based on the descriptive statistics, the study found that credit risk varied from 0.00 to 0.76 while size of the board of directors varied from 0.6 to 1.15 with an average score of 0.9307. Concerning gender diversity, the study found that in some commercial banks, female directors were not included in the board of directors although in other commercial banks, six in every ten directors are female. On average, the board of directors in commercial banks comprises of three female directors. The study also found that, in terms of total assets, commercial banks in Kenya have been growing steadily between 2017 and 2021. Regarding inferential statistics, the research found a link between board size (B=-0.341, a=0.007) and risk-taking conduct in Kenyan commercial banks. The research also found a negative (-0.013, -0.548) link between CEO ownership and organizational risk-taking behavior. The research determined that having directors who are more independent boosts the ability of the bank to engage in hazardous investments based on directors' independence as a feature of the board of directors. The research revealed a substantial (p=0.008) positive association between board independence and commercial banks' capacity for risk-taking. A positive and significant association between foreign ownership and the risk-taking behavior of commercial banks was also found by the study's results (B=0.197, a=0.007). Based on the study's analysis of the total impact of board characteristics on commercial banks' willingness to take financial risks, it was determined that board size, CEO ownership, independent directors, foreign shareholding, and gender diversity together account for 8.8% of this willingness. However, when financial leverage and business size are taken into account as control factors, the total impact of board features on risk-taking behavior rises to 18.7%. The study recommends that commercial banks should consider having an average number of independent directors in order to have appropriate risky investment that may jeopardize the financial performance of the bank. Similarly, the study recommends that commercial banks that the composition of the board concerning gender diversity. With the positivity in relation to risk taking behavior of commercial banks, there should be appropriate mix in gender to avoid venturing into more risky behavior that may jeopardize the operation of the bank in case of failure in the investment results.

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LIST OF ABBREVIATION AND ACRONYMS

CAR - Capital Ratio

CBK - Central Bank of Kenya

CEO - Chief Executive Officer

CRO - Credit Risk Officer

ERM - Enterprise Risk Management

EQTA - Total Equity to Total Assets

MENA Middle East and North Africa

NPL - Non-performing Loans

NSE - Nairobi Stock Exchange

POLS - Pooled Ordinary Least Squares

RC - Risk Committee

RDT - Resource dependence theory

ROC - Chief Risk Officer

CHAPTER ONE: INTRODUCTION

1.1 Background to the Study

The need of bolstering financial institutions' governance processes has been highlighted by the global financial crisis in order to track managers' exposure to risk in their day-to-day activities (Addo et al., 2021). Financial institutions all across the world have been hit with fines and penalties totalling more than $400 billion during the 2007–2008 financial crisis. This is because it was established that financial institutions' excessive risk-taking and insufficient risk governance measures were the primary causes of the current financial crisis (S&P Global, 2020). One of the pillars of corporate governance, risk governance, is purposed to ensure that the board of directors controls the range of risks that a company faces. Additionally, the most necessary are the creation of a specific board-level risk committee (RC) and the employment of a chief risk officer (CRO) to supervise all pertinent risks to which a firm is exposed (Lundqvist, 2015). With strong risk management practices, it is expected that financial institutions would deal with less off-balance sheet derivatives and private mortgage-backed securities. According to Aebi et al. (2012), having a risk governance framework overall and having a chief risk officer in particular has a beneficial impact on stock returns. Additionally, it has been found that when a board implements a successful risk governance framework, the same has a favourable impact on stock prices. Therefore, managing the risk exposure of financial institutions benefits both the shareholders and the individual firm.

By employing enterprise risk management (ERM) methodology and offering policy recommendations on risk strategy, desire, and tolerance level, the board risk committee seeks to improve bank level risk governance and foster an organizational culture of risk awareness (Malik, Nowland & Buckby, 2021). Boards with greater risk management strategies and, as a

result, sound corporate governance, are frequently advised to incorporate board risk committees with members who have lengthy tenures, financial competence, and gender balance. Battaglia and Gallo (2015) demonstrate the benefits of having a control committee in lowering bank risk and boosting profitability. (Lee & Hooy, 2020) also show the advantages of the board monitoring committee in reducing bank-risk behaviour for both private and governmental institutions. They discover that the board monitoring committee decreases state-owned banks' risk-taking.

Three theories—the moral hazard theory, the agency theory, and the stewardship theory—will serve as the foundation for the study on the effect of board characteristics on commercial banks' risk-taking behaviour. The moral hazard theory contends that shareholders are enticed to participate in risky endeavours in the hopes of making a profit at the expense of the deposit insurance fund and the taxpayers who support it (Galai & Masulis, 1976). There is a chance that the borrowing company will go against the initial commitment they made when signing the loan contract because the financial institutions are unable to continuously monitor the borrower and obtain useful information about the borrower's willingness to repay loans, their organizational performance, and the purpose of the loan (Huang, Liu & Ren, 2018). Jensen and Meckling (1976) were the founders of the agency theory. The theory is utilized in the context of the current study to demonstrate how managers often stay ahead of risky strategies in order to safeguard their employment and how, as a consequence of their indulgence, the board and the audit committee may help bank managers stop from taking unnecessary risks. Donaldson and Davis (1989) proposed the theory of stewardship. The stewardship theory presupposes that managers may properly align their organization's activities with the interests of shareholders, in contrast to the agency theory, which believes that the interests of the agent and the principle differ.

1.1.1 Board Characteristics

According to Fama and Jensen (1983), the separation of firm control and management with the shareholders limits the engagement of shareholders in a business since the management has the power to act on behalf of the shareholders and in their best interests. Because of this setup, managers frequently have the upper hand when it comes to managing the company and making managerial decisions. The board of directors is appointed to monitor the managers' actions since the expectations of the managers and those of the shareholders are not exactly in line, with the shareholders benefiting less (Fitriya & Stuart, 2012). As a result, the board should have certain characteristics that will result in effective monitoring of the manager's activities. These features are categorized into two broad categories, namely; board demography that encompasses such attributes as gender, ethnicity and age of the directors, and structure of the board, which contains such features as the size, meetings, tenure, size of the committee and its perceived independence (Hu, Hao, Liu & Yao, 2015).

The diverse nature of the board characteristics is expected to influence the extent to which firm managers are controlled and not only concentrate in stopping the negative action by managers that might lead to corporate scandals or failures but at the same time help the firm seize opportunities that improve the value and wealth of all stakeholders (Dalimunthe, Fadli & Muda, 2016). This is because boards consist of a team of individuals that are expected to bring together their diverse competencies and capabilities that should form a synergy of social capital and thus effective performance of governance function. The collapse of many firms in both developed and developing countries has brought into fore the limited role played by respective boards in not implementing appropriate risk mitigating policies.

The incorporation of board of directors members that have financial experience is expected to constrain opportunistic behaviours of managers because they will be able to detect such

activities much easily than board members with no or limited accounting background (Carcello & Neal, 2002). Similar to this, company managers will be less likely to be persuaded to make hazardous management choices that have an impact on the long-term viability of the organization when the board of directors is made up of people with a longer tenure of financial experience. Large board sizes also improve a company's capacity to comprehend the demands of a wide variety of stakeholders and, as a result, better meet those needs. This leads to more openness, which enhances risk-management practices.

1.1.2 Risk Taking Behaviour

Risk taking behaviours are policies undertaken by the management and that increase risk in any of the business channels existing in the institution (Srivastav & Hagendorff, 2016). In contrast to other sectors, the banking industry has certain challenges that make it easier to observe their risk-taking behaviour. These include various individual or aggregate spreads of the loans the bank advances, various loan maturities, non-performing loans, the bank's off-balance-sheet activities, and the frequent requirement for funding for short-term liquidity (Srairi, 2013). All of these risk-taking factors are influenced by the bank's level of risk-taking behaviour, which is represented by the level of diversification it has implemented with the board's approval, the calibre and frequency of its product innovation and syndication work, the location of its operations, and its regulatory environment. The Agency theory states that managers try to avoid taking risks in order to protect their positions and personal benefits. On the other hand, shareholders who have diversified portfolios are motivated to increase bank risk by investing in risky projects after receiving funding from bondholders and depositors (Esty, 1998; Galai & Masulis, 1976).

Banks face a variety of risks in the course of their operations, including credit, operational, insolvency, and liquidity risks. Furthermore, banks are more complicated and opaque than

non-financial enterprises due to high levels of leverage and a mismatch between assets and liabilities (Khan, Scheule & Wu, 2017). It is essential to create a distinct risk committee with the goal of identifying, controlling, and mitigating the many risks that the banks are exposed to due to increased business complexity and risk exposure. This is carried out via the board. Similar to this, organization will face capital requirements and limitations on particular investment and behaviour types in an effort to reduce these risk-taking incentives.

Bank directors control the board's decision-making process in general by maintaining the best relationship between executive and non-executive directors, monitoring director attendance at board meetings, and acting correctly at board meetings (Borio & Zhu, 2012). The regulator's recommended requirements for bank boards are similar to these director conduct traits. Directors of the board should be educated on bank policies, which may be obtained by attending meetings often, planning beforehand, and actively engaging in board meetings.

1.1.3 Effect of Board Characteristics on Risk Taking Behaviour

The board of directors is tasked with developing a risk management method and laying the groundwork for its oversight since a company's internal governance structure is built on a risk-taking culture (Fama & Jensen, 1983). The board develops executive incentive programs to encourage prudent risk-taking and monitors CEO conduct to understand how business actions influence bank risk. It also analyses whether present and future risk exposure is consistent with risk appetite. In order to achieve the same results, board members need be aware and competent enough to change bank risk-taking incentives. Due to the complexity and opaqueness of banks, the board should be composed of individuals who can comprehend and evaluate advanced risk measuring processes as well as the consequences of bank policies on risk. Berger et al. (2014) demonstrate that banks had reduced risk when a larger percentage of executive officers had PhDs in accordance.

Another factor that is connected to lower risk-taking is the board's independence. Board independence is the capacity to make appropriate decisions after taking into account all relevant information and perspectives, free from any managerial interference. Similar to this, it is essential for the board members to have financial expertise in order to comprehend complicated financial transactions and the risks involved. This will help the board avoid taking risks that will not be profitable or that are unwise for the bank's financial stability. Additionally, with a deeper comprehension of the intricate investment transactions, independent financial experts may be better equipped to encourage risk-taking behaviors if they think doing so will strengthen shareholders' remaining claims to the bank's assets. The agency theory contends that independent directors may conduct improved oversight and make choices that are effective and impartial for the company (Anderson et al., 2004). In the same vein, it is anticipated that independent chief risk officers would be significant to the board and likely make effective, impartial, and objective risk managerial decisions (Magee et al., 2019).

Understanding the intricate operations of the company and the dangers related to corporate policy requires a strong background in finance. According to Hau and Thum (2015), however, in the years leading up to the crisis, the boards of directors of banks lacked the essential financial competence to identify and manage the risk exposures faced by their institutions. They pointed out those German banks with inexperienced boards sustained greater losses during the financial crisis. This point of view is in line with that made by Minton et al. (2014), who found a positive correlation between financial expertise and bank risk in their sample of US banks.

The authority of the chief executive officer is another aspect of corporate governance that may have an impact on how successful the board of directors is (Hermalin & Weisbach, 1998). If they have the power to sway board decisions and hinder the board's capacity to properly monitor itself, powerful CEOs may jeopardize board independence. According to Adams et al. (2005), companies that have CEOs with more authority have more performance variability, which shows that these CEOs make decisions that raise the risk of the firm. As a result, influential CEOs have a greater chance of convincing the board to pursue riskier company prospects in the pursuit of higher investment returns. Additionally, the size of a bank can have an impact on its risk profile because bigger financial organizations often have stronger diversification and are therefore more resilient to shocks. In a similar perspective, larger institutions could also take on riskier ventures, such more off-balance sheet transactions that raise banks' risk exposure. Consequently, when combined, diversified board characteristics may be crucial in ensuring efficient monitoring of bank executives' performance.

1.1.4 Commercial Banks in Kenya

According to the Central Bank of Kenya, there are 41 banks in Kenya today, 11 of which are publicly traded on the Nairobi Securities Exchange. Kenya Commercial Bank has the largest market share in terms of assets and deposits, while Equity Bank has the largest market share in terms of loans and penetration. The Banking Act (Cap 488) of 1995 as well as other regulations and prudential principles, all of which are intended to safeguard the overall soundness and stability of the Kenyan financial system, govern the banking sector in Kenya. This law was enacted to preserve the stability of Kenya's financial system. The Central Bank of Kenya Act, CAP 491 (the Act), stipulates, among other things, that it is responsible for monitoring the interaction between local banks and the regulatory body.

Many banks have implemented various types of modifications in their operations in the recent decade, according to CBK (2019). During the same time, the local banking sector saw eight separate mergers and acquisitions, which, when combined with varied product diversifications, resulted in a variety of performance results. The banking industry has undergone a number of transformations in the last decade, including the merger and acquisition of small financial institutions by a number of large banks, the adoption of new technology, particularly mobile technology, to create a seamless banking system, the establishment of new organizational structures, and the continuous evaluation of culture. Similarly, banking sector regulation has expanded, forcing continual bank adaption to the current banking paradigm. Because of the uncertain nature of the banking industry in Kenya and the competitiveness being witnessed, it becomes imperative that persons that have a strategic vision and can anticipate changes and be able to come up with appropriate strategies manage the banks.

