STOCK LIQUIDITY, GROWTH OPPORTUNITIES AND DEFAULT RISK OF NON-FINANCIAL FIRMS LISTED IN NAIROBI SECURITIES EXCHANGE

BY

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DECLARATION

Declaration by the Candidate

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DEDICATION

This thesis is dedicated to my late parents, Mr. John Charles Barasa and Mrs. Mary Khalayi Wanjala. I am grateful for your support that has enabled me to achieve this doctoral degree. You sowed the seed of wisdom and nurtured it. Mum and dad, you never lost your trust in me. Faith, my beloved wife, and our children Mercy, Glen, Phoebe, and Maria, I am forever indebted to you all for the unrelenting support and motivation that you have given me during my journey.

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ABSTRACT

Default risk can be detrimental to the existence of any organization. It makes it harder for firms to keep their customers and employees, reduces the productivity of the supply chain, and drives up their administrative and legal costs. The risk of default increases if a company's cash flows are erratic and/or there is no market access. Though studies suggest that stock market liquidity affect default risk, the findings are mixed and inconclusive. Extant literature further demonstrates that growth opportunities affect default risk. Therefore, this study sought to examine whether growth opportunities moderated the association between stock market liquidity and default risk among nonfinancial firms listed in the Nairobi Securities Exchange (NSE). The specific objectives were to determine the effect of; price impact, trading quantity, transaction cost and trading speed on default risk. The study further examined whether growth opportunities moderated the relationship between; price impact, transaction quantity, trading cost, trade speed and default risk. This study was grounded on the static trade off theory, feedback theory and the market timing theory. The study was anchored on the positivism paradigm and both the explanatory and longitudinal research design. Data was secondary in nature and was sourced from both the NSE and the individual firm's annual financial reports. The study used sample of 31 nonfinancial firms and data for the period over 2011 and 2020. Data collection process was guided by a data collection and it was analyzed through descriptive and inferential statistics. The choice between the fixed effect and the random effect panel data estimation methods was based on the results of the Hausman test. The study adopted the hierarchical multiple regression model. Based on the regression results, the study found that price impact ($\beta = 0.150; \rho < 0.05$) and transaction cost ($\beta = 0.775; \rho < 0.05$) had a positive and significant effect on default risk while trading quantity ($\beta = -0.127; \rho < 0.05$) and trading speed ($\beta = -0.071; \rho < 0.05$) had a negative and significant effect on default risk. The study further found that growth opportunities had a buffering moderating effect on the relationship between price impact ($\beta = -0.131; \rho < 0.05$) and transaction cost ($\beta = -0.080; \rho < 0.05$) and default risk. Further, the results reveal that growth opportunities had an enhancing moderating effect on the relationship between trading quantity ($\beta = -0.041; \rho < 0.05$), trading speed ($\beta = -0.021; \rho < 0.05$) and default risk. The study concluded that stock liquidity is key in mitigating default risk among listed firms and that a firm's growth opportunities moderated that relationship. The study's conclusions have implications for managers and regulators. First, managers should take into account how crucial stock liquidity in lessening default risk. Thus, when selecting an optimal capital structure, they should consider the firm's stock liquidity. Second, investors and managers should take into account the influence of growth opportunities on the relationship between stock liquidity and default risk. Third, capital market regulator should initiate strategies that promote stock liquidity for instance enhance use of technology in trading and investor protection. One of the study's limitations was that it only focused on non-financial firms listed in NSE; hence, future research may consider unlisted firms as well as firms listed in other jurisdictions.

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ACRONYMS AND ABBREVIATIONS

CDS	Credit Default Swaps
CMA	Capital Market Authority
DD	Distance to default
GFC	Global Financial Crises
ILLIQ	Illiquidity
IPO	Initial Public Offer
JSE	Johannesburg Stock Exchange
KBM	Kester-Myers Model
LEV	Leverage
LM	Lagrange Multiplier
MTB	Market to book ratio
NACOSTI	National Commission for Science, Technology, and Innovation
NPV	Net Present Value
NSE	Nairobi Securities Exchange
NYSE	New York Stock Exchange
PVGO	Present value of growth opportunities
ROA	Return on Assets
ROE	Return on Equity
SET	Stock Exchange of Thailand
SME	Small and Medium Enterprises
TANG	Tangible Assets
TSE	Tehran Stock Exchange
TWQS	The Time-Weighted Quoted Spread
VIF	Variance Inflation Factor

OPERATIONAL DEFINITION OF TERMS

Default risk: refers to the unpredictability that surrounds a company's capacity to pay its bills and fulfill its commitments.

Growth opportunities: refers to the firm's anticipated future investments that are expected to have a positive net present value.

Non-financial firms: are firms that do not engage in banking, insurance and investment services.

Price impact: represents average response of prices to transactions of varying magnitude.

Stock liquidity: is the degree to which a stock/shares can be bought or sold in the market without affecting its price.

Tangibility: is the net property, plant and equipment divided by assets.

Trading quantity: is the trading volume and stock turnover.

Trading speed: means how quickly stocks are traded

Transaction cost: is the difference between the execution price and the benchmark price**.**

CHAPTER ONE

INTRODUCTION

1.0 Overview

This chapter presents the background of the study, the Nairobi Securities Exchange, the statement of the problem, research objectives, hypotheses, significance and scope of the study.

1.1 Background of the Study

Default is a damaging occurrence in a corporation's life. It has an adverse effect on employee and customer retention, supply chain productivity and raises legal and administrative expenses for firms (Brogaard, Li & Xia, 2017). The risk of default increases for a company when its cash flows are inconsistent and/or when it does not have access to the market. This kind of risk becomes a benchmark for assessing the financial stability of a company (Rego *et al*., 2009). According to the literature, shareholders are merely residual owners of the firm, whereas debtholders have a special interest in the firm (Anderson & Mansi, 2009). This suggests that in the event of a firm experiencing financial difficulties, debtholders will be most affected.

Default risk is the outcome of a firm experiencing serious financial distress and it should be avoided at all costs, as bankruptcy is an almost certain consequence if the default is allowed to persist. Altman (1968) argues that default is primarily brought on by firms' weak liquidity position, which could have been prevented in the short term. Consequently, is vital for firm managers to have a good understanding of default risk, as equity investors may end up losing their stake in the event of bankruptcy and ultimate winding up of the entity. Additionally, default risk is seen as a significant aspect by financial analysts and investing when evaluating a firm.

Investors and debt holders usually consider default risk throughout the investment screening process (Campbell, Hilscher & Szilagyi, 2008; Dichev, 1998). Because the capital market is the principal source of external funding, managers aim to minimize default risk to the greatest extent possible in order to ensure that adequate money will be available in the future at a cost that is affordable (Anderson & Mansi, 2009). A lower risk of default may therefore boost market trust, which may lead to a decrease in the cost of capital, thereby ensuring that operations run smoothly.