There is ample evidence in the bank's annual reports of the chief risk officer's disclosure in the relevant firms and the format of reporting the type of risk exposure of the firms. The existence of a credit risk officer, a risk reporting structure, the involvement of the BOD in the risk management process, adherence to the regulatory framework, and the existence of a common language on communicating risk are among the risk management practices that are common and disclosed by commercial banks, according to Odero and Omoro. (2021). However, it was reported that investors in the bourse are not concerned with individual firm risk but rather the overall risk of their portfolio, a position that is in line with the modern portfolio theory

1.2 Research Problem

The lack of internal risk governance measures is recognized as a contributing aspect to the impacted financial institutions' excessive risk-taking, which was one obvious result of the current financial crisis (Bebchuk & Spamann, 2018). With the onset of the same, there has been a request for changes to the bank governance structure with the intention of having individuals with certain traits be able to advise the bank management on the type of investments to pursue. Financial institutions have unique characteristics including leverage, regulation, opaqueness, and government interference, thus it is necessary to set up the appropriate internal mechanisms to provide the requisite scrutiny on the manager's activities. Calls for banking sector reform specifically claim that the crisis was greatly aggravated by the board members' lack of financial information understanding (Abdelbadie & Salama, 2019). In addition to the requirement that board members possess the necessary financial acumen, it is expected that the independence of the board, the frequency of meetings, the composition of the risk committee, and the gender of the same committee will all have an impact on the type of risk-taking behaviour adopted by the banks. A unique environment for analysing the risk-governance techniques deployed and their effects on the risk-taking behaviour of the banks may be provided by developing nations like Kenya, which have a young financial industry and a frail regulatory structure. Various research have been conducted to establish this relationship.

Srivastav and Hagendorff (2016) looked at the connection between corporate governance and the level of risk-taking adopted by British financial organizations. According to the study's findings, taking risks affects bank debtors more than it helps shareholders. Guarantees are financed by bank creditors and provide financial protection for various holders of bank liabilities. The research also draws the conclusion that further research is required to

comprehend the influence of board characteristic dimensions, particularly personal characteristics such as educational background and financial expertise on risk taking behaviour. This finding becomes known as another result of the study. Researchers Islam, Bhuiyan, and Kassim (2019) performed study in Bangladesh Islamic financial institutions in order to gain a better understanding of the link between board characteristics and risk-taking choices made by those organizations. Specifically, board size, independence, leadership, education and qualifications, and board attendance at meetings were all examined. According to the findings, the banks' risk-taking behaviour was significantly and negatively impacted by the board's financial information and management competence and independence. Buyl, Boon, and Wade (2019) conducted research among US commercial banks to ascertain the CEOs' risk-taking, narcissism, and resilience. The results show that CEO narcissism positively influenced the riskiness of banks' policies, particularly when risk-incentive compensation policies are in place. Elamer, Ntim, and Abdou (2020) did study on bank risk management and transparency, national governance, and Islamic governance. They emphasized the Middle East and North Africa in their research (MENA). The results of the study, which were produced from data gathered from 78 banks situated in 10 different countries, show that the nature of macro-social-level components like religion determines the degree to which information is shared.

Research was carried out by Ndwiga (2020) to investigate the influence that FinTechs have on the market dominance and risk-taking behaviour of Kenyan banks. The findings indicate that a bank's propensity to take risks has a positive correlation with the expansion of market power that has resulted from the introduction of FinTech companies. Njenga and Jagongo (2020) investigated the effects of various board structures, company sizes, and levels of financial advantage on manufacturing companies listed on Kenya's Nairobi Securities

Exchange. The results of the study suggest that a company's ability to choose economic benefits and the amount of external borrowing it can obtain are both influenced by its size and the qualities of its board of directors.

According to the research mentioned above, the characteristics of the board have a big impact on how the company runs every day through the managers' decisions. To the best of my knowledge, the impact of board characteristics on the risk-taking behaviour of commercial banks in Kenya has not been examined, despite the fact that numerous studies have been carried out to determine this relationship. Risk behaviour of banks is an important concept since it determines the stability of the overall banking industry and therefore its determination is critical. In the Kenyan context, there is no study that has evaluated the bank risk-taking decision among commercial banks in Kenya. Similarly, the choice of the measure of the risk behaviour by assessing the ratio of NPL to the total loans advanced is unique since it gives a measure of the bank risk exposure in its business. Because of these gaps, this research will seek to answer the following question; what is the effect of board characteristics on risk taking behaviour of commercial banks in Kenya?

1.3 Research Objective

To determine the effect of board characteristics on risk taking behaviour of commercial banks in Kenya

1.4 Value of the Study

The research gives information that is useful to academics, policymakers, and other stakeholders while also adding to the body of knowledge on the efficacy of board features. The research assists policymakers in defining the attributes a board member must possess before to being nominated to head a business and assists them in making sensible management choices. Lenders may also get advice from authorities on a company's correct

financial standings before making an investment choice. This is due to the fact that both tactics have the ability to affect a company's bottom line in terms of risk-taking behaviour.

By examining how risk-taking behaviour may be impacted by board characteristics, the research assists finance management experts in recommending to the bank management an acceptable amount of risk-taking policy. The study also helps the financial managers to follow the stated guidelines for risk management by having an acceptable board composition. Further discussion of the management choices affecting financing has increased understanding of the finance function and how it might affect a company's financial accounting function.

The research, which is conducted from the viewpoint of Kenya, a developing nation, fills a vacuum in the literature on the effect of board features on enterprises. With numerous predictor factors, the study will reveal a number of gaps that may be further explored by other academics.

CHAPTER TWO: LITERATURE REVIEW

2.1: Introduction

This chapter examines earlier research on board characteristics and its effect on an organization's risk-taking behaviour. This part also discusses the study's theoretical foundations and their applicability to the whole endeavour. In addition, both internal and external variables, which affect banks' risk-taking behaviour, are explored. Along with the conceptual framework, an empirical review is presented.

2.2 Theoretical Review

Three theories—agency theory, stewardship theory, and resource dependency theory—served as the foundation for the study. Also given is the theory's applicability to the current study.

2.2.1 Agency Theory

Agency theory was advanced by Jensen and Meckling (1976) and posits that in company operations, one party (owners/principal) gives mandate of decision making and/or responsibilities to another party (an agent) to conduct the business activities on behalf of the principal. However, with this relationship, uneven distribution of information will regularly exist between agents and principals in the sense that the managers will be privy to more information about the company than the owners, a situation might lead to maximization of shareholder wealth or not will lead to efficiency being the selection criteria (Rungtusanatham et al., 2018). In an agency relationship, there are potentially two problems that may arise, risk sharing and agency problem. With regard to the agency problem, the objectives of agents vary from the ones of principals and since the owners do not run the firm on the day-to-day basis, it is expensive or difficult to verify whether the delegations awarded to agents were done as required (Jensen & Meckling, 1976). As regards the risk-sharing problems, this challenge comes up when agents and principals have varying attitudes towards risk that

results into conflict about remedies to be undertaken. Efficient management of the organization activities will enable the increase in shareholder wealth and vice versa. Therefore, efficient utilization of resources in an organization is expected to influence the performance of a firm since it affects its output.

Kokoreva and Ulugova (2016) highlight that the corporate principle decisions in a firm can provide incentive to different stakeholders in a way that will reduce behaviour of value minimizing and therefore lower the agency costs. Particularly, the selection process of the firm's operation, liquidity, and advantage, can control the costs of agency that arise from the company's management – shareholders' relationship. Mensa and Abor (2014) suggested that the management support of the principal goals could be increased in the company and put in line with its accompanying interest of shareholders. Kokoreva and Ulugova (2016) opines that a company can lower the cost of agency by mounting its dependence on debt financing as sources of capital as well as being able to generate internal sources of finance. Effective cash conversion cycle, liquidity holding, advantage and management of payables is therefore expected to increase shareholder value. However, the concept of accruing debt financing dependency is limited because of continuous accumulation of debt, which may render a firm to get involved in financial distress. On top of financial distress costs, allegiance of emerging debt holders are expected to reduce the claim of active shareholders, thus the requirement of higher return rates that are depicted in increased capital cost of a firm (Mans-Kemp, 2014).

The relevance of the agency theory in the current study is borne of the fact that the bank board of management is formed for the sole purpose of increasing internal governance of the banks with a view to controlling the opportunist behaviour of management that might endanger the interest of shareholders. Risk taking behaviour of the bank management if not monitored might erode the value of the bank and therefore, the board need to have

appropriate characteristics to effectively control the decisions of the management with a view to managing the risk exposure of the bank. Appropriate board characteristic, such as, financial literacy and larger board size with audit committee that is knowledgeable is an effective tool of monitoring. Therefore, relevant board characteristic helps in reducing the agency cost.

2.2.2 Stewardship Theory

Donaldson and Davis (1989) made significant contributions to the Stewardship theory. The stewardship theory, in contrast to the agency theory, which assumes that the agent and principal have conflicting interests, takes into account the dynamic nature of life by taking into account the possibility that managers can actually align their actions in the firm to the interest of the shareholders. The theory represents situations where managers become stewards of the shareholders and relegate their interest to that of the firm in general. The behavioural characteristics of a manager is determined by the situational and psychological factors of the individual, such that some managers might find it in order to always work in the best interest of the shareholders (Davis, Schoorman & Donaldson, 2018). The theory posits that the behaviour of a steward is completely encompassing such that seek to collectively achieve the organizations objectives such as increased sales and profits. The shareholder wealth therefore is increased through firm performance, which in turn increases steward utility function. Because there are many interest groups in an organization, it would be collectively advantageous if the stewards pursue objectives that will be beneficial as a whole as opposed to meeting specific party interests (Martin & Butler, 2017). Therefore, a steward who increases the organization performance will be able to meet the interest of many of the stakeholder groups, many of whom interest is served by increasing the shareholder wealth.

The stewardship theory recognizes that a steward manager can be able to trade-off personal and the organizational goals and is convinced that by seeking to realise the organizational objectives, so will they be able to achieve individual interest (Chrisman, 2019). Empowering organizational governance structures, through the establishment of boards with unique characteristics, will therefore not be a problem. An individualistic agent will be able to seek pro-organizational behaviour, and this means that stringent regulations may be unproductive since they limit the pro-organizational behaviour of the steward. Individualistic agents will be able to pursue pro-organizational behaviour. Because stewards can be relied on and the majority of the time their activities are in line with those of the principle, the stewards' autonomy should be increased so that the advantages they provide to the principal may be maximized (Davis, Schoorman & Donaldson, 2018).

The stewardship theory is relevant to this study because unlike the the agency theory, it recognizes that the board of management as well as the bank management are good custodians of the bank assets and resources. Indeed, in the majority of the banks, the CEOs and the top management are significant shareholders of the respective banks by virtue of the ESOPs program. Therefore, they would least be interested to erode the banks value since they would be the first persons to loose in case of such a behaviour. As a result, the board and the top management are taken to have the best interest of the bank and therefore not expose it to unnecessary risk.

2.2.3 Resource Dependence Theory

The Resource dependence theory (RDT) is traced to the work of Pfeffer and Salancik (1978) that suggest that firms are dependent on their surroundings for their survival through the interchange of resources. Though the theory was originally developed to explain the interdependence of different actors within an organization and their operating environment,

the theory has been used to explain the relationships between firms and different types of institutions and actors (Cuervo-Cazurra, Mudambi & Pedersen, 2019). The RDT is of the view that boards is an important resource source through the provision of a sustained value creation in form of strategic initiative, decision making and continued evaluation of strategic choices. Consequently, the boards are considered under the RDT to be a critical resource that is lacking internally and be able to integrate organizational and the environment that they operate in (Hillman & Dalziel, 2013). Therefore, when an organization faces a performance challenge, external board members will look for opportunities based on their experience in other firms and realigns firms' strategic direction. Similarly, in performance of their advisory role, the board will support the executive team in making informed decision about future direction with a view changing the prevailing sub-optimal performance.

RDT advocates that a company pay close attention to the players and stakeholders who control critical resources. This may be the reason why businesses that depend heavily on female employees give work-life balance concerns a lot of thought. It may also help to explain why local companies that rely on natural resources spend heavily in large-scale local development projects in the fields of health and education (Hess & Warren 2008).

The RDT perspective emphasizes that the board of directors plays a significant role in ensuring that the company has access to essential resources, including knowledge, credibility, and personal relationships (Chou, 2015). This is further supported by the board's increased participation of current CEOs and the presence of additional legal experts. The company pays more attention to social performance when it has a broad source of information and a sizable board, and both of these characteristics further increase this. Hillman and Dalziel (2003) emphasize the board's involvement, which includes boosting the company's credibility and public image, giving knowledge, guidance, and counsel, connecting the business to

significant stakeholders or other significant organizations, and making resources more accessible. In addition, the members of the board need to have the expertise necessary for developing external contacts, assisting in the creation of strategy, and making other crucial choices for the company (Porter & Kramer 2006). The corporate boards serve as an essential link between the company and its environment, providing the organization with a channel for communication purposes, obtaining commitments of support from significant elements, and ensuring that the board linkage contributes to the legitimization of the organization. Additionally, the organization is able to acquire useful information through this link. Firms that are customer oriented have been found to appoint women as directors and such decision helps in giving the business some degree of legitimacy and is found to provide customer stakeholder legitimacy (Brammer, Millington & Rayton, 2007).

The resource dependency theory alludes to the fact that the board of directors plays a significant role in ensuring that the company has access to essential resources, including knowledge, credibility, and personal relationships. A firm has the resources at its disposal that differentiates its performance from the peers. Consequently, a board that is endowed with appropriate qualities will add value to the performance of the bank –including making appropriate decisions with regard to risk taking investments.

2.3 Determinants of Bank Risk-Taking Behaviour

In the banking industry, the understanding of the bank risk-taking behaviour is important because excessive risk-taking by banks has resulted in bank failures and in some case turbulence of government around the world. In addition, bank crises have led to increased public debt; drop in prices of assets and prolonged recoveries (Reinhart & Rogoff, 2009). Consequently, research on this area has attracted research from a number of researchers (Laeven and Levine, 2009; Acharya and Naqvi, 2012; Agarwal et al., 2012). The factors

affecting a bank risk-taking behaviour in the current research include; board size, CEO ownership, independent directors, foreign directors and having women in the board of directors.

Depending on its attributes, such as size and composition, the board of directors in a bank can oversee bank management and restrict their opportunistic conduct (Zgarni & Fedhila, 2021). According to the agency's literature, independent board members provide a crucial oversight function in the effort to try to settle or, at the very least, greatly reduce agency conflicts between management and shareholders. It is possible to view the board's independence as a device to restrain irrational risk-taking in this situation. The relationship between greater performance and an independent board of directors has been looked into in earlier studies. However, it's likely that the relationship between higher risk-taking and an independent board of directors might not follow the same pattern (Liu & Sun, 2021). For example, Birindelli, Chiappini, and Savioli (2020) discovered that financial institutions with more autonomous boards underperformed during the crisis, but they did not prove that these institutions had increased their risk-taking before to the crisis. Fernandes et al. (2021) found that banks were more risk-averse between the years of 1997 and 2004 when there were more independent directors present as a response to this. This finding can be attributed to the independent directors' increased focus on complying with regulatory standards.

In addition, according to this reputational theory, independent directors will prefer less risky initiatives that will assist businesses in avoiding losses. This will protect their reputations as independent directors in the directorship market as well as the public perceptions of their organizations. In an economic crisis, a larger percentage of independent directors on a board is associated with lower levels of firm risk-taking, but this link is not true during an economic expansion, according to study by Mollah, Liljeblom, and Mobarek (2008). (2021). The results

of Akbar et al. (2017), which are based on a study of financial corporations operating in the UK between the years of 2003 and 2012, demonstrate that organizations with more independent boards take on less risk. Additionally, the results of Vallascas, Mollah, and Keasey (2017) from a cross-country sample of big banks for the years 2004 to 2014 demonstrate that, compared to the bulk of the sample period, increasing board independence is related with more cautious bank risk-taking after 2009. These conclusions are based on research that was carried out between 2004 and 2014.

As argued by Zgarni and Fedhila (2021), larger boards mitigate the sheer unpredictability of board decisions since it takes more debate and compromise to reach an agreement (Akbar et al., 2017). Larger organizations should express moderate opinions that constitute a compromise between individual positions, according to Birindelli, Chiappini, and Savioli (2020). Mollah, Liljeblom, and Mobarek (2021) disagree, believing that a group's ultimate choice should represent a compromise between the many points of view held by its members. Therefore, because it is more challenging to come to a consensus in a big group, riskier initiatives are more likely to be rejected.

Zgarni and Fedhila's (2021) findings for corporate boards are consistent with the aforementioned claims made about the literature on group decisions and demonstrate that organizations with larger boards have less erratic performance. The results by Birindelli, Chiappini, and Savioli (2020) on a sample of US corporations provide validity to the theory that the size of a company's board of directors reduces risk-taking by the company. Greater information asymmetry is created by the banking industry's complexity and opaqueness, which makes bigger boards particularly advantageous for banks which is attributed to the nature of the financial sector. Due to the unique characteristics of bank assets, the problem of risk-taking is more important for these companies than for non-financial enterprises, and the

function of bigger boards is far more critical. The amount of risk that banks were prepared to assume was shown to be negatively impacted by the board size of bank holding companies (BHCs) in the United States by Casu et al. (2011). In UK financial institutions, Akbar et al. (2017) research revealed no evidence of a significant relationship between board size and risk-taking. Wang (2012), however, discovered a sizable inverted U-shaped association between board size and risk-taking in European banks.

CEO ownership and organization ownership structure is considered as a key determinant of bank risk taking since it has a direct influence on the principle-agent relationship and by extension the type decisions made as a whole (Agusman, Cullen, Gasbarro, Monroe, & Zumwalt, 2014). It is suggested that managerial ownership causes large stakes in the company and lowers the likelihood of product diversification. Chen and Yu (2012) highlighted the benefits of diversity, which are brought about by management ownership and result in short-term company success. In relation to institutional ownership, Deng, Elyasiani, and Jia (2013) highlight that they exhibit risk-averse attribute that advocates for diversification strategy and this can best be realised through a diverse ownership pattern.

According to Birindelli, Chiappini, and Savioli (2020), CEOs who own stock in the firm have a tendency to safeguard organizational resources since they benefit from the company's increased shareholder value and hence take less risks. Mollah, Liljeblom, and Mobarek (2021), on the other hand, made the case that risk-averse bank management may approve safer initiatives that lower value while rejecting riskier ventures that raise value. The framework of agency theory functions upon the basic notion that strong CEOs would pursue activities and make choices that are in their own best interests. This is because it is believed that strong CEOs will behave in their own best interests. As a result, because risk aversion is presumptive, it will not be expected that they will make choices that are deemed risky. Soi,

Yegon, and Kosgei (2021) provide empirical evidence to support their claim that firms adopting CEOs who hold company shares display much lower levels of risk. Using a sample of US BHCs, Casu et al. (2011) similarly find that CEO ownership is related to reduced bank risk. Similar to this, Akbar et al. (2017)'s findings show that CEO ownership causes financial firms to take less risk. The agency hypothesis, which contends that managers prefer to refrain from taking risks since doing so carries reputational and job consequences, may help explain the negative correlation.

According to Croson and Gneezy (2009), three elements influence gender disparities between men and women: risk choices, social preferences, and competitiveness. According to research, women are generally less competitive than males, more socially perceptive than men are, and less risk-averse than men. They exhibit different risk-taking behaviors explicitly because they are more emotional and less overconfident than males. Men frequently engage in risky ventures (Dwyer, et al. 2002). Liljeblom, Mollah, and Mobarek (2021) noted that women are easier to persuade than males because they are more cautious, passive, and less assertive. As a result, the literature gives mixed reaction as far as women directors and risk-taking behaviour in organizations is concerned. However, majority of previous studies suggests that women directors have a negative impact relationship with risk taking behaviour in organizations.

Birindelli, Chiappini, and Savioli (2020) assert that board characteristics have a significant influence on how organizations react when taking risks. Barako and Brown (2008) claim that the number of freely provided pieces of information was unaffected by the presence of foreign directors on the board. Since it is likely that foreign directors would favor the interests of the company's foreign owners, they contended that adding foreign members to the board might take the place of enhanced disclosure processes. Additionally, foreign directors

are more likely than local directors to have a less effective role in overseeing management, which lowers the efficacy of the board in terms of its oversight and reprimanding responsibilities (Masulis, Wang, & Xie, 2012).

According to the agency theory, foreign directors may successfully monitor performance if they use their position as agents of foreign investors to fight against the interests of the manager. This is a key tenet of the agency theory. The presence of directors from other countries offers a possibility to mitigate the negative impact of management on value creation to the stakeholders (Dewayanto et al., 2017). Furthermore, according to the resource dependency theory, foreign board members are strategic resources that make it easier to acquire accessible external input. As a result, the resource dependency theory encourages hiring competent foreign directors to maintain strong connections with foreign market (Ujunwa, 2012). Because they maintain a diverse range of relationships with foreign stakeholders, foreign directors are further obligated to provide a greater degree of openness and disclosure (Ibrahim & Hanefah, 2016). It is plausible to assume that the presence of foreign directors will be positively associated with an enhanced level of risk taking and transparency based on agency theory, resource dependency theory, and the evidence given above.

2.4 Empirical Reviews

There are two types of studies on how board features influence bank risk-taking behavior. The first group consists of scholars who think the board of directors' independence accounts for the company's stellar success and those who think the opposite. External independent directors, in light of their encouragement to exercise control, according to Fama and Jensen (1983), positively contribute to the effective control of organization management. The market reputation that board members would have in terms of corporate control is often what

motivates them to operate in the company's best interests. Lefort and Urza (2008) reinforce the same point by utilizing 160 publicly listed Chilean firms to demonstrate how having independent directors on the board improves a company's performance by assuring competent management decision-making and raises the firm's market value. External directors are ideally suited to control the board of directors because they apply their knowledge and expertise to the company, have strong leadership qualities, and may favourably influence corporate performance. Similarly, independent directors can override the CEO's poor choices and so safeguard the interests of minority and big shareholder groups.

Tran, Do, and Nguyen (2020) investigated how board qualities affected bank risk in Vietnam. Ordinary least squares technique (OLS) was used in the study's 10-year panel data review, which began in 2008, to analyse the variables. The factors included deposits, ownership structure, and equity to asset ratio, bank size, and ownership variables. A unique dataset of 216 observations from 31 Vietnamese banks was used in total for the investigation, which ran from 2008 to 2018. The results point to a substantial relationship between CEO gender and bank risk-taking in Vietnam, with female-led institutions taking on greater risk than their male counterparts do. This was ascribed to the fact that female CEOs in Vietnam struggle to balance the demands of their families and careers, and when this is coupled with a lack of family support, it ultimately affects their ability to focus at work. This result supports Nguyen's (2018) claims that there is social bias against women company owners because they are too sentimental. When negotiating and signing significant contracts, this position has unfavourable outcomes. In contrast, Barucci and Milani (2018) report that banks in South Africa run by women over the age of fifty were found to be more risk averse than their male led counterparts. According to the research, bank managers' demographic characteristics should be taken into account for institutions that are under pressure.

Excessive interest rates according to Zheng et al. (2019), particularly during economic crises, were detrimental to banks' ability to turn a profit. A careful strategy of provisioning and a greater capital adequacy ratio aid to reduce the problems with banks' loan capitalization, albeit the association is small in terms of loan loss provision, according to the findings, which are consistent with Lee and Hwang's (2019) findings.

The results of a prior research by Nkusu (2011) revealed that bigger banks had greater risk levels than smaller banks, are supported by this discovery. This situation has been attributed to the bigger banks' greater proportion of the investment portfolio. Furthermore, it was shown that the bank's liquidity position has a statistical bearing on credit risk; the positive connection between the two demonstrates that banks with higher liquidity levels are more susceptible to credit risk. Off-balance sheet incidents increase bank risk, the investigation found.

Andres and Vallelado (2008) conducted a study across six major commercial banks from Canada, Britain, the United States, Spain, Italy, and France during a ten-year period from 1995 to 2005 in an effort to corroborate these beliefs about board characteristics. A small board of directors is more successful than a large board, according to the study, which used a descriptive research approach and came to that conclusion. This is because a small board of directors may be more effective in areas of financial discipline on management action. They provide an example where a decision to fire a CEO must be made unanimously, which is frequently simple to do in this type of board of directors. Following this finding, Adam and Mehram (2013) reach a different conclusion by pointing out that banks with a big board of directors would perform better when there is a lot of risk present. Similar to this, when a board is tiny, management may easily influence and control its members. Indeed, managers' risk-taking behaviour may be influenced by the size of the board of directors. In a similar

vein, Blanchard and Dionne (2004) highlighted that managers' excessive risk-taking is justified by the increased usage of sophisticated tools to hedge against risk as the number of directors grows.

Doan and Ekşi (2020) have focused on the risk-taking habits of the board of directors and how they affects a company's success. The study employed the ordinary least square approach to establish the association using 19 Turkey banks and a final sample of 133 observations. According to the study's findings, the number of directors on a bank's board and ROA ratios have an inverse and statistically significant connection, which suggests that having a larger board does not help a bank's performance. The data also show that foreign ownership worsened the degree of NPL and therefore the performance of the entire bank. This was ascribed to the absence of necessary information about the Turkish economic climate held by foreign directors. However, it was shown that bank size had a positive and large impact on bank NPL and a negative and significant impact on bank profitability. Because of this, banks with small bank sizes may have higher ROA and offer advantages in terms of bank NPL (Ararat, Black & Yurtoglu, 2017).

Aebi, Sabato, and Schmid (2012) investigated the relationship between corporate governance and the impact of risk management on bank performance. To determine whether the board characteristic might have prevented the financial catastrophe of the North American banks, the research examined data from 2006, just one year prior to the start of the financial crisis. The criteria for using CG included whether or not there was a specific committee charged with overseeing and managing risk in banks, the size, independence, and expertise of the board, and whether or not the CRO was a board member. The conclusion demonstrates that the CRO’s membership on neither the board nor the makeup of the risk committee was determined to have a substantial impact on bank performance. This result backs up Adams'

(2009) assertion that the firm's risk management posture was unaffected by the CRO's board membership.