Corporate default, which is generally described as a firm failing to make contractual payments to debt holders, can have severe implications for all stakeholders, including investors, creditors, consumers, employees, and regulators. Corporate default is commonly described as a corporation failing to make contractual payments to debt holders. According to Brogaard *et al*. (2017), a company is considered to be in default when its cash flows are insufficient to fulfill the interest and principal payments required by its debt instruments. When a company's average future cash flows fluctuate in a negative direction or when those future cash flows become more unpredictable, the likelihood of the company defaulting on its debt typically increases. Default risk is a measure that reflects the chance of a company defaulting on its obligations and captures the projected distance to default (Ali *et al*., 2018; Bharath & Shumway, 2008). An evaluation of a company's propensity to default on its debts is essential because it can facilitate the prompt and accurate identification of warning signs that a company will likely default on its debts in the near future. (Brogaard *et al.,* 2017; Vassalou & Xing, 2004; Nguyen, Diaz-Rainey & Kuruppuarachchi, 2023).

External forces have the potential to initiate or worsen default risk. For instance, COVID19 pandemic and worldwide economic downturn caused many corporate defaults. In China, debt default reached US$ 29.9 Billion in 2020 and US$ 25 Billion

in the first half of 2021 (Meng *et al*., 2023). Evergrande, a Chinese property developer, and the second largest in China by sales, defaulted in paying close to $300 billion as of 2021.

Investors are negatively impacted by corporate defaults, which tends to spread pessimism across the global financial system because so many businesses are dependent on one another in the global economy, a severed link might threaten both the short-term and long-term liquidity of these firms. Empirical evidence further reveals that firms across sectors are facing severe risk of default. For instance, Kaur (2019) found that over 65% of the banks in India are in distress zone, representing a high probability of default risk. From Jordan, Zeitun and Tian (2007) reported that in the period 1989 to 2002 29 of the 59 listed firms in the Amman Stock Exchange (ASE) had experienced default risk. In their study conducted between 2005 and 2011, Baklouti, Gautier, and Affes (2016) examined the financial condition of banks in several European nations, including Ireland, the United Kingdom, Belgium, Greece, France, Germany, and Cyprus. The findings revealed that the percentages of banks experiencing financial difficulties in these countries were as follows: 64.29%, 53.97%, 50.00%, 40.00%, 28.57%, 27.38%, and 20.00% respectively. Ninh, Do Thanh and Hong (2018) found that around 24% of Vietnamese listed firms were facing bankruptcy. Feng (2021) over 24% of Chinese firms are facing financial distress.

A study by Nandi, Sengupta and Dutta (2019) revealed that 25 per cent of the Indian firms in the oil industry were financially distressed and on the verge of bankruptcy. Soni *et al.,* (2021) shows that 118 out of 161 Indian textile companies are financially distressed. A study conducted by Ashraf, Félix, and Serrasqueiro (2021) revealed that in China, 76.22% of firms are classified as non-financially distressed, while the

remaining 23.78% are considered financially distressed. In the UK, 64.15% of firms are non-financially distressed, whereas 35.85% are financially distressed.

Within African context, Titshabona (2013) did a study on listed firms in the Zimbabwe Stock Exchange, he found that 83.33% were in the distress zone while 16.67% were at the grey zone. Sewpersadh (2020) demonstrates that over 34% of firms listed in the Johannesburg Stock Exchange (JSE), the telecommunications and health care sectors were classified as “grey” zone. While, Mujwahuzi and Mbogo (2020) found that 2 of the 6 manufacturing firms Listed in Tanzania were experiencing financing distress. In Egypt, Shahwan (2015) reported that over 52% of listed firms are financially distressed. In Kenya, a study by Gichaiya, Muchina and Macharia (2019) reported that the percentage financially distressed listed firms in Kenya from year with a percentage increment from 28.9% to 46.2% between 2012 to 2015. The authors further noted that the percentage of safe firms dropped from 50% to 35.9%. In recent years several non-financial firms in Kenya have been delisted and suspended from trading from Nairobi Securities Exchange because of severe financial distress. These companies include Mumias, Uchumi, Kenya Airways and Eveready (Irungu, 2022).

Researchers continue to explore factors that contribute to default risk among publicly traded companies worldwide, in light of the adverse consequences associated with default risk. Recent studies conducted in the field of corporate finance have revealed an important connection between stock liquidity and default risk. The primary contention posits that heightened utilization of borrowed capital amplifies the likelihood of default, while the adoption of equity financing could mitigate the possibility of default.,

Stock liquidity is one of the most crucial elements that makes up a securities market, and it appears to be one of the most frequently discussed topics among academics. Some of the dimension of stock liquidity studied include trading cost and price impact (Chung *et al.,* (2010), price impact and immediacy (Prommin, Jumreornvong & Jiraporn, 2014). Singh, Gupta, and Sharma (2015) argued that stock liquidity is a crucial tool for assessing the market's growth and efficiency. When stock liquidity increases, a company's reputation will improve, which will lead to a rise in the market value of the company (Amihud & Mendelson, 2015), as well as a decrease in the cost of capital (Diamond & Verrecchia, bhab1991). In addition, Odders-White and Ready (2006), who investigated the relationship between credit ratings and stock liquidity, found that companies that have liquid stock have higher credit quality than companies that do not have liquid stock. In the same line of research, Denis and Mihov (2003), found that companies with higher credit quality had a greater likelihood of issuing public debt.

Stock liquidity increases a company's capacity to obtain outside funding, which lessens the need for excessive reliance on debt capital and reduces the chance that a company would experience default risk. Ali *et al*. (2018), assert that a firm with debt as part of its capital structure may experience significant difficulties with its cash flow. This is because firms need adequate financial resources their financial obligations. Therefore, the liquidity of the firm's shares as a source of financing may have a significant impact on the firm’s ability to service its debt. This demonstrates that the liquidity of the stock market is an important factor in determining the company's capacity to fulfill the terms of its debt contract commitments. Frino, Jones and Wong (2007) found that stock illiquidity of defaulting firms increases significantly up to seven months before failure, suggesting that there is a high probability of major illiquidity among market participants in the defaulted firms. Furthermore, a study by Brogaard *et al*., (2017) in the American

equity market observed that a decrease in default risk is associated with an increase in the stock liquidity dimensions (effective spread, quoted spread, Amihud, and Zero) of a firm's equity stock. In addition to this, Ali *et al*., (2018) noted that there was a negative relationship between stock liquidity and default risk in the Australian market. In addition, increased liquidity could reduce the risk of default by enhancing the efficiency with which pricing information is communicated, so strengthening corporate governance by making it simpler for investors to withdraw their money. In line with this argument, Fang, Noe and Tice (2009) found that stock liquidity increases firm value. They concluded that stock liquidity increases firm value because it enhances information content of market prices and performance-sensitive management compensation.

On the other hand, boosting stock liquidity can increase default risk if it exacerbates noise trading, which in turn leads to larger company mispricing and higher volatility. This is because increased noise trading makes default risk more likely. In addition, high stock liquidity can reduce the amount of time spent monitoring the company's operations internally because it makes it simpler for unsatisfied investors to sell their shares (Bakke & Whited, 2010; Goldstein & Guembel, 2008; Ozdenoren & Yuan, 2008; Polk & Sapienza, 2008).