Lotto (2016) investigated how Tanzanian commercial banks' risk-taking behaviour is facilitated by capital adequacy efficiency. In order to determine the link between the predictor variables (capital adequacy, bank size, profitability, profitability, and credit risk), the panel data for the years 2009 through 2014 were used. To estimate the relationship, a two stage least squares method was employed. The findings show that capital ratios and bank risk-taking behaviour are clearly correlated, and that when risk levels rise, bank management strives to boost bank capital in an effort to stay within the legally required minimum. This finding supports the idea that banks with capital ratios close to the statutory capital minimum level would wish to increase their risk appetite in order to get access to possible revenues that the banks may employ to strengthen and diversify their capital base. This behaviour was projected to happen because banks whose capital ratios were approaching the lowest regulatory capital requirement level would engage in riskier business activities in order to generate higher returns that would be reinvested in capital reserves. The investigation also uncovered a robust and favourable connection between financial institution profitability and capitalization. The existence of a positive link between bank profits and capital illustrates that when banks grow their profitability, they hoard more of their revenues in order to boost the amount of capital they have on hand. Therefore, one may conclude those banks' higher profitability results in a rise in their capital ratios, which prevents them from failing when they take on more risks. This is the realization González (2004) established in his study.

Gachigo, Ondigo, Aduda, and Onsomu (2022) investigated the function of institutional features as a moderator in the link between merger and acquisition strategies and performance of Kenyan banks. The study included information from 30 commercial banks

that had merged by 2017. The moderating influence of institutional characteristics was estimated using the Baron and Kenny (1986) stepwise regression. The study was guided by the positivism research design with a correlation research design being adopted because it facilitates the examination of the relationship between variables. Secondary data for a fifteen-year period was utilized. The study's findings imply that bank size, operational effectiveness, and management effectiveness were linked to the company's financial success in a favourable and substantial way.

Mandala, Kaijage, Aduda, and Iraya (2018) performed a research to determine how board structure influences the performance of financial institutions in Kenya using a ten-year panel data set covering the years 2006-2015. Because they enable the correlation of variables in their natural condition, free from extraneous effects, correlation and cross-sectional research methodologies were utilized in the study. As proxy metrics for the board structure, we looked at board size, board composition, CEO duality, board activity, and board type. In a similar way, ROA and profit growth—measures influenced by the idea that businesses exist to boost shareholder value—captured the financial success of the enterprises. The results, however, demonstrate that other board structure components are also taken into account. The CEO's dual function, independence, size, or diversity had no impact on performance. The same thing was noted in regards to the lack of importance of the board structure variable on financial performance in these results by Johl et al. (2015) and later Aduda and Obondy (2021), who performed an empirical investigation of the link between credit risk management and the success of savings and credit cooperative societies.

Ekadah and Mboya (2015) argued that in majority of organizations, an eight-member board of directors typically has only one female director. The study's concluding finding is that the performance of Kenyan banks is unaffected by board diversity. According to the study,

gender diversity typically has minimal effect on organizations' risk-taking behavior since there are so few women serving on boards of directors.

Yegon (2015) conducted a study on the impact of enterprise risk management components on the monetary results of Kenyan listed companies. The annual financial statements of each of the listed firms were surveyed using a survey sheet, and a finance officer, an auditor, and a staff member in charge of the ERM department were each given a semi-structured questionnaire. All listed companies that had sent the NSE audited financial statements were selected for the census survey. Using the F-test with a 5% level of confidence, regression analysis was done to evaluate the null hypotheses, and descriptive and inferential data were gathered. The primary factors affecting corporate risk management, according to the study, are board size, board independence, and CEO ownership. A multivariate linear regression model found that the only variable with a significant (p-value $0.000<0.05$) association to financial performance was staff capacity.

A firm's performance is significantly impacted by its operational environment. Therefore, it is necessary to employ suitable control variables to reflect the many environmental conditions that could have an impact on the firm's performance. Firm size and leverage are the two control variables taken into account in this research. Total asset value provides a measurement of the resources that the company uses to produce more money. Firm leverage is a proxy for firm risk that has been used in several research as a control variable (Saieidi et al., 2015, Galbreath, 2018). Findings on this connection, however, are conflicting. Financial leverage should be favourably correlated with the extra risk management procedures used by the company, according to expectations of the link between this factor and bank risk behavior.

2.5 Conceptual Framework

A conceptual framework represents a practicable course of action or a desired plan of thoughts desired outcomes. The predicting factors in the present study are board characteristics that are represented by; board size, CEO ownership, independent directors, foreign directors and proportion of women in the board. The control variable will be the firm size and firm performance. The bank risk behaviour is measured by ratio of non-performing loans to total assets. This relationship is presented in Figure 2.1.

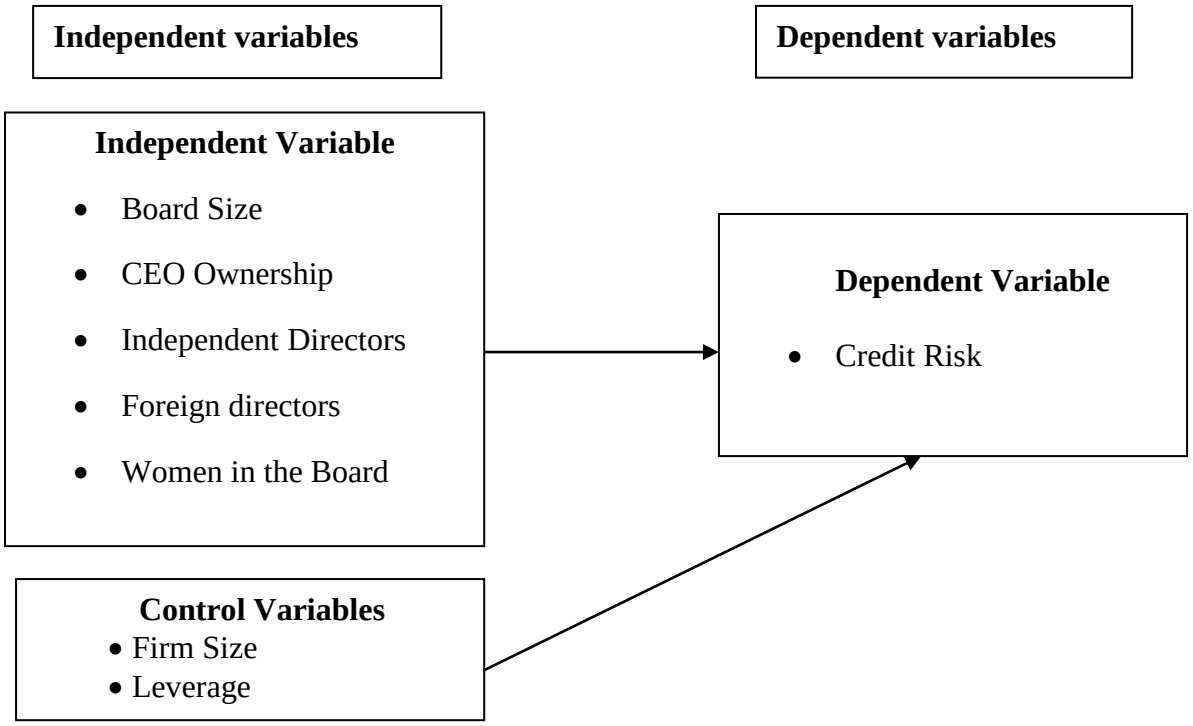


Figure 2. 1 Conceptual Framework

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This section details the numerous methodological processes and procedures that was carried out in order for the research study to establish it objectives. It describes the design of the research, the empirical model, the population under investigation, the sampling method, the procedure for collecting data, and the analysis of the data.

3.2 Research Design

Research design, according to Sekaran and Bougie (2013), relates to guidelines relating to the achievement of objectives with minimal distraction. The study employed a correlation descriptive research design as well as a cross-sectional survey design. A correlation research design aims at explaining a relationship between variables, as they exist (Asamoah, 2014). In this case, an association between board characteristics and risk-taking behaviour of commercial banks was explored. Quantitative data is based on precise measurements using structured collection instruments and involves determination of statistical significance of findings using means of variables.

3.3 Population of the Study

A study population is the whole set of individuals or organizations that the researcher is trying to understand (Sekaran & Bougie, 2013). It is described in terms of the accessibility of the components, how long it took to gather the data, where it was collected, and what the study's focus was.

As of June 30, 2022, the study's sample included 41 commercial banks that were active in Kenya. (See Annex II). The research was a census because the study's population was manageable and small.

3.4 Data Collection

Secondary data from a range of sources, including the audited financial statements of the relevant companies and reports submitted to the Central Bank of Kenya, was utilized to analyse the study variables (CBK). Five years, from 2017 to 2021, were covered by the data that was gathered. In order to determine board size, CEO ownership, independent directors, foreign directors, women on the board, and business size, financial data had to be gathered. At the conclusion of the year, the data was gathered from the financial statements together with the supporting notes.

3.5 Data Analysis

Data analysis covers the conversion of study data into useful formats, as well as making deductions and inferences, for the purposes of interpretation. Both descriptive and panel regression was used as the analyses' foundation. Arithmetic mean, standard deviations, total number of observations, maximum number of observations, and minimum number of observations are all included in the descriptive research. On the other hand, the panel data regression analysis must serve as the foundation for the inferential analysis. The sample's hypotheses was then evaluated using the regression analysis panel with a significance threshold of 5%. The analysis will use the Statistical Package of Social Science - Version 22.

3.5.1 Diagnostic Test

Diagnostic tests are carried out prior to the regression analysis to determine whether the data on the study variables is suitable for drawing conclusions. Numerous diagnostic procedures were carried out. These include the heteroscedasticity, multicollinearity, and normalcy tests. The study will carry out normality test to establish distribution of the data based on normality criterion. Normality of data enhances precision of the findings, which also enhances internal consistency of the data values.

Any correlation of independent variables in a sample is known as multicollinearity (Wooldridge, 2013). High degrees of multicollinearity raise the p-values in a regression model, which leads to inaccurate predictions. The correlation matrix is used to determine the degree of correlation between the predictor variables. The assumption corresponds with Greene (2012), who found a significant degree of multicollinearity in r or r^2 values greater than 0.8 or 64%. In such a case, each of the variables involved would be omitted. Heteroscedasticity is a condition in which the residual variances are consistently measured and established to be significantly different from each other (Verbeek, 2012). The Breusch Pagan Godfrey test was used to determine heteroscedasticity. A p-value of more than 5% indicated that the model is free of heteroscedasticity.

3.5.2 Analytical Model

The bank risk -behaviour was determined as a function of board size, CEO ownership, independent directors, foreign directors and women in the board, while firm size was the control variable. The aim of a control variable was to reduce potential omitted variable bias that might arise due not by the independent variables explaining the dependent variable (Taylor & Peens, 2017). The analytical model was as follows.

$$Y = \beta o + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_6 X_6 + \varepsilon$$

The variables descriptions is presented in Table 3.1

Table 3. 1: Research Variables

Type	Variable	Definition
Independent Variables	Board Size (X_1)	Natural Log of the number of directors in the board
	CEO ownership (X_2)	Percentage of CEO shareholding in the bank
	Independent director (X_3)	The percentage of total directors who are independent (%)
	Foreign shareholding (X_4)	Percentage of shareholding owned by foreign entities
	Women in the Board (X_5)	Women in the board / Total size of the board
Control Variable	Firm Size (X_6)	Log of Total Assets
	Leverage (X_7)	Total Liabilities / Total Assets
Dependent Variable	Credit Risk	Non-Performing Loan/ Total Loans

The study will conduct both descriptive and inferential statistics. Descriptive statistics will help elucidate summary of the findings in relation to the study variables. On the other hand, inferential statistics will help establish statistical relationship between dependent and independent variables.

CHAPTER FOUR: DATA ANALYSIS, FINDINGS AND DISCUSSION

4.1. Introduction

The chapter covers the analysis of data, presentation of the study findings, interpretation and discussion of the findings. Analysis of data followed the procedures highlighted in the previous section with emphasis of the outcome that was fashioned towards achieving the objective of the study. The processes of data analysis comprised of descriptive and inferential statistics.

4.2 Descriptive Statistics

Descriptive statistics was conducted to establish the pattern of data in relation to the specific variable. Secondary data was collected from published data in the central bank repository as well as financial statements that are audited and published at the end of the financial year by commercial banks. Descriptive statistics considered in the study comprised of minimum, maximum, mean and standard deviation. The measures of central tendency in the analysis provided the overview of the data concerning skewness and kurtosis while the measure of dispersion established the spread of data and deviation from the average.

Table 4. 1 Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Credit risk	195	.00	.76	.1896	.15637
Board size	195	.60	1.15	.9307	.09468
CEO Ownership	195	.06	10.54	1.7485	2.44236
Independent director	195	.20	.71	.3991	.09894
Foreign shareholding	195	.01	.89	.1558	.22328
Gender diversity	195	.00	.60	.2586	.12031
Firm size	195	3.42	5.94	4.6985	.60852
Leverage	195	-10.77	1.50	.6518	1.28310
Valid N (listwise)	195				

The research found that the credit risk of commercial banks ranged from a low of 0.00 to a high of 0.76, expressed as the percentage of non-performing loans to gross total loans. The results also indicated that non-performing loans make up, on average, 18.96% of the overall loan volume. The low standard deviation suggests that credit risk is evenly distributed across Kenya's commercial banks.

The research determined that the smaller board of directors has a score of 0.6 and the biggest board of directors has a score of 1.15 based on the size of the board. The logarithm of the total number of directors produced these phrases. Findings show that the majority of Kenyan commercial banks' boards of directors have scores that fall within 0.9307, and that the standard deviation (SD) indicates a narrow range for the bulk of the data values.

Additionally, the study found that CEO ownership, expressed as a percentage of commercial banks' shares owned by the CEO varied from 0.06 and 10.54. On average, the findings show that commercial banks in Kenya are 1.7485% owned by their respective CEOs. This ownership structure varied significantly among the commercial banks as shown by the standard deviation (2.4424).

According to the study's conclusions regarding the independence of the board of directors, the least independent board of directors among Kenya's commercial banks has 20% independent members, while the most independent boards have 71% independent members. However, the data indicate that the average board independence is 39.91%, with just a little fluctuation between and among the majority of the banks (standard deviation = 0.09894). According to the study's results, the commercial bank with the lowest percentage of foreign ownership owns 0.01% of its shares, while the bank with the highest percentage owns 0.89% of its shares. However, on average, foreign companies possess 0.15158% of the shares in

Kenyan commercial banks. The standard deviation of 0.2233 suggests that there is little variance among Kenya's commercial banks in terms of foreign ownership.

Gender diversity is considered as one of the most significant characteristics that guides decision-making in the board of directors. The descriptive statistics showed that in some commercial banks, gender diversity is not a factor of consideration since female gender are not represented in the board. On the other hand, the most gender-diversified board of directors comprises of 60% of female directors. On average, the study found that gender diversity is at 26 which was further found to be a common threshold in majority of commercial banks (std dev. = 0.12031).

Furthermore, the descriptive statistics found small variation among commercial banks about the size of the organization (std. dev= 0.6885). On average, commercial banks are rated at a score of 4.6985 units where the largest bank has 5.94 units while the smallest bank has 3.42 units. Similarly, the study established that financial leverage among commercial banks varied significantly (std. dev= 1.2831). On average, financial leverage among commercial banks stands at 65.18% with highest ratio of 1.50 and the lowest ratio at -10.77. The findings thus imply that there is huge difference between top financially performing bank and the least performing commercial bank.

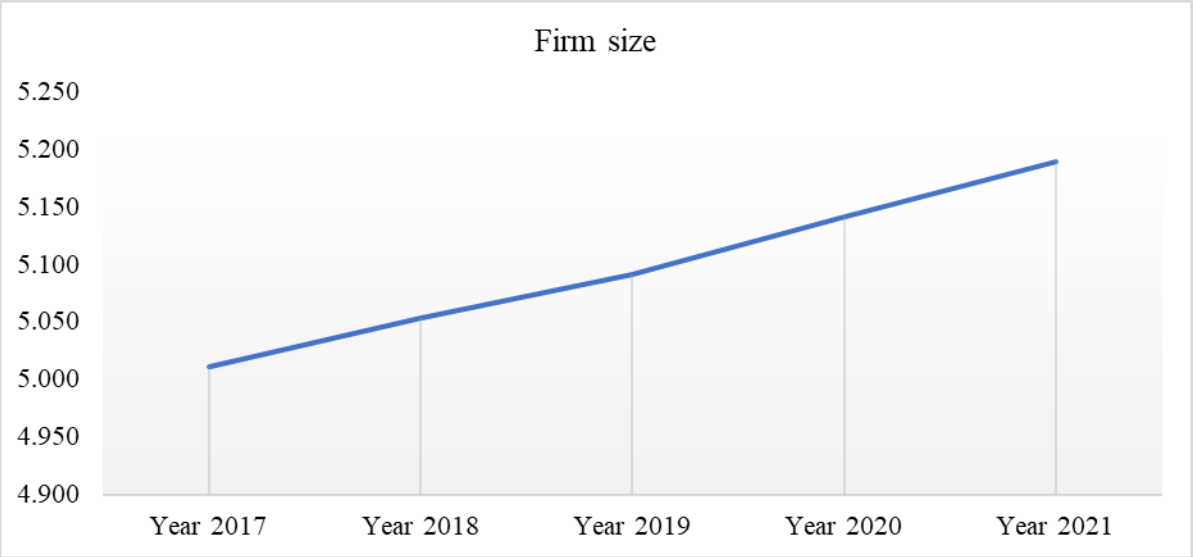
4.3 Trend Analysis

Trend analysis is a scientific procedure that analyzes the behavior of a dataset using past occurrences to help forecast the future. The study used data from five prior fiscal years to forecast the performance of commercial banks in relation to the variables of interest. As a result, the study used data from 2017-2021.

4.3.1 Size of Commercial Banks

In estimating the size of commercial banks, the study used logarithm of total assets. In this regard, an average of total assets for commercial banks over the years under review was established that their logarithm used as raw data. The finding is presented graphically in Figure 4.1.

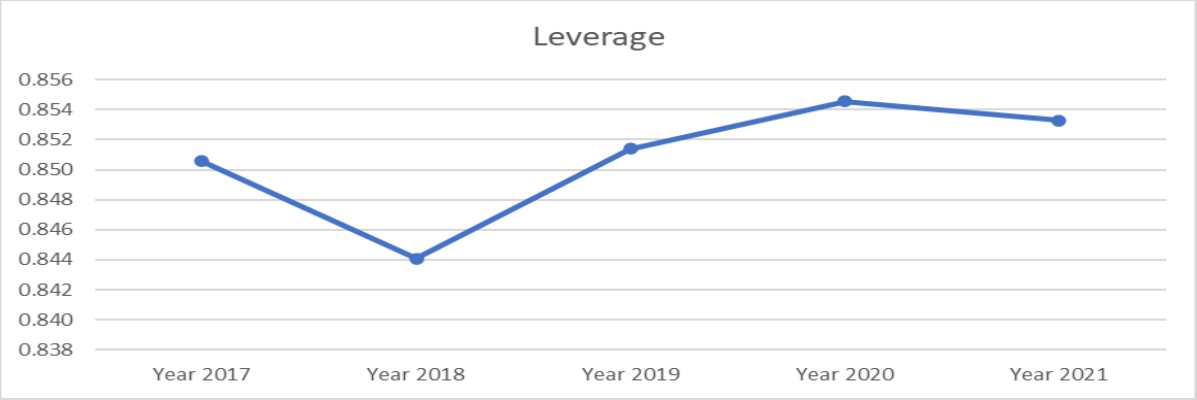
Figure 4. 1 Size of Commercial Banks



Based on the findings, the graphical representation of the size of commercial banks shows that there has been a gradual growth in size for the banks over the years. Similarly, the study forecasts that in the near future, there will be a continuous upward trend.

4.3.2 Financial Leverage

Figure 4. 2 Financial Leverage

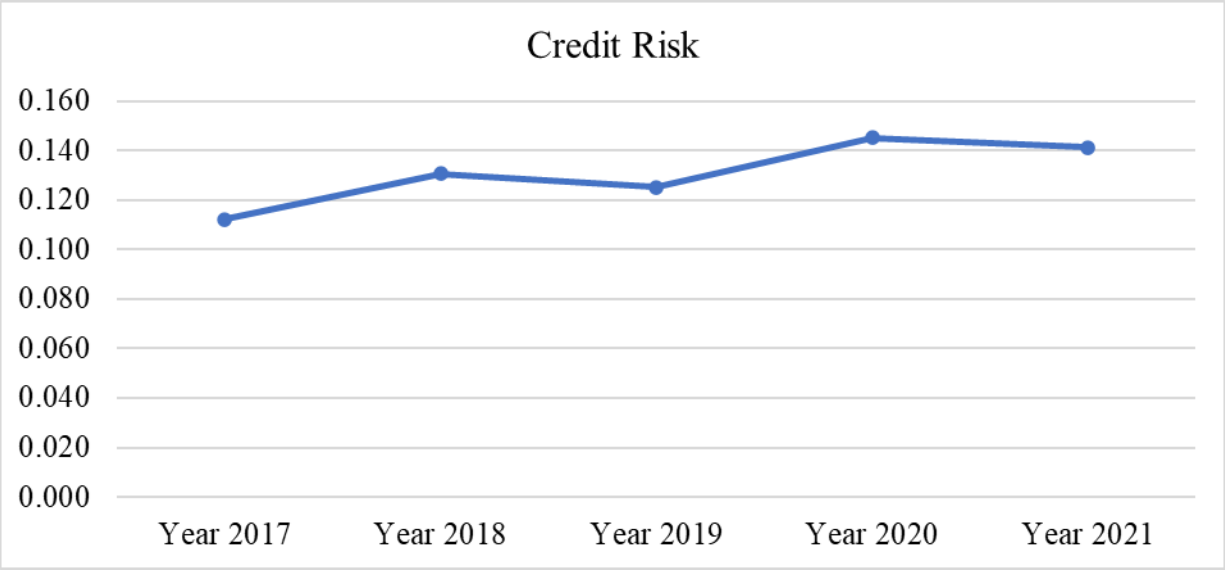


From the findings, the study established that there was a drop in financial leverage of commercial banks in 2018. This implies that commercial banks acquired its assets on credit more where the study attributes to the aftermath of 2017 post-election economic interference. From the year 2018 to 2020, there has been an upward trend as far as financial leverage of commercial banks is concerned. However, there was a slight downward trend in 2021. The study attributes the reduced financial leverage in 2021 due to the effect of COVID19. In general, the findings implies that financial leverage of commercial banks is unpredictable due to the zigzag behavior established from 2017-2021.

4.3.3 Credit Risk

The current study used the ratio of NPL to gross loans of commercial banks to estimate credit risk of the banks. The finding is graphically represented in figure 4.3.

Figure 4. 3 Credit Risk



The study finding in relation to the trend behavior of credit risk in commercial banks is considered as a zigzag behavior. In this regard, the study concludes that credit risk among commercial banks from 2017 to 2021 has not been uniformly distributed over the years. As a

result, going into the future, credit risk behavior will be unpredictable since the economic environment is also unstable hence affecting business operations in commercial banks.

4.4 Diagnostic Test

4.4.1 Tests of Normality

Normality tests are done to establish the distribution of data based on its skewness and kurtosis. An appropriate data for appropriate findings has a normal distribution. Shapiro Wilk test, however, is used in the vast majority of research with sample sizes larger than 50. The Shapiro-Wilk test was used to determine the normality of the data gathered on the dividend payout ratio, board size, independence of directors, financial competence, gender diversity, and business size. Based on the significance levels, the test's null hypothesis is evaluated. The data in regard to a particular variable is considered to be regularly distributed if its significance value is less than 0.05.

Table 4. 2 Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
Credit risk	.173	195	.000	.839	195	.000
Board size	.154	195	.000	.951	195	.000
CEO Ownership	.260	195	.000	.697	195	.000
Independent director	.082	195	.003	.977	195	.003
Foreign shareholding	.269	195	.000	.676	195	.000
Gender diversity	.107	195	.000	.975	195	.001
Firm size	.096	195	.000	.956	195	.000
Leverage	.465	195	.000	.197	195	.000

a. Lilliefors Significance Correction

The results of the regression analysis were unaffected by the challenge of data abnormality because the significance values for all the variables in the data analysis with regard to the

normality test were less than 0.05, indicating that the data values explaining the variables in the questions were normally distributed.

4.4.2 Test for Multicollinearity

Multicollinearity occurs when one or more variable among the independent variables are related with one another such that when one variable changes, it affects the results of the other independent variable and therefore resulting in level of correlation. Presence of multicollinearity among the variable residuals highlights a problem in the model since each independent variable cannot be correlated with each other. The presence of multicollinearity decreases the model's reliability when it is produced from data. The degree of multicollinearity among the variables under investigation was investigated using the variance inflation factor (VIF) technique. The null hypothesis of VIF is based on the assumption that the values range between 1-10 and as the values approaches 10, the more the presence of multicollinearity problem in the data values.

Table 4. 3 Test for Multicollinearity

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	Board size	.760	1.317
	CEO Ownership	.041	2.625
	Independent director	.866	1.155
	Foreign shareholding	.039	2.551
	Gender diversity	.843	1.186
	Firm size	.650	1.538
	Leverage	.612	1.634

a. Dependent Variable: Credit risk

From the findings, it is evident that VIF values obtained fell in the recommended bracket 1-10. Furthermore, the values are close to one implying that there is little or no multicollinearity in the data values and thus no effect on the regression model for prediction of the outcome variable because of multicollinearity.