Although empirical studies reveal a relationship between stock liquidity and default risk, the findings are inconsistent (Ali *et al.*, 2018; Brogaard *et al*., 2017). Furthermore, very little has been done to examine the effect of stock liquidity dimensions on default risk among listed firms in developing economies and potential moderating factors. Ryu *et al.,* (2021) further emphasized the need consider a variety of liquidity dimensions. While, Brogaard *et al*., (2017) found that information efficiency and block holder governance may influence the relationship between stock liquidity and default risk.

Consequently, this study incorporated a variety of stock liquidity dimensions that include price impact, transaction cost, trading quantity and trading speed (Le & Gregoriou, 2020).

Growth opportunities may influence a firm's default risk because it may drain internal funding, forcing the company to take additional debt. Leverage decisions entail weighing the advantages and disadvantages of debt financing. The risk of conflict between the company's owners and lenders may influence a firm's investment and financing strategies. In a seminal paper, Myers (1977) studies potential externalities caused by borrowings on optimal investment decisions. Myers (1977) revealed that growth opportunities can lead to moral hazard circumstances, which in turn result in a negative link between debt and growth opportunities. The author contend that debt overhang lessens the incentives for the owners-managers collusion in controlling the firm to pursue investments with positive net present value because the benefits go, possibly in a portion, to lenders rather than wholly to the owners of the company.

In line with Jensen and Meckling (1976) and Myers (1977), when a firm has a risky debt and its management attempt to maximize the value of the stock rather than the value of the company as a whole, the agents may have incentives to underinvest and overinvest in potential growth opportunities. Further, empirical research indicates a negative relationship between leverage and growth prospects. For example, Rajan and Zingales (1995) found that leverage had a negative relationship with firm growth. Additionally, Barclay and Smith (1995) found that debt maturity also had a negative link with growth opportunities. Billett, King and Mauer (2007) also reported an inverse relationship between leverage and growth opportunities. They further observed that the relationship is significantly weakened by covenant protection. The authors concluded that covenants can alleviate the agency costs of debt for high growth firms.

Therefore, in contrast to firms with a low degree of leverage, highly leveraged firms are less likely to take advantage of attractive growth opportunities (Billett *et al.*, 2007). Practically, if future growth opportunities are noticed and quantified early enough, even if debt generates possible underinvestment incentives, the effect can be mitigated by the firm taking corrective action and lowering its leverage (Aivazian & Callen, 1980). In order to minimize the impact of leverage on growth, management appropriately reduces leverage ex ante in light of anticipated attractive ex post growth prospects. Consequently, leverage and growth may be inversely related because of managers attempting to lower leverage in readiness of potential opportunities for future investments.

Lyandres and Zhdanov (2013) claim that the optimal default likelihood of a company is dependent on the combination of growth possibilities and assets that the company currently possesses. They concluded that shareholders are more tolerant of a longer period of time before a company default on its contractual commitment in the event of companies that offer valuable investment prospects as opposed to companies that do not offer such opportunities. Furthermore, Brogaard *et al*., (2017) claim that the negative relationship between stock liquidity and default risk can be attributed to firm value effect. Growth opportunities may lead to increased information asymmetry as well as increasing monitoring costs (Hutchinson & Gul, 2004; Danso *et al.*, 2019). This could therefore have an impact on those firms' stock liquidity, which could then have a bearing on their default risk. Gaver and Gaver (1995) argue that a state of information asymmetry arises between the managers and owners of growing companies, as managers possess privileged information concerning possible growth prospects.

Based on the empirical literature, this study sought to contribute to the existing literature in two folds. First, this study explored the effect stock liquidity dimensions

comprising of price impact, trading quantity, transaction cost, trading speed on default risk among listed nonfinancial firms listed in Nairobi Securities Exchange, which is missing in the existing literature. Furthermore, a study of Nairobi Securities Exchange may offer a better understanding of the relationship between stock liquidity and default risk from a developing economy such as Kenyan. Second, the study further sough to examine whether growth opportunities moderated the relationship between stock liquidity on default risk, which may explain the conflicting findings in earlier studies.

1.1.1 Nairobi Securities Exchange (NSE)

This study's primary objective was to investigate the effect of stock liquidity has on default risk and whether growth opportunities moderate the relationship among non-financial listed at the Nairobi Securities Exchange. NSE was first founded in 1954 as a nonprofit organization operating under the auspices of the Societies Act. It was later renamed the Nairobi Securities Exchange. It was tasked with the responsibility of establishing the securities market and regulating trading operations at the time they were carried out. The Capital Markets Authority is in charge of regulating the NSE. One of its primary responsibilities is to monitor the operations of listed firms (NSE, 2015).

In order to be listed on the NSE, companies must comply with the regulations set by CMA and NSE, which include demonstrating a stable financial situation. The objective is to gain the trust of potential investors. The mandate given to the NSE is to set policies and procedures in order to ensure that market operations are carried out effectively. Although it is assumed that the companies that are listed have healthy financial standings, this has not always been the case, as evidenced by the fact that some of them have defaulted on their financial obligations, resulting in the delisting of those

companies. Hence the evaluation of the risk of default serves as an early warning system for the impending catastrophe.

At the time of being listed on NSE, firms are required to fulfill certain conditions laid down by the exchange and CMA. However, these firms are still susceptible to the market dynamics that can either favorably or unfavorably affect the trading of their securities. NSE (2014) documents that these dynamics could be the result of government policies, risk perceptions, management actions, or investor decisions. This study focuses on non-financial companies since, in contrast to financial companies, which are subject to stringent controls regarding their holdings of capital, capital holding regulations do not apply to non-financial companies, despite the fact that all listed companies fall under the jurisdiction of the Capital Markets Authority (CMA). This suggests that non-financial companies have a greater ability to choose any finance structure that is advantageous to them when it comes to running their firms. At the moment, several firms have been delisted from NSE because they have failed to meet their financial responsibilities, and others have been put into receivership.

Many Kenyan listed companies have faced financial challenges that have resulted in financial distress. As a result, some of these companies have been placed under receivership, have undergone statutory management, have undergone financial restructuring, have issued profit warnings, and others have had their NSE listing revoked due to cash flow issues, massive debts, and losses (Mwangi, Makau, & Kosimbei, 2014; Ong'era, *et al*., 2017). Recently, multiple Kenyan companies such as Mumias Sugar Company, Uchumi Supermarket, and Kenya Airways, Express Kenya, Nakumatt Supermarkets, Atlas Africa Industries plc, East Africa Deacons Plc, ARM Cement Plc and Marshall East Africa Limited experienced significant default risk (Maina & Sakwa, 2012; Songhor, 2018).

In the context of Sub-Saharan Africa, it is observed that the majority of securities markets have certain characteristics. Specifically, a considerable portion of the overall market capitalization is represented by only a small number of companies that are actively traded. Conversely, the remaining equities in these markets face notable challenges in terms of inadequate information and disclosure practices (Adjasi & Yartey, 2007). African securities markets typically demonstrate low turnover rates, with even the major markets such as South Africa, Nigeria, and Egypt exhibiting very low levels of liquidity compared to global standards (McMillan & Thupayagale, 2009).

The lack of an active and well-developed investor base has been identified as the primary cause of illiquidity in African stock markets (Magnusson & Wydick, 2002). Irving's (2005) research findings revealed that African exchanges are characterized by low liquidity levels. Kibuthu (2005) reported the stock exchanges in Africa were characterized by their small size, lack of liquidity, and underdeveloped nature.

As noted by Hearn and Piesse (2009) the equity markets in Africa are relatively small with a restricted number of listings. Consequently, these markets were also characterized by underdeveloped infrastructure, a lack of diverse financial instruments, and low liquidity. United Nations Development Programme (2003) showed that the financial markets in Africa have demonstrated limited liquidity and capitalization.

The securities market in Kenya is considered to be highly developed within the East and Central African area, although it is regarded as relatively young according to international standards. Nonetheless, it possesses significant potential for further development (Nyasha & Odhiambo, 2014). The Nairobi Securities Exchange (NSE) is ranked as the fifth largest stock exchange in Africa, following the Johannesburg, Egypt, Morocco, and Nigeria's exchanges (Kiremu *et al.,* 2013). It holds the distinction of being

the largest stock exchange in East Africa, with a market value of approximately US$25 billion. Over the years, various enhancements have been implemented to improve the Nairobi Stock Exchange (NSE). These include the establishment of a regulatory body, the Capital Markets Authority (CMA), in 1989. In 1991, the "Call-Over" trading system was replaced with the floor-based "Open Outcry System." Additionally, listing costs were reduced in the same year. In 1995, the Exchange Control Act was repealed, and there was a relaxation of the Act for locally controlled firms. Furthermore, in 2000/2001, tax concessions of 50% were introduced for newly listed companies for a period of five years (Nairobi Stock Exchange, 1996). The Kenyan Government implemented these reforms with the objective of promoting sustainable economic growth through the establishment of a reliable and effective financial system. The reforms aimed to strengthen the involvement of the private sector in the economy, thereby reducing the burden on public enterprises and optimizing their operations. Additionally, the reforms sought to expand the ownership base and facilitate the development of the capital market (Nairobi Stock Exchange, 2002).

The Capital Markets Authority (CMA) has previously undertaken initiatives to actively include pertinent players, such as the Nairobi Securities Exchange (NSE), the National Treasury, the Central Depository and Settlement Corporation (CDSC), and the Fund Managers Association (FMA). The stakeholder engagements have yielded positive outcomes, as the NSE has implemented an incubation board with the aim of expediting the growth and prosperity of entrepreneurial enterprises. This initiative is focused on cultivating a pool of thriving businesses that have the potential to be listed on the stock exchange in the future. The introduction of regulations for various Capital Markets instruments occurred during different years, including Real Estate Investment Trusts in 2013, Exchange Traded Funds in 2015, Asset Backed Securities in 2017, Derivatives

Markets in 2015, Global Depositary Receipts and Notes in 2017, and Online forex trading in 2017. Additionally, Securities Lending and Borrowing were added to the existing Capital Markets investment structures, which include bonds, equities, and collective investment schemes (CMA, 2018).

The implementation of these reforms has resulted in enhancements in various aspects, including the overall value of shares traded, turnover ratio, and market capitalization. Several issues are encountered at the bourse, including insufficient investor awareness, diminished investor confidence, susceptibility to shocks, limited liquidity, and a lack of competitive pressure in the local market (Nyasha & Odhiambo, 2014). Listed firms at the NSE face various external challenges, such as a stringent monetary policy, inadequate interest rate policy, a complex taxation system, an ambiguous legal and regulatory framework governing the stock exchange, limited expertise and inefficient methods within the stock exchange system, insufficient technological advancements, political instability, inadequate governance of the capital markets, information asymmetry, heightened market volatility, and a low level of liquidity in the stock exchange (Ogina, 2009).

1.2 Statement of the Problem

It is often assumed that firms are operating on a going concern basis and, as a consequence, are financially sound. Unfortunately, this may not be the case given that firms frequently collapse due to unforeseen situations. Default risk may severely affect a firm and its operations since it may lead to disruptions in operations and increased legal and administrative costs (Kauppi *et al.,* 2016). The magnitude of the widespread default in financial sectors and the financial losses experienced by stakeholders have gained the interest of policy-makers, academics, and practitioners.

NSE listed firms continue to witnessed deteriorating financial performance, corporate governance concerns, decrease in stock values and rise in default risk. In response NSE has issued notices of delisting to several companies unless they could achieve a turnaround within two to three years. Mumias Sugar company was unable to pay the 4 billion debt (The Standard, 2018). The Kenyan government had already provided Mumias Sugar with a bailout of Ksh 500 million, as a result of the high debt burden and massive losses that the company had incurred. In spite of the rescue, the company continued to declare losses and had been unable to pay its creditors. In the same vein, Kenya Airways was recently given a bailout by the government of Ksh 36 billion in 2022 in order to keep it afloat (Business Daily, 2022). Kenya Airways continues to suffer with a total debt of 196 billion. In the year 2020, the Kenyan court gave the company a six months' notice to settle its 4.7 billion obligations, which included auctions of its assets by creditors (Business Daily, 2020).

Stock liquidity may affect default risk in several ways. A corporation's debt repayment depends on its stock liquidity and financial resources. When a corporation needs borrowed money to service debt, stock market liquidity is important to its survival. A liquid (illiquid) market reduces (increases) a firm's default risk (Duan &Zou, 2014). El Kalak *et al.,* (2017) found that stock liquidity affects a company's valuation and future cash flow, which affects its debt default risk (Holmstrom & Tirole 1993; Subrahmanyam & Titman 2001). Liquidity also eases trading of stock by market participants. Butler and Wan (2010) show that higher liquidity increases the possibility of issuing public debt and reduces the cost of doing so directly. In seasoned equity issues, Bulter *et al.,* (2005) found a strong negative association between investment bank costs and issuing firm stock market liquidity. Lyandres and Zhdanov (2013) observed that a company's ideal default strategy depends on its growth options and

assets. Spiegel and Wang (2006) observed that growth prospects improve stock liquidity and performance. Generally, fast-growing companies have high market-to-book ratios, which may attract large and long-term investors. In addition, the view that stock liquidity can have an effect on default risk is supported by the idea that growth opportunities may send a positive signal to the market which increases the marketability of equity shares. Consequently, the purpose of this study was to examine whether growth opportunities moderate the relationship between stock liquidity and default risk of non-financial firms listed in NSE.

1.3 Research Objectives

1.3.1 General Objective

The general objective was to examine whether growth opportunities moderate the relationship between stock liquidity and default risk among non-financial firms listed in Nairobi Securities Exchange.

1.3.2 Specific Objectives

The specific objectives of the study were:

1. To examine the effect of price impact on default risk of non-financial firms listed in Nairobi Securities Exchange.
2. To evaluate the effect of trading quantity on default risk of non-financial firms listed in Nairobi Securities Exchange.
3. To establish the effect of transaction cost on default risk of non-financial firms listed in Nairobi Securities Exchange.
4. To determine the effect of trading speed on default risk of non-financial firms listed in Nairobi Securities Exchange.
5. To assess whether growth opportunities moderates the relationship between:

a) Price impact and default risk of non-financial firms listed in Nairobi Securities Exchange.
b) Trading quantity and default risk of non-financial firms listed in Nairobi Securities Exchange.
c) Transaction cost and default risk of non-financial firms listed in Nairobi Securities Exchange.
d) Trading speed and default risk of non-financial firms listed in Nairobi Securities Exchange.