4.4.3 Serial Correlation

The objective of autocorrelation, also known as serial correlation analysis, is to establish whether the sample variables are continuously auto correlated with their residuals. With a judgment condition that the DW statistic fluctuates between 1-4, the Dublin Watson serial correlation is a commonly used indicator of serial correlation. A statistic of two indicates the absence of autocorrelation, whereas values of less than 2 and more than 2 indicate the presence of autocorrelation.

Table 4. 4 Serial Correlation

Test	Statistic
Durbin Watson	2.144

According to the results of the Durbin Watson serial correlation test discussed above, there is no serial correlation since the DW value is 2.144, which is equal to 2. The conclusion thus suggests that the results of the regression analysis are devoid of serial correlation.

4.4.4 Heteroscedasticity

In the acquired data set, heteroscedasticity quantifies the degree of variation between an independent variable and the dependent variable. The decision criteria is such that less than 0.05 indicates that there is no heteroscedasticity while greater than 0.05 indicates that there is little variance throughout the data set that was obtained.

Table 4. 5 Heteroscedasticity

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	.474	.090		5.279	.000
Board size	-.197	.077	-.189	-2.543	.012
CEO Ownership	.000	.013	.007	.022	.983
Independent director	.032	.069	.032	.466	.641
Foreign shareholding	.021	.145	.048	.147	.883
Gender diversity	.207	.058	.253	3.583	.000
Firm size	-.056	.013	-.347	-4.319	.000
Leverage	.005	.006	.070	.845	.399

a. Dependent Variable: Abs

From the findings, it is evident that the significance values in relation to all the variables under consideration except board size, firm size and gender diversity are greater than 0.05 implying that there is presence of heteroscedasticity. However, the researcher took appropriate measure of establishing an average of the residual variable to do away with a data value that had the traces of heteroscedasticity.

4.5 Regression Analysis without the control variable

In order to ascertain the association between board characteristics and the risk-taking behavior of commercial banks in Kenya, the study conducted two sets of linear regression analyses. The study factored control variables to distinguish between the two analyses and to determine the impact on the association between board characteristics and commercial banks' risk-taking behavior. In the study, the relationship between firm characteristics and risk-taking behavior was controlled for by firm size and financial leverage.

4.5.1 Model Summary

Table 4. 6 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.297[a]	.088	.064	.15130

a. Predictors: (Constant), Gender diversity, independent director, Foreign shareholding, Board size, CEO Ownership

It is clear from the results that there is little relationship between the board qualities and corporate financial risk-taking behavior. The research discovered a correlation coefficient of r=0.297, demonstrating the poor link between the study's key factors. The research also discovered that 8.8% of the total risk-taking behavior is explained by gender diversity, the board's independence, foreign shareholding, the size of the board, and CEO ownership.

4.5.2 ANOVA

The significance of the model in relation to the model's goodness of fit is presented by analysis of variance. The ANOVA model evaluates whether the regression model provides a good fit for the regression data in this regard. A 95% level of confidence is provided by the decision criteria, which is based on a 5% significance level.

Table 4. 7 ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.417	5	.083	3.647	.004[b]
	Residual	4.326	189	.023		
	Total	4.744	194			

a. Dependent Variable: Credit risk

b. Predictors: (Constant), Gender diversity, independent director, foreign shareholding, Board size, CEO Ownership

A significance level of 0.004, which is less than 0.05, is shown by the results. The results suggest that, given the exact units of the predicting variables, the regression model is significant for predicting the outcome variable and has a good fit for the regression data.

4.5.3 Regression Coefficients

The regression coefficients help in determining individual variable effect on the outcome variable. The better coefficients attached to each variable shows the magnitude of effect on the outcome variable or the relationship between the dependent and independent variables.

Table 4. 8 Regression Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
Model	B	Std. Error	Beta	t	Sig.
(Constant)	.393	.143		2.754	.006
Board size	-.341	.124	-.206	-2.742	.007
CEO Ownership	-.013	.021	-.200	-.602	.548
Independent director	.161	.117	.102	1.383	.008
Foreign shareholding	.197	.232	.281	.849	.007
Gender diversity	.161	.095	.124	1.686	.004

a. Dependent Variable: Credit risk

As shown in the regression coefficient table, with zero effect of board characteristic in the model, risk-taking behavior of commercial banks in Kenya will remain at 0.393. However, by introducing the board size and CEO ownership variable, it reduces the overall credit risk position by -0.341 and -0.013 respectively. On the other hand, the study established that presence of independent directors, foreign shareholding and gender diversity as a characteristic of the board of directors increases the probability of risk taking in commercial

banks by 0.161, 0.197 and 0.161 respectively. In regard to the significance of the contribution accorded to each independent variable on the outcome variable, the study found that board size a, independence of directors, foreign shareholding and gender diversity have significant contribution towards risk taking in the organizations studied. The results also suggest that apart from CEO ownership ($p>0.05$), all other variables were significant, with $p<0.05$. Hence, CEO ownership is removed from the model.

The resulting regression model is presented as;

Risk taking behavior = 0.393 – 0.341 (board size) + 0.161 (independence of directors) + 0.197 (foreign shareholding) + 0.161 (gender diversity)

4.6 Regression Analysis with Control Variables

The study aimed to establish the role that control variables play in the relationship between board characteristics and risk-taking behavior of commercial banks. This was realized based on the changes in correlation coefficient, coefficient of determination and on beta coefficients of individual variables.

4.6.1 Model Summary

Table 4. 9 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.432[a]	.187	.156	.14364

a. Predictors: (Constant), Leverage, Gender diversity, Board size, independent director, Firm size, CEO Ownership, Foreign shareholding

According to the model's summary, it is clear that firm size and organizational financial leverage have an impact on the link between board features and commercial banks' risk-taking behavior. The correlation coefficient increased from 0.297 to 0.432, which is the cause

of this. Additionally, the total contribution of board characteristics to the explanation of risk-taking behavior in commercial banks has increased. The results demonstrate that the total influence of board features on risk taking behavior among commercial banks increased to 18.7% from 8.8% when financial leverage and firm size were included as explanatory variables.

4.6.2 Regression Coefficients

Table 4. 10 Regression Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.592	.145		4.084	.000
Board size	-.152	.125	-.092	-1.217	.225
CEO Ownership	.012	.021	.189	.576	.565
Independent director	.117	.112	.074	1.041	.299
Foreign shareholding	-.072	.233	-.103	-.308	.758
Gender diversity	.268	.093	.206	2.866	.005
Firm size	-.080	.021	-.312	-3.810	.000
Leverage	-.016	.010	-.129	-1.533	.127

a. Dependent Variable: Credit risk

The research discovered that company size and leverage both have a detrimental impact on the risk-taking behavior of commercial banks when it comes to regression coefficients. The results demonstrate that firm size significantly decreases risk taking in the studied businesses by 0.016 units while leverage significantly increases risk taking by 0.080 units in commercial banks. The other board characteristics variable (board size, CEO ownership, independent director, foreign shareholding and leverage were found to be insignificant ($p>0.05$) and thus

not included in the model. The relationship between board characteristics and risk-taking behaviour of commercial banks under investigation is as provided by the following model;

Risk taking behavior = 0.592 + 0.268 (gender diversity) – 0.080 (firm size)

4.7 Discussion of the Findings

The aim of the study was to establish the relationship between board of directors' characteristics and risk-taking behavior of commercial banks. Based on the findings, the study established that the size of the board negatively influences risk-taking behavior of commercial banks. This implies that as the board becomes large, there is multitude of decisions that may be difficult to filter out appropriate decisions in regard to risk investment for the bank. The finding is in tandem with Vallascas, Mollah and Keasey (2017) that larger groups have more people involved in the decision-making process. As a result, larger boards are probably associated with increased variability in corporate performance because they tend to make more extreme judgments and choices on risk-taking behavior.

Secondly, the study established that CEO ownership negatively affect risk taking behavior of commercial banks. The findings is attributed to the fact that having CEOs in the boards of directors makes the organization to invest in projects that are less risky because the CEO with shares has a conflict of interest as far as investment decisions are concerned. The findings supports earlier finding by Birindelli, Chiappini and Savioli (2020) that established that CEOs with shareholding in the company tend to protect organizational resources due to the gains they get from shareholder value creation in the company hence they are less risk-takers.

Additionally, the study established that independence of the board of directors has a positive relationship with risk taking in commercial banks. This is due to the fact that independent non-executive director makes independent decisions and aims at taking high risky investment for higher gains. However, the study findings differ with Fernandes et al. (2021) that found

that banks were more risk-averse between the years of 1997 and 2004 when there were more independent directors present as a response to this. This finding can be attributed to the independent directors' increased focus on complying with regulatory standards.

In regard to foreign shareholding, the study established that having foreign entities as owners of commercial banks increases the chances of banks investing in more risky businesses. The study established a positive relationship between foreign shareholding and risk taking behavior of commercial banks. According to Ibrahim and Hanefah (2016), foreign investors engage more on risky investment due to their short-term involvement in business in the country. They opt for businesses that have higher rate of return and therefore investing on risky ventures.

Furthermore, the study established a positive relationship between gender diversity and risk-taking behavior of commercial banks. According to the findings, women are more generous in giving in to decisions of the bard without objections. However, Liljeblom, Mollah, and Mobarek (2021) established a contrary point of view and note that female directors have a negative impact relationship with risk taking behavior in organizations.

CHAPTER FIVE: SUMMARY CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The main conclusions drawn from the findings are summarized in this chapter, along with some highlighted recommendations for future research and policy. The recommendations and conclusions reached sought to address the study's goal.

5.2 Summary

The aim of the study was to establish the relationship between board characteristics and risk taking behavior of commercial banks in Kenya. As a measure of board characteristics, the study incorporated five dimensions; board size, CEO ownership, independent directors, foreign shareholding as well as board gender diversity. On the other hand, the study used credit risk to measure credit risk behavior in commercial banks. Since various other factors might lead to different findings in different commercial banks, the study incorporated control variables; firm size and financial leverage. Based on the descriptive statistics, the study found that credit risk varied from 0.00 to 0.76 while size of the board of directors varied from 0.6 to 1.15 with an average score of 0.9307. In regards to gender diversity, the study found that in some commercial banks, female directors were not included in the board of directors although in other commercial banks, six in every ten directors are female. On average, the board of directors in commercial banks comprises of three female directors. The study also established that commercial banks in Kenya have been experiencing an upward trend in growth from 2017-2021 as far as total assets are concerned.

Concerning inferential statistics, the study established a negative relationship between board size (β=-0.341, α=0.007) and risk-taking behavior in commercial banks in Kenya. In this regard, the findings attributed the finding to the fact that large board of directors is faced with a challenge of influx of decisions and therefore to arrive at the most appropriate investment

decision may take a while hence the initial risky investment may have been taken by a different firm or may not be risky anymore. Additionally, the study established that CEO ownership has a negative (β=-0.013, α=0.548) relationship with organizational risk-taking behavior. The study attributes the finding to the notion that CEOs having shares in the institution will have interest of protecting institutional resources and therefore they will not buy the opinion of investing on risky ventures thus a negative relationship with firm's risk-taking behavior.

Based on directors' independence as a characteristic of the board of directors, the study established that having more directors that are independent increases the capacity of the bank to get involved on risky investment. The findings showed that board independence has a positive (β=0.161) and significant (α=0.008) relationship with commercial banks' risk-taking ability. This is as a result of the freedom that independent directors have in regard to the management of commercial banks hence, they decide on investment opportunities that has high rate of return and in most cases, these investments are considered as risky.

Additionally, the study findings established a positive and significant relationship (β=0.197, α=0.007) between foreign shareholding and risk taking behavior of commercial banks. As a result, the findings follows the argument that foreign shareholding majorly depends on the decision of independent directors and as a result, may buy the idea of investing on more risky investment for higher rate of return. Similarly, the study found that having more female directors enhances (β=0.161, α=0.004 the capacity of commercial banks to engage in risky behavior.

Based on the overall contribution of the factors of board characteristics on the financial risk-taking behavior of commercial banks, the study established that board size, CEO ownership, independent directors, foreign shareholding and gender diversity all explains 8.8% of the

risk-taking behavior in banks operating in Kenya. However, in consideration of financial leverage and firm size as control variables, the overall contribution of board characteristics on risk taking behavior increases to 18.7%. This is attributed to the fact that financial leverage and firm size determines investment decision of the firms and therefore may influence the decisions made by the board of directors.

54.3 Conclusions

Based on the study findings, the study concludes that board characteristic proxied by size, independence, gender diversity, CEO shareholdings and foreign shareholding explains less than 20% of the overall risk-taking behavior of commercial banks in Kenya. Based on individual characteristics, large board of directors negatively influences risk-taking behavior in commercial banks. This is due to the complexity and challenge in harmonizing perceptions and views of the board directors. It is believed that the large board of directors have different views in regard to risk taking. In this regard, it will be difficult to select an appropriate decision from the multitude of opinions hence a negative relationship with risk taking behavior of the board of directors.

Additionally, the study concludes that independence of the board of directors helps commercial banks venture into risky investments with an aim of establishing a fast rate of return. Independent directors have the ability to make individual views count on the board decision-making. Consequently, on decisions regarding risk taking in the organizations, opinions from independent directors are taken into account. Similarly, the study concludes that foreign shareholding and gender diversity favorably influences risk-taking behavior of commercial banks.