1.4 Hypotheses

The study sought to address the following research hypotheses:

H_{01}: Price impact has no significant effect on default risk of non-financial firms listed in Nairobi Securities Exchange.

H_{02}: Trading quantity has no significant effect on default risk of non-financial firms listed in Nairobi Securities Exchange.

H_{03}: Transaction cost has no significant effect on default risk of non-financial firms listed in Nairobi Securities Exchange.

H_{04}: Trading speed has no significant effect on default risk of non-financial firms listed in Nairobi Securities Exchange.

H_{05}: Growth opportunity does not moderate the relationship between:

a) Price impact and default risk of non-financial firms listed in Nairobi Securities Exchange.

b) Trading quantity and default risk of non-financial firms listed in Nairobi Securities Exchange.

c) Transaction cost and default risk of non-financial firms listed in Nairobi Securities Exchange.

d) Trading speed and default risk of non-financial firms listed in Nairobi Securities Exchange.

1.5 Significance of the Study

The findings of this study may be beneficial to several stakeholders may. First, the findings may assist managers and investors in understanding how they can leverage stock liquidity and growth opportunities in reducing the likelihood of falling into default risks.

Second, this study contributes to the existing body of knowledge on default risk by examining the stock liquidity and default risk association from a developing nation perspective. Additionally, the study adds to the existing body by assessing the moderating effect of growth opportunities on the relationship between stock liquidity and default risk, which may explain the inclusive findings as demonstrated by extant literature.

Third, regulators and securities exchange will understand the important association between stock liquidity, growth opportunities and default risk. This knowledge could be useful in developing strategies that can reduce the likelihood of financial difficulties using advantageous financing options to exploit profitable investment options. Potential strategies might include the adoption of technological advancements that facilitate trading speed and lowering transaction costs, thereby increasing stock liquidity and reducing dependence on debt capital, which is a key cause of default risk.

1.6 Scope of the Study

The study sought to examine the moderating effect of growth opportunities on the relationship between stock liquidity and default risk among non-financial firms listed in Nairobi Securities Exchange. The dimensions of stock liquidity that were investigated included price impact, trading quantity, transaction cost and trading speed. The study further controlled for firm specific characteristics that have possible confounding effects on default risk. These variables comprised of profitability, tangibility, firm size, firm age, institutional ownership, and leverage. The study focused on non-financial firms listed in Nairobi Securities Exchange over the period 2011 to 2020. NSE witnessed several firms face several financial distress and default risk. The period further allowed for a cooling off period following the 2008 global financial crisis and the Kenya's 2007/08 political crisis. The study used secondary data and panel data estimation techniques to analyze the data.

CHAPTER TWO

LITERATURE REVIEW

2.0 Overview

This chapter discusses the research concepts, the theoretical and empirical literature related to the research variables and hypothesized relationships. The chapter begins by giving an overview of the key concepts of the study and the theoretical framework. The chapter further look into the existing empirical literature and a conceptual framework provided at the end of the chapter.

2.1 Concept of Default Risk

Default risk, also known as credit risk, is the risk associated with the failure of a borrower or issuer to meet their financial obligations (Lou & Wang, 2013). This may include failing to repay a loan or fulfill interest and principal payments on bonds or other debt instruments as stipulated in the borrowing or investment agreement. Default risk is a primary concern for lenders and investors who are exposed to debt instruments, as it can lead to financial losses and reduced income. Factors contributing to default risk encompass the financial health and creditworthiness of the borrower or issuer, broader economic conditions, and industry-specific factors (Glady & Potin, 2011). To assess and manage default risk, credit rating agencies assign credit ratings to borrowers and issuers to provide market participants with an indicator of their creditworthiness ((Lou & Wang, 2013). Financial institutions employ risk management strategies to mitigate and handle default risk in their portfolios, including diversification and in-depth credit analysis.

Probability of default is regarded as an essential indicator of firm health in the finance literature (Altman *et al*., 2016). Fama and French (1993) proposed the three-factor

model, which is a very helpful in measuring portfolio performance, building portfolios, determining the impact of active management, forecasting future returns and the likelihood of default risk. According to the authors shareholders are more worried about three distinct risk indicators namely size of firm, book-to-market value and excess return on market; than just market risk.

Financial distress is a major element to monitor due to its severe implications to the firms such as loss of market, valued suppliers, key workers, default of debt covenants and loss of shareholders confidence (Purnanandam, 2008). Brogaard *et al.,* (2017) assert default of a financial obligation is one of the most disruptive occurrences that may occur in the life of a firm. Default risk has a detrimental effect on productivity due to the fact that it disrupts a firm's operation. In addition to this, it has the effect of driving up the expenses of legal and administrative services and reduces the ability to keep existing clients. Ali *et al*., (2018) suggest that the likelihood of a company going bankrupt is proportional to the extent to which the company's anticipated future cash flows are adequate to satisfy all of its debt servicing costs, which include both the principle amount and the interest payments. When a company sees a decline in the average amount of cash it will receive in the future, or when the average amount of cash it will receive in the future becomes more erratic.

A corporation is considered to be in default when its cash flows are unable to satisfy the costs of its debt service obligations as well as the principal payments that are due. According to Brogaard *et al*. (2017), default risk rises whenever a company experiences a decrease in its average cash flow level, an increase in the volatility of its cash flow, or both of these factors.

Over the last four decades the prediction of company failure has captured the attention of financial analysts, investors, policy makers, and academics alike (Altman, 2001). Because of the large financial and social consequences involved with an enterprise failure, a rising number of strategies have been developed to improve the explanatory power and predictive performance of various bankruptcy models. These strategies aim to reduce the likelihood of corporate failure by reducing the costs associated with it. (Altman, 2001; Frino *et al.,* 2007; Shumway, 2001; Jones & Hensher, 2004).

The static trade-off theory of a firm's capital structure places a significant emphasis on the default likelihood, which is commonly quantified by the expected default frequency (EDF) and credit ratings. Higher levels of leverage are linked to a higher likelihood of default (Bonaccorsi di Patti, D'Ignazio, Gallo, & Micucci, 2015), and financial troubled firm tend to take more debt are assumed to have a higher likelihood of bankruptcy (Hovakimian, Kayhan & Titman, 2012). Consistent with Merton's (1974) structural model, a firm default risk is a blend of the firm's capital structure and asset volatility. When a company has more leverage, there is a greater probability that its value will fall below the default point (its liabilities), as increased leverage makes its market value more erratic. However, increased systematic risk does not always flow from increased default risk. For instance, the yield on corporate debt includes both projected loss and expected gain components. The expected loss is directly related to the risk of default, whereas the expected gain is related to the risk of non-diversification (Merton, 1974). Hamada (1972) noted that, in an ideal world, covariance between market risks, or beta, should rise with a rise in leverage level. However, it is also possible that firms with high levels of leverage may exhibit low levels of asset or business risk.

Kisgen (2006) claims that firms adjust their capital structure in accordance with credit ratings (a measure of default risk). As argued by Kisgen (2009), managers set the

minimum level of credit ratings by coordinating the behaviours of the capital structure, making it more probable that the firm will reduce its debt in line with the lower rating level. As stated by Bosch and Steffen (2011), if the company's rating is low, non-bank investors will not provide any financing, and it will instead depend more on equity shares. Kisgen and Strahan (2010) also argue that restrictions based on bond investments' rating have an impact on the firm's debt cost. While Molina (2005), credit ratings are significant evaluations in forecasting corporate default risk when making capital structure choices.

Default risk assessments enable lenders and insurers to accurately evaluate the risks associated with lending or insuring debts. This allows them to choose if and under what conditions they are willing to enter into a contract connected to debt. Recently, several articles have emphasized the correlation between default risk and stock returns, expanding the applicability of default risk evaluations to encompass equity investors. Nevertheless, the findings of research on the link between stock returns and default risk present ambiguity over the actual link. Vassalou and Xing (2004) found that stocks with high default risk have the best returns. On the other hand, Dichev (1998), Avramov *et al*. (2009), and Garlappi and Yan (2011) discovered that firms with high default risk tend to have lower stock returns compared to enterprises with low default risk. Vassalou and Xing (2004) provide evidence that default risk is systematic and therefore affects stock returns. On the other hand, Avramov *et al*. (2009) contend that the connection between stock returns and default risk is primarily observed in firms with low credit quality during financial crises.

Existing literature suggests that the financial position (Beaver, 1966; Altman, 1968), ownership structure (Abinzano *et al*., 2021), and governance level (Chiang *et al*., 2015; Ghouma *et al*., 2018; Baghdadi *et al*., 2020) of firms are important micro factors that

affect the probability of corporate loan default. Investing in innovation, practicing corporate social responsibility, building social capital, and establishing political connections not only improve the financial stability of companies but also enable them to attract more funding by sending positive signals to external stakeholders. Ultimately, these actions enhance corporate operational capabilities and reduce the risk of defaulting on debt. The default risk is influenced by the extent of information asymmetry, which can be mitigated by factors such as the attitude of management's discussion and analysis (MD&A) (Mayew *et al*., 2015), the quality of disclosure (Bharath *et al*., 2008; Atif and Ali, 2021), and the sharing of company credit information (Dierkes *et al*., 2013). Existing literature primarily examines the influence of financial cycles, capital market liquidity, credit mismatch, monetary policy, fiscal policy, and deleveraging policies on the risk of corporate debt default. There is currently no existing literature that has examined the influence of financial mismatches on the likelihood of corporate debt default.

2.2 Concept of Stock Liquidity

The concept of "liquidity" does not have a definition that has been defined in the literature on finance. The ability of people to transact quickly at prices that are acceptable in light of the underlying demand and supply dynamics is a restricted definition of an asset's liquidity, as stated by Schwartz, Roll and Subrahmanyam (2005). This definition is based on the dynamics of demand and supply. Another definition of liquidity offered by Liu (2006) was the capacity to trade with minimal price impact, minimal trading cost, and rapid trading speed. In his definition of liquidity, Liu explained it in terms of many aspects, including trading speed, trading cost, trading quantity, and price impact. Specifically, Liu mentioned these characteristics. When

talking about the stock market, liquidity refers to the degree to which an item can be bought or sold without having an effect on its price (Daryaei & Fattahi, 2022).

Stock market liquidity is extremely important in financial markets because market participants' value increased and stable market liquidity, which also contributes to the credibility of the financial market. Financial markets are unable to send correct price signals to investors and firms, which are essential for effective risk sharing and precise investment decisions, in the lack of liquidity. Financial markets dissipate in the absence of counter-offers, and they are replaced by unique bilateral contracts. Thus, a financial market cannot survive without some liquidity. High liquidity expands the pool of prospective counteroffers and raises the likelihood of a good match. Consequently, greater liquidity raises the anticipated degree of satisfaction (utility) among market participants (Economides, 1994).

The liquidity of an asset on the stock market reflects the speed (transaction time) and price of a desired transaction (transaction cost). By linking illiquidity to the costs associated with carrying out a transaction in the capital markets, Baker (1996) furthers this point. Illiquidity has a cost since buyers and sellers must make a price decrease in order to promptly fill orders. Iliquidity is only a characteristic of non-frictionless markets, and it is associated with trading costs, including direct transaction costs, bid-ask spreads, market impact costs, delay, and search costs (Amihud & Mendelson, 1991). Following Darst (1975), a security's marketability or liquidity is determined by two factors: the quantity of shares that can be bought or sold at once without materially impacting the price and the time needed to accomplish a desired transaction.

Palkar and Tripathy (2011) claim that the main elements of stock liquidity are trading volume, trading speed, transaction cost, and price impact. Extant literature has also

cited market liquidity can measured by depth (measured by volume or quantity), breadth (measured by price impact), immediacy (measured by time or speed), and transaction costs (measured by spread or transaction cost) (Díaz & Escribano, 2020, Naik, Poornima & Reddy, 2020).

Stock liquidity and stability are the two main characteristics of securities markets (Zhou, Zhong & Li, 2022). Liquidity is frequently examined as a key characteristic of financial assets and is essential to the functioning of the financial markets (Ahmed *et al.,* 2020). According to Tran *et al.,* (2018), markets with high liquidity are more likely to draw investors' attention. Financial theory suggests that the bid-ask gap widens when there is more risk and uncertainty, but it also suggests that the spread is related to illiquidity, according to Glosten and Milgrom (1985) and Hasbrouck (1988). Market shifts can be brought about by market illiquidity, according to Amihud *et al.,* (1990). The authors contend that difficulties in stock trading and a decline in liquidity contributed, at least in part, to the stock market crash of 1987. Therefore, liquidity is crucial for investors, and it becomes much more crucial during financial crises when markets are extremely unsure (Ben-Rephael, 2011).

By 1930, the words "liquid" and "liquidity" were frequently used in writing about the banking industry. These ideas are covered in a number of publications and books written specifically for bankers, including The Banking Process by Rodkey (1928), The Financial Organization of Society by Innes (1921), and Elementary Banking by the American Banking Institute (1922). The liquidity preference theory was substantially influenced by economists John Maynard Keynes and John Hicks. Keynes discusses liquidity in his serial works Treatise on Money (1930) and The General Theory of Employment, Interest, and Money (1936), whereas John Hicks conducted an inquiry on

the demand for money that advanced his theories. The literature documents the diverse nature of liquidity. Sarr and Lybek (2002), assert that liquidity encompassed asset liquidity, asset's market liquidity, a financial market's liquidity, financial institution's liquidity. Keynes (1930), argues that an asset as being liquid if it may be quickly and profitably realized. In the context of financial markets, Shen and Starr (2002) claim that liquidity is "the ability to absorb the flow of buying and selling orders smoothly."

The concept of market liquidity remains unclear among numerous authors and in a variety of circumstances. In the realm of economics, Hicks (1962) introduces the liquidity preference in their theories and provides the motives that underlie the demand for money. In a similar vein, Liu (2006) defines market liquidity as presenting an opportunity for participants to sell or buy market securities quickly, privately, and with a small price impact. Marunaga and Szhimizu (1999), a liquid market is one in which a significant number of trades may be executed immediately with little price volatility. Crockett (2008) contends that a liquid market has the following attributes" First, if its infrastructure is effective, with low transaction costs and narrow bid-ask spreads. Second, many investors participate in the market, and a small adjustment in price could help balance out an imbalance in orders. Third, the market and the assets both exhibit transparency, and prices adjust to new information as it becomes available.