5.4 Recommendations for Policy

As a result of the positive relationship between board independence and firm risk taking behaviour, the study recommends that commercial banks should consider having an average

number of independent directors in order to have appropriate risky investment that may jeopardize the financial performance of the bank. Similarly, the study recommends that commercial banks that the composition of the board in regard to gender diversity. With the positivity in relation to risk taking behavior of commercial banks, there should be appropriate mix in gender to avoid venturing into more risky behavior that may jeopardize the operation of the bank in case of failure in the investment results.

The study also recommends that the board size should be looked at to ensure that decision-making is made efficient and enhance policy formulation and implementation. This will enhance proper choice on investment decisions as far as risky investment is concerned. In case of viable risky investment, the study recommends that CEO ownership should not be considered during the boards' policy formulation. This may deter the income generation of the bank from viable risky venture.

5.5 Limitations of the Study

The study encountered some limitations, which were dealt with to avoid interference with the achievement of the study objectives. The research was limited to a 5-year duration from 2017 to 2021 however, the five-year period was deemed appropriate to study the firms and provide generalizable findings, conclusions and recommendations for policy and future studies.

Additionally, the research was confined to secondary data gathered from the financial information of commercial banks. While the evidence was verifiable because it came from audited books of accounts, it was also susceptible to limitations like earnings control.

5.6 Recommendations for Further Research

Based on the limitations of the study, it is suggested that more studies be conducted within the topic covered using data captured from a longer period of time say ten years. This may register a different outcome that may be generalized in other firms that are not listed.

Lastly, the study was confined within the scope of commercial banks in Kenya. Future studies should consider other sectors of the economy to have a more diversified view of the effect of board characteristics on risk taking behavior. Furthermore, the study recommends that future studies be conducted using more dimensions of board characteristics to establish whether there is difference in the findings.

REFERENCES

Addo, K. A., Hussain, N., & Iqbal, J. (2021). Corporate governance and banking systemic risk: a test of the bundling hypothesis. *Journal of International Money and Finance*, *115*, 102-112.

Aduda, J., & Obondy, S. (2021). Credit Risk Management and Efficiency of Savings and Credit Cooperative Societies: A Review of Literature. *Journal of Applied Finance and Banking*, *11*(1), 99-120.

Aebi, V., Sabato, G., Schmid, M. (2012). Risk management, corporate governance, and bank performance in the financial crisis. *Journal of Bank Finance* 36 (12), 3213–3226.

Battaglia, F & Gallo, A., (2015). Risk governance and Asian bank performance: An empirical investigation over the financial crisis. *Emergent Markets Review*. 2(5), 53–68.

Borio, C., & Zhu, H. (2012). Capital regulation, risk-taking and monetary policy: a missing link in the transmission mechanism?. *Journal of Financial stability*, *8*(4), 236-251.

Buyl, T., Boone, C., & Wade, J. B. (2019). CEO narcissism, risk-taking, and resilience: An empirical analysis in US commercial banks. *Journal of Management*, *45*(4), 1372-1400.

Chrisman, J. J. (2019). Stewardship theory: Realism, relevance, and family firm governance. *Entrepreneurship Theory and Practice*, *43*(6), 1051-1066.

Davis, J. H., Schoorman, F. D., & Donaldson, L. (2018). Toward a stewardship theory of management. In *Business ethics and strategy, 2(1),* 473-500

Donaldson, L., & Davis, H. J. (1989). CEO governance and shareholder returns: Agency theory or stewardship theory [paper presented at annual meeting of the Academy of Management, Washington, DC]. In Washington, DC

Elamer, A. A., Ntim, C. G., & Abdou, H. A. (2020). Islamic governance, national governance, and bank risk management and disclosure in MENA countries. *Business & Society*, *59*(5), 914-955.

Fama, E.F., & Jensen, M.C. (1983). Separation of ownership and control. *Journal of Law and Economics*, *26*(2), 301-25.

Fitriya, F., & Stuart, L. (2012). Board structure, ownership structure and firm performance: A study of New Zealand listed firms. *Asian Academy of Management Journal of Accounting and Finance*, 8(2), 43-67.

Galbreath, J. (2018). Is board gender diversity linked to financial performance? The mediating mechanism of CSR. *Business & Society*, *57*(5), 863-889.

Gachigo, J., Ondigo, H., Aduda, J., & Onsomu, Z. (2022). Moderating role of institutional characteristics on the relationship between mergers & acquisition strategies and financial performance of Commercial Banks In Kenya. *African Development Finance Journal*, *1*(2), 65-94.

Galai, D., & R. W. Masulis (1976), "The option pricing model and the risk factor of stock, *Journal of Financial Economics*, 3(1-2), 53-81

Global, S. P. (2020). S&P Global.

González, F. (2004). Bank regulation and risk-taking incentives: An international comparison of bank risk. *Journal of Banking and Finance* 2(1): 1153-1184.

Hillman, A.J & Dalziel T. (2013). Boards of directors and firm performance: Integrating agency and resource dependence perspectives. Academy Management Review, 28(2), 383-39

Huang, X., Liu, X., & Ren, Y. (2018). Enterprise credit risk evaluation based on neural network algorithm. *Cognitive Systems Research*, *52*, 317-324.

Islam, M. M., Bhuiyan, A. B., & Kassim, A. A. (2019). Board Characteristics and Risk-Taking Decisions among Islamic Financial Institutions in Bangladesh. *Selangor Business Review*, 15-25.

Jensen, M. C., & Meckling, W. H. 1976. Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3(4): 305-336.

Johl S.K, Kaur S & Cooper B.J. (2015). Board Characteristics and Firm Performance: Evidence from Malaysian Public Listed Firms, Journal of Economics, Business and Management. 3(2), 63-70.

Khan, M. S., Scheule, H., & Wu, E. (2017). Funding liquidity and bank risk taking. *Journal of Banking & Finance*, *82*, 203-216.

Kokoreva, M., & Ulugova, A. (2016). Agency costs and capital structure choice in emerging markets. *Economic and Social Development: Book of Proceedings*, 384.

Lee, A.-X., Hooy, C.-W., 2020. Banks' risk-taking and state ownership: Evidence from Asian emerging markets. *Malaysian Journal of Economic Studies* 57, 59–80.

Lee, M &Hwang, I.T. (2019). The Effect of the Compensation System on Earnings Management and Sustainability: Evidence from Korea Banks. Sustainability, 1(1), 31 - 65.

Lotto, J. (2016). Efficiency of capital adequacy requirements in reducing Risk-Taking behavior of Tanzanian commercial banks. *Research Journal of Finance and Accounting*, 7(22), 72-76

Lundqvist, S.A., 2015. Why firms implement risk governance–Stepping beyond traditional risk management to enterprise risk management. *Journal of Accounting and Public Policy* 34 (5), 441–466.

Malik, M. F., Nowland, J., & Buckby, S. (2021). Voluntary adoption of board risk committees and financial constraints risk. *International Review of Financial Analysis*, *7(3)*, 10 -16.

Mandala, N., Kaijage, E., Aduda, J., & Iraya, C. (2018). An empirical investigation of the relationship between board structure and performance of financial institutions in Kenya. *Journal of Finance and Investment Analysis*, *7*(1), 1-3.

Martin, J. A., & Butler, F. C. (2017). Agent and stewardship behavior: How do they differ?. *Journal of Management & Organization*, *23*(5), 633-646.

Mensah, S., & Abor, J. Y. (2014). Agency conflict and bank interest spreads in Ghana. *African Development Review*, *26*(4), 549-560.

Ndwiga, D. (2020). *The effects of FinTechs on bank market power and risk taking behaviour in Kenya* (No. 44). KBA Centre for Research on Financial Markets and Policy Working Paper Series.

Njenga, R., & Jagongo, A. (2019). Board characteristics, firm size and financial leverage of manufacturing firms listed at Nairobi Security Exchange, Kenya: Theoretical review. *International Academic Journal of Economics and Finance*, *3*(3), 418-426.

Ngware, S., Olweny, T., & Muturi, W. (2020). Do Bank Size Moderate Relationship between Banks' Portfolio Diversification and Financial Performance of Commercial Banks in Kenya? *SEISENSE Journal of Management*, 2(1), 76-83

Nkusu, M. (2011). Nonperforming Loans and Macro-financial Vulnerabilities in Advanced Economies. IMF Working Paper 11/161.

Paligorova, T., & Santos, J. A. (2017). Monetary policy and bank risk-taking: Evidence from the corporate loan market. *Journal of Financial Intermediation*, *30*, 35-49.

Rahman, M. M., Uddin, K. M. K., & Moudud-Ul-Huq, S. (2015). Factors affecting the risk-taking behavior of commercial banks in Bangladesh. *Applied Finance and Accounting*, *1*(2), 96-106.

Rungtusanatham, M., Miller, J. W., & Boyer, K. K. (2018). Theorizing, testing, and concluding for mediation in SCM research: tutorial and procedural recommendations. *Journal of Operations Management*, *32*(3), 99-113.

Saeidi, S. P., Sofian, S., Saeidi, P., Saeidi, S. P., & Saaeidi, S. A. (2015). How does corporate social responsibility contribute to firm financial performance? The mediating role of competitive advantage, reputation, and customer satisfaction. *Journal of business research*, *68*(2), 341-350

Srairi, S. (2013). Ownership structure and risk-taking behaviour in conventional and Islamic banks: Evidence for MENA countries. *Borsa Istanbul Review*, *13*(4), 115-127.

Srivastav, A., & Hagendorff, J. (2016). Corporate governance and bank risk-taking. *Corporate Governance: An International Review*, *24*(3), 334-345.

Tarus, T. K., & Tenai, J. K. (2019). Board attributes and financial risk management: moderating effect of ownership structure among listed non-financial firms in Kenya. *Economic Research*, *3*(12), 1-20.

Vallascas, F., & Hagendorff, J. 2013. The risk sensitivity of capital requirements: Evidence from an international sample of large banks. *Review of Finance*, 17(6), 1947-1988

Zheng, C., Perhiar, S. M., Gilal, N. G., & Gilal, F. G. (2019). Loan loss provision and risk-taking behavior of commercial banks in Pakistan: A dynamic GMM approach. *Sustainability*, *11*(19), 5209.

APPENDIXES

Appendix I : Data Collection Form

Name of the Bank:.....

Items	**Survey items**	**Variables**	**2017**	**2018**	**2019**	**2020**	**2021**
Dependent Variable (Y)	Bank risk behaviour	Non-Performing Loans					
		Total Assets					
		Ratio					
Independent Variable (X)	Board Size (X_1)	Number of director					
		Natural Log of number of director					
	CEO Ownership (X_2)	Percentage of CEO shareholding in the bank					
	Independent director (X_3)	The percentage of total directors who are independent (%)					
	Foreign shareholding (X4)	Percentage of shareholding owned by foreign entities					
	Women in the Board (X5)	Women in the board / Total size of the board					

Control Variables	Firm Size	Log of Total Assets					
	Leverage	Total Liabilities / Total Assets					

Appendix II : Processed Data

Y	X_1	X_2	X_3	X_4	X_5	X_6	X_7
0.071	0.954	4.39	0.444	0.44	0.333	5.43	0.84
0.217	1.041	0.20	0.455	0.02	0.273	4.01	0.80
0.216	0.903	0.29	0.500	0.03	0.125	4.39	0.88
0.315	0.845	0.70	0.286	0.07	0.286	4.73	0.87
0.061	0.954	1.69	0.444	0.17	0.000	4.98	0.82
0.021	0.699	1.11	0.400	0.11	0.000	4.75	0.80
0.045	0.903	1.98	0.375	0.20	0.500	4.99	0.80
0.251	0.954	8.10	0.333	0.81	0.222	4.13	-5.02
0.071	0.903	0.06	0.375	0.01	0.375	5.58	1.00
0.086	0.845	0.26	0.286	0.03	0.143	4.16	0.82
0.216	0.903	0.19	0.375	0.02	0.250	4.21	0.88
0.076	0.954	3.88	0.222	0.39	0.333	5.43	0.86
0.000	0.845	0.13	0.429	0.01	0.286	3.42	0.51
0.386	0.903	0.60	0.500	0.06	0.250	4.73	0.89
0.067	0.954	6.19	0.444	0.62	0.333	5.61	0.85
0.202	0.903	1.31	0.500	0.13	0.375	4.84	0.81
0.400	0.845	0.20	0.429	0.02	0.143	4.24	0.88
0.103	0.903	0.54	0.375	0.05	0.125	4.44	0.81
0.109	0.845	0.24	0.429	0.02	0.286	4.20	0.85
0.097	0.903	0.48	0.500	0.05	0.125	4.50	0.85
0.104	0.954	0.28	0.444	0.03	0.000	4.27	0.85
0.156	0.845	0.91	0.429	0.09	0.286	4.79	0.85
0.139	1.041	3.22	0.364	0.32	0.273	5.26	0.82
0.083	1.079	0.23	0.250	0.02	0.250	5.74	1.00
0.212	0.845	7.80	0.571	0.78	0.286	4.11	-5.07
0.000	0.903	0.29	0.375	0.03	0.125	3.55	0.19
0.444	0.845	0.12	0.286	0.01	0.000	3.71	0.77
0.105	0.903	0.12	0.250	0.01	0.250	4.02	0.89
0.406	0.845	0.48	0.429	0.05	0.286	5.04	0.96
0.059	1.041	3.30	0.364	0.10	0.273	5.63	0.92
0.123	0.954	0.16	0.222	0.02	0.222	3.98	0.83
0.057	1.000	1.18	0.300	0.12	0.100	4.88	0.85
0.586	0.903	0.10	0.375	0.01	0.250	4.07	0.91
0.211	0.778	0.34	0.667	0.03	0.167	4.29	0.83
0.342	0.602	0.12	0.500	0.01	0.500	4.05	0.89
0.076	0.845	3.62	0.429	0.36	0.286	5.38	0.85
0.126	0.699	4.22	0.400	0.02	0.400	5.46	0.85
0.046	0.845	0.22	0.286	0.02	0.143	3.81	0.67
0.001	0.778	0.55	0.500	0.06	0.333	4.41	0.79
0.074	0.954	4.39	0.444	0.44	0.333	5.51	0.87
0.242	1.041	0.20	0.455	0.02	0.273	4.01	0.82
0.227	0.903	0.29	0.500	0.03	0.125	4.43	0.89
0.362	0.845	0.70	0.286	0.07	0.286	4.69	0.90