Amihud & Mendelson (2012) suggest that stock liquidity is the extent to which stocks can be traded (that is purchased and sold) quickly and at minimal cost. While, Foucault, Pagano, and Röell (2013) the capacity to trade a security rapidly at a price that is somewhat near to its consensus value is what is meant by the term "stock market liquidity." Stock liquidity has been a major concern for instruments that are traded on financial markets for a very long time. For securities to be traded in the quantities that are required in a timely way without any price discount, a certain degree of stock

liquidity is essential. In addition, in order to trade securities in line with the rules set forth by the regulatory agencies, a certain degree of liquidity is required. (Chai *et al.*, 2010). Lipson and Mortal (2009) further indicate that a liquid stock is one that can be purchased and sold easily. Because of the numerous transactional characteristics of the market, such as tightness (the cost of trading), depth (the price impact), and robustness, stock liquidity has been referred to be a "slippery and elusive concept."

The topic of liquidity, as a stock-changing issue, has appeared in corporate finance literature since the middle of the 1980s (as evidenced by the numerous publications for instance Cooper *et al.,* 1985; Amihud & Mendelson, 1986; Datar *et al.,* 1998). Arguably, rational investors find illiquid stock less appealing (Kiel & Nicholson, 2003). Furthermore, the capacity to transact quickly with large quantities of securities is a key component of liquidity. This indicates that there is little variation in the asset's price between purchase orders (Liu, 2006). When a fair price is not rapidly realized, an investment's liquidity level declines. When building an investment portfolio, investors' choices are heavily impacted by the degree of stock liquidity (Becker & Paul, 2006; Baker & Wurgler, 2007; Dunham & Garcia, 2020). In practice, rational investors look for opportunities to take on more risk in exchange for stocks that have lesser liquidity but provide higher expected returns. According to Chan and Faff (2003), there is an inverse relationship between liquidity and stock returns at the level of very small firms. This is due to the fact that less liquidity results in an increase in risk, and risk results in an increase in stock returns. However, it is envisaged that as stock liquidity increases, it will contain new information for incremental stock adjustments, which will result in higher returns at the macro and national levels (Bortolotti *et al*., 2007). These higher returns will be the outcome of higher stock prices. According to the findings of a great deal of research, there is a correlation between liquidity and stock returns that is both

favourable and negative. As an illustration, Baker and Stein (2004) discovered that there is a positive correlation between the returns on stocks and their liquidity. Additionally, Amihood and Mendelssohn (1986) found a positive association between stock returns and liquidity.

Liquidity in the stock market is often characterized as the ability to trade large volumes of shares quickly, at low cost, and with minimal effect on the price. This explanation focuses on four dimensions of liquidity: trading volume and speed, trading expense and impact on price, and overall trading volume. Researchers have conducted empirical studies making use of a variety of liquidity metrics to investigate the significance of liquidity in terms of its role in explaining the cross-section of asset returns. The vast majority of the currently available measurements focus on just one of the dimensions of liquidity. To give just a few examples, the measure of the bid-ask spread that was developed by Amihud and Mendelson in 1986 is related to the trading cost dimension, the turnover measure that was developed by Datar, Naik, and Radcliffe in 1998 captures the trading quantity dimension, and the measures that were developed by Amihud in 2002 and Pástor and Stambaugh in 2003 use the concept of price impact to measure the price impact of trading volume (Liu, 2006).

Goyenko *et al*. (2009) add that stock liquidity research uses multiple proxy measures due to their diverse dimensions and limitations. Tightness represents the cost of quickly changing a market position. Depth is the market's ability to handle numerous trades without affecting prices. Price resilience is how quickly prices recover from significant trades (Kyle, 1985). Black (1971) suggests another stock liquidity dimension, immediacy, which is trading speed.

Consistent with studies on stock liquidity measurements, Lybek and Sarr (2002) provide an overview of indicators that can be used to measure liquidity developments in stock markets. They contend that the indicators of stock market liquidity include tightness (trading costs), immediacy, depth breath and resiliency. According to Lybek and Sarr (2002), There are a total of four categories that can be used for categorizing stock liquidity measures. First, are the transaction cost measures, which seek to represent the cost of trading financial assets. Second, are volume-based measures, which differentiate liquid markets based on the volume of transactions in comparison to the price variability. Third, are the equilibrium price-based measures, which try to capture orderly movements towards equilibrium prices in order to primarily measure resilience. Finally, are the price impact measures, which make an effort to differentiate between the impact of price changes and the volume of transactions in the market. The study by Ali *et al*. (2018) examined a large sample of 1,086 non-financial Australian firms over the period of time from 2001 to 2013. They measured stock liquidity by using three proxies of stock liquidity: the Time-Weighted Quoted Spread (TWQS), the Amihud illiquidity estimate (AMIHUD), and the turnover-adjusted zero daily volumes (LM). Additionally, Chai *et al*., (2010) support the idea that liquidity is a multidimensional idea, and suggests that each alternate proxy may only reflect a subset of liquidity's characteristics. Using information gathered from the Australian equity market, they investigate the extent to which various liquidity proxies are related to the trading behaviour of individual stocks. Previous research has shown that the trading characteristics of equities are major factors that determine liquidity; their findings confirm this finding. They concluded that many proxies for liquidity each capture a different aspect of stock liquidity. Initially, they reach the determination that the zero-return measure and the proportional spread are both acceptable measures of tightness

on account of their ability to represent trading costs through proxies. In addition, the illiquidity ratio is a reflection of the price movement that is linked with trading volume, and as a result, it is related to depth and price effect. This is because the ratio is a measure of the effect that trading volume has on price movement. The return reversal metric, on the other hand, is a measure that assesses a company's capacity for resilience. Lastly, immediacy is represented by stock turnover as well as the turnover-adjusted number of zero daily volumes. This is due to the fact that both of these proxies reflect the trading speed as well as the trading frequency. Therefore, it be concluded that the main dimensions of stock liquidity (or illiquidity) include price impact, trading quantity, transaction cost, and trading speed (Brogaard *et al*., 2017; Chai *et al*., 2010; Lybek & Sarr, 2002; Ali *et al*., 2018).

Similarly, Rahim and Nor (2006) assert that investors are interested with firm-specific issues including distress and liquidity levels. The authors show that, logically, a company's small size does not by itself make it risky. There are different views from researchers that indicate that stock liquidity may affect default risk. Stock liquidity should reduce a firm's debt dependence, lowering its default risk, according to Ali *et al*., (2018). Stock liquidity lowers equity costs, making them a cheaper financing option. Thus, organizations with greater equity finance have lower default risk due to lower debt service and principal payments. Several empirical studies demonstrate that enterprises with more liquid shares have lower equity costs and leverage. For instance, Lipson and Mortal (2009) and Udomsirikul, Jumreornvong, and Jiraporn (2011) notes that the cost of equity will decrease as a company's stock liquidity level increases. This results in a larger dependence upon equity financing as opposed to debt financing. Consequently, this has an impact on the choices made regarding the structure of capital, as it involves weighing the advantages of tax benefits gained from debt against the

disadvantages of the cost of equity. As a result, companies with stocks that are more easily converted into cash tend to rely more on equity financing and therefore have lower levels of debt. Amihud and Mendelson (1986) argue that a firm with a high stock liquidity level has a reduced cost of equity financing, which will eventually translate to a drop in the proportion of debt in the capital structure. This is a direct result of the high level of stock liquidity that the company maintains. In a similar vein, Butler, Grullon and Weston (2005) assert that enterprises with substantial stock liquidity will pay little for equity funding.

Frieder and Martell (2006) contend that given that investors are willing and desire to buy liquid stocks, stock illiquidity is associated with higher cost of capital. For instance, Brennan *et al*. (1998) found that equity holders need a greater yield to cover the costs of illiquidity. On account of illiquidity, using debt financing instead of equity financing is more cost-effective for the company.

According to Acharya & Pedersen 2005; Shang, (2020), the degree of liquidity in the stock market is a significant factor in determining the accessibility of the equity financing instead of debt. In addition, Asem *et al*., (2016) showed that there is a bigger increase in discounts for equity offers in firms that have illiquid stocks. This is in comparison to companies that have equities that are easily traded. In the same vein, Butler *et al.,* (2005) demonstrated that firms with highly liquid stock tend to pay less for banking fees, which improves the capacity of those firms to raise capital. In addition, Belkhir, Saad and Samet (2020), who conducted a study across several countries, founded that the drop in stock liquidity had a considerable effect on the cost of capital.

The trade-off idea states that when firms are looking for funding, they attempt to balance the costs and advantages (Agyei, Sun & Abrokwah, 2020). Given all other

factors being equal, it follows that whenever the net cost of equity is lower than debt, equity should always be chosen over debt (Baule, 2019). The primary factor that determines the cost of issuing new stock is the liquidity of the existing equity since stock liquidity is the main determinant of the cost of issuing new securities, stock market will set higher bid ask spread for shares with low liquidity (Pattiruhu & Paais, 2020; Le & Gregoriou, 2020). As a consequence of this, the transaction costs associated with issuing more shares have an effect on the bid-ask spread's effect on the cost of capital (Brennan & Subrahmanyam 1996; Brennan, Chordia & Subrahmanyam, 1998).

The firm's cost of capital and, consequently, the value of equity investments are significantly impacted by the transaction cost. According to Stoll and Whaley (1983), the less liquid stocks of small companies have a high level of transaction costs, which means that a greater rate of return is needed on those stocks. As a result, it is essential to understand how company managers factor in stock liquidity when making capital structure decision, and how it affects firm outcomes.

Despite the fact that numerous analytical studies have been done in the field of the factors that affect capital structure, not a lot of research has been done to investigate the effect that the liquidity of the stock market has on the risk of default. A recent study by Lipson & Mortal (2007) and another by Udomsirikul, Jumreornvong, *et al*. (2011) found that a firm's debt level and equity liquidity had a negative association. While Brogaard *et al.,* (2017) found that companies with high stock liquidity tend to have a decreased probability of going bankrupt. Capital structure theories (for example, the static trade-off theory, the pecking order theory, and the market timing theory) have all been used to explain how stock market liquidity affects a firm's decision between debt and equity and, consequently, risk of default.

Theoretically, Modigliani and Miller (1963) contend that highly levered firms may reap the benefits of debt financing. However, Myers' (1984) trade-off theory, firms that borrow too much money are more likely to default. Firms are urged to weigh the costs of debt financing to its advantages while also taking into account the anticipated expenses of bankruptcy. Firms can choose the optimal financing structure for their needs by weighing the advantages and disadvantages of debt financing.

Udomsirikul *et al.*, (2011) who studied Thai companies found that firms with highly liquid stock have low leverage. The authors concluded that improved liquidity reduces the costs of equity, as a result making equity capital more attractive than debt. In the same line of research, Rashid and Mehmood (2017) examined the influence of stock market liquidity on the leverage using a sample of firms listed in Pakistan for the years 2000 and 2013. They found a statistically significant inverse association between the liquidity of stock markets and leverage. The authors concluded that firms with more liquid equities are more likely to favor equity financing over debt financing.

2.2.1 Concept of Price Impact

According to Bouchard, Farmer, and Lillo (2009), price impact is defined as the average reaction of prices to trades of varying quantities. Black (1971), author of one of the original papers on price impact, noticed that large-order execution would always have an impact on price, regardless of the manner in which it was executed. Price impact is an important topic in market microstructure research, and it has significant implications corporate finance theories. Kraus and Stoll (1972) published one of the earliest studies on the effect of pricing impact on a market, which may be traced back to the early 1970s. The study revealed that the execution of big orders on the NYSE had both a temporary and a long term impact on stock price. The findings of empirical research

conducted by Coppejans, Domowitz, and Madhavan (2003) and Evans and Lyons (2002) reported that the temporary impact is correlated with the magnitude of the trade and the liquidity of the market, whereas the permanent impact is associated with information. Different points of view on the pricing impact have been demonstrated by empirical studies. For instance, Bouchaud *et al*. (2004) state that the impact on prices might be both permanent and temporary. Despite this, Farmer *et al*., (2006) argue that price impact is both temporary and ongoing. According to the findings of these studies, the information included in trade has an effect on prices, and this effect increases as the volume of trade increases. In addition, Subrahmanyam and Titman (2001) believe that increased stock liquidity leads to more informed trading, which improves the informational efficiency of stock prices. It is possible for outside investors to have access to more accurate information on other price-relevant elements, such as the macroeconomic and industry outlook as well as the strategies employed by competitors. This information can be translated into stock prices through the trading activities of outside investors.

Even though managers are most familiar with the fundamentals of their firms and the investment possibilities, they however look to the financial market for information because it is both affordable and readily available (Dow & Gorton, 1997). Therefore, managers make decisions and invest based on stock prices (Luo, 2005; Chen *et al*., 2007; Bakke & Whited, 2010), which effects a company's cash flow and debt obligation.

Price impact refers to the influence that specific events or actions have on the market price of a financial asset, particularly in the context of securities trading (Dufour & Engle, 2000). It can be a response to various factors, including large trade orders, news releases, changes in market sentiment, or trading algorithms. When a significant buy or

sell order is executed, it can disrupt the equilibrium of supply and demand, leading to short-term price movements (Chung, Li, & McInish, 2005). For example, a large sell order can lead to a temporary decrease in the asset's price as the increased selling pressure surpasses buying interest. Conversely, a substantial buy order can drive the price up as demand outpaces supply. Traders and investors closely monitor price impact to assess the potential consequences of their trades and make informed decisions (Lee & Ryu, 2013). Consequently, price impact is a crucial aspect of market dynamics and plays a role in risk management and trade execution strategies.

Price impact has also been used in bond markets, particularly in fixed-income securities. When default risk is perceived to be increasing for a bond issuer, the market's perception of that issuer's creditworthiness weakens (Vassalou & Xing, 2004). As a result, the demand for the issuer's bonds may decrease, and their prices may decline