0.090	0.954	1.69	0.444	0.17	0.000	5.09	0.84
0.070	0.699	1.11	0.400	0.11	0.000	4.80	0.80
0.030	0.903	1.98	0.375	0.20	0.500	4.93	0.78
0.253	0.954	8.10	0.333	0.81	0.222	4.11	-1.23
0.112	0.903	0.06	0.375	0.01	0.375	5.61	0.73
0.083	0.845	0.26	0.429	0.03	0.143	4.25	0.85
0.287	0.903	0.19	0.375	0.02	0.250	4.19	0.86
0.072	0.954	3.88	0.222	0.39	0.333	5.45	0.84
0.004	0.845	0.13	0.429	0.01	0.286	3.72	0.78
0.217	0.903	0.60	0.500	0.06	0.250	4.74	0.89
0.074	0.954	6.19	0.444	0.62	0.333	5.64	0.87
0.173	0.903	1.31	0.500	0.13	0.375	4.83	0.81
0.462	0.845	0.20	0.429	0.02	0.143	4.25	0.94
0.189	0.903	0.54	0.375	0.05	0.125	4.40	0.80
0.099	0.845	0.24	0.429	0.02	0.286	4.21	0.84
0.109	0.903	0.48	0.500	0.05	0.125	4.52	0.82
0.090	0.954	0.28	0.444	0.03	0.000	4.33	0.86
0.271	0.845	0.91	0.429	0.09	0.286	4.76	0.87
0.146	1.041	3.22	0.364	0.32	0.273	5.36	0.84
0.069	1.079	0.23	0.250	0.02	0.250	5.79	1.00
0.696	0.845	7.80	0.571	0.78	0.286	4.00	-8.55
0.000	0.903	0.29	0.375	0.03	0.125	3.84	0.85
0.400	0.845	0.12	0.286	0.01	0.000	3.73	0.79
0.096	0.903	0.12	0.250	0.01	0.250	4.02	0.74
0.476	0.845	0.48	0.429	0.05	0.286	5.06	0.97
0.106	1.041	3.30	0.364	0.10	0.273	5.63	0.93
0.173	0.954	0.16	0.222	0.02	0.222	4.00	0.84
0.074	1.000	1.18	0.300	0.12	0.100	4.99	0.80
0.691	0.903	0.10	0.375	0.01	0.250	4.85	0.90
0.209	0.778	0.34	0.667	0.03	0.167	4.40	0.85
0.440	0.602	0.12	0.500	0.01	0.500	3.96	1.00
0.107	0.845	3.62	0.429	0.36	0.286	5.45	0.86
0.163	0.699	4.22	0.400	0.02	0.400	5.45	0.85
0.128	0.845	0.22	0.286	0.02	0.143	4.19	0.86
0.031	0.778	0.55	0.500	0.06	0.333	4.51	0.81
0.066	1.000	4.83	0.500	0.48	0.300	5.57	0.88
0.300	1.079	0.22	0.500	0.02	0.250	3.97	0.80
0.177	0.954	0.32	0.556	0.03	0.111	4.46	0.89
0.399	0.903	0.77	0.375	0.08	0.250	4.64	0.94
0.084	1.000	1.86	0.500	0.19	0.000	5.16	0.84
0.089	0.778	1.22	0.500	0.12	0.000	4.80	0.76
0.041	0.954	2.17	0.444	0.22	0.444	4.98	0.81
0.295	1.000	8.92	0.400	0.89	0.200	4.07	-4.45
0.111	0.954	0.07	0.444	0.01	0.333	5.65	1.00
0.101	0.903	0.29	0.250	0.03	0.125	4.33	0.86

0.341	0.954	0.21	0.444	0.02	0.222	4.19	0.81
0.083	1.000	4.27	0.300	0.43	0.300	5.46	0.83
0.010	0.903	0.14	0.500	0.01	0.250	3.95	0.89
0.198	0.954	0.66	0.556	0.07	0.222	4.88	0.91
0.090	1.000	6.81	0.300	0.68	0.300	5.71	0.84
0.152	0.954	1.45	0.222	0.14	0.333	4.90	0.83
0.397	0.903	0.22	0.500	0.02	0.125	4.27	0.94
0.185	0.954	0.59	0.444	0.06	0.111	4.46	0.81
0.095	0.903	0.26	0.500	0.03	0.250	4.21	0.83
0.147	0.954	0.53	0.556	0.05	0.111	4.55	0.83
0.112	1.000	0.31	0.500	0.03	0.000	4.39	0.88
0.269	0.903	1.00	0.500	0.10	0.250	4.76	0.89
0.123	1.079	3.54	0.417	0.35	0.250	5.41	0.82
0.074	1.114	0.26	0.308	0.03	0.231	5.83	1.00
0.565	0.903	8.58	0.625	0.86	0.250	3.93	-10.77
0.015	0.954	0.32	0.444	0.03	0.111	3.94	0.69
0.141	0.903	0.13	0.375	0.01	0.000	3.93	0.88
0.189	0.954	0.13	0.222	0.01	0.222	4.09	0.91
0.415	0.903	0.52	0.500	0.05	0.250	5.05	0.93
0.125	1.079	3.63	0.250	0.36	0.250	5.67	0.86
0.176	1.000	0.18	0.300	0.02	0.200	4.02	0.84
0.117	1.041	1.30	0.364	0.13	0.091	5.04	0.80
0.550	0.954	0.11	0.444	0.01	0.222	4.86	0.89
0.206	0.845	0.37	0.714	0.04	0.143	4.42	0.81
0.515	0.699	0.13	0.600	0.01	0.400	3.84	1.19
0.118	0.903	3.98	0.500	0.40	0.250	5.47	0.85
0.139	0.778	4.65	0.333	0.46	0.333	5.48	0.86
0.230	0.903	0.24	0.375	0.02	0.125	4.21	0.86
0.049	0.845	0.61	0.571	0.06	0.286	4.56	0.82
0.074	1.000	5.71	0.400	0.48	0.400	5.58	0.86
0.046	1.079	0.26	0.417	0.02	0.333	4.01	0.86
0.156	0.954	0.38	0.444	0.03	0.222	4.51	0.90
0.398	0.903	0.91	0.250	0.08	0.375	4.65	0.92
0.124	1.000	2.20	0.400	0.19	0.100	5.22	0.84
0.047	0.778	1.44	0.333	0.12	0.167	4.88	0.77
0.028	0.954	2.57	0.333	0.22	0.556	5.03	0.83
0.240	1.000	10.54	0.300	0.89	0.300	4.11	0.92
0.168	0.954	0.08	0.333	0.01	0.444	5.70	0.84
0.115	0.903	0.34	0.375	0.03	0.250	4.36	0.86
0.337	0.954	0.25	0.333	0.02	0.333	4.24	0.84
0.119	1.000	5.04	0.200	0.43	0.400	5.49	0.83
0.014	0.903	0.16	0.375	0.01	0.375	4.12	0.87
0.163	0.954	0.78	0.444	0.07	0.333	4.98	0.93
0.120	1.000	8.05	0.400	0.68	0.400	5.82	0.86
0.149	0.954	1.71	0.444	0.14	0.444	4.96	0.85

0.361	0.903	0.26	0.375	0.02	0.250	4.34	0.93
0.208	0.954	0.70	0.333	0.06	0.222	4.50	0.82
0.128	0.903	0.31	0.375	0.03	0.375	4.23	0.83
0.176	0.954	0.63	0.444	0.05	0.222	4.58	0.84
0.122	1.000	0.37	0.400	0.03	0.100	4.43	0.89
0.258	0.903	1.18	0.375	0.10	0.375	4.74	0.92
0.126	1.079	4.19	0.333	0.35	0.333	5.45	0.83
0.123	1.114	0.31	0.231	0.03	0.308	5.88	0.83
0.762	0.903	10.14	0.500	0.86	0.375	4.49	0.97
0.026	0.954	0.38	0.333	0.03	0.222	4.10	0.68
0.103	0.903	0.15	0.250	0.01	0.125	4.04	0.89
0.234	0.954	0.15	0.222	0.01	0.333	4.11	0.80
0.354	0.903	0.62	0.375	0.05	0.375	5.10	0.94
0.139	1.079	4.29	0.333	0.36	0.333	5.69	0.88
0.171	1.000	0.21	0.200	0.02	0.300	4.06	0.85
0.109	1.041	1.53	0.273	0.13	0.182	5.07	0.80
0.441	0.954	0.14	0.333	0.01	0.333	4.90	0.90
0.115	0.845	0.44	0.571	0.04	0.286	4.53	0.85
0.708	0.699	0.16	0.400	0.01	0.600	3.71	1.50
0.142	0.903	4.71	0.375	0.40	0.375	5.50	0.85
0.146	0.778	5.49	0.333	0.46	0.500	5.51	0.86
0.407	0.903	0.28	0.250	0.02	0.250	4.27	0.88
0.066	0.845	0.72	0.429	0.06	0.429	4.58	0.83
0.077	1.041	5.71	0.455	0.48	0.364	5.63	0.87
0.065	1.114	0.26	0.462	0.02	0.308	4.12	0.88
0.197	1.000	0.38	0.500	0.03	0.200	4.56	0.91
0.317	0.954	0.91	0.333	0.08	0.333	4.64	0.91
0.105	1.041	2.20	0.455	0.19	0.091	5.26	0.84
0.028	0.845	1.44	0.429	0.12	0.143	4.94	0.77
0.019	1.000	2.57	0.400	0.22	0.500	5.12	0.86
0.275	1.041	10.54	0.364	0.89	0.273	4.15	0.95
0.130	1.000	0.08	0.400	0.01	0.400	5.73	0.84
0.282	0.954	0.34	0.333	0.03	0.222	4.41	0.87
0.293	1.000	0.25	0.400	0.02	0.300	4.24	0.85
0.158	1.041	5.04	0.273	0.43	0.364	5.51	0.84
0.150	0.954	0.16	0.444	0.01	0.333	4.19	0.88
0.161	1.000	0.78	0.500	0.07	0.300	5.01	0.93
0.084	1.041	8.05	0.273	0.68	0.364	5.94	0.85
0.150	1.000	1.71	0.300	0.14	0.400	5.05	0.84
0.288	0.954	0.26	0.444	0.02	0.222	4.39	0.92
0.138	1.000	0.70	0.400	0.06	0.200	4.54	0.83
0.164	0.954	0.31	0.444	0.03	0.333	4.25	0.83
0.161	1.000	0.63	0.500	0.05	0.200	4.58	0.84
0.116	1.041	0.37	0.455	0.03	0.091	4.46	0.89
0.220	0.954	1.18	0.444	0.10	0.333	4.72	0.91

0.108	1.114	4.19	0.385	0.35	0.308	5.49	0.83
0.158	1.146	0.31	0.286	0.03	0.286	5.92	0.83
0.745	0.954	10.14	0.556	0.86	0.333	4.50	0.97
0.038	1.000	0.38	0.400	0.03	0.200	4.13	0.70
0.079	0.954	0.15	0.333	0.01	0.111	4.05	0.88
0.268	1.000	0.15	0.300	0.01	0.300	4.14	0.80
0.335	0.954	0.62	0.444	0.05	0.333	5.17	0.92
0.160	1.114	4.29	0.231	0.36	0.308	5.74	0.88
0.191	1.041	0.21	0.273	0.02	0.273	4.10	0.85
0.109	1.079	1.53	0.333	0.13	0.167	5.10	0.81
0.344	1.000	0.14	0.400	0.01	0.300	4.91	0.90
0.118	0.903	0.44	0.625	0.04	0.250	4.62	0.84
0.760	0.778	0.16	0.500	0.01	0.500	3.59	1.07
0.112	0.954	4.71	0.444	0.40	0.333	5.50	0.84
0.157	0.845	5.49	0.286	0.46	0.429	5.53	0.86
0.478	0.954	0.28	0.333	0.02	0.222	4.13	0.94
0.139	0.903	0.72	0.500	0.06	0.375	4.64	0.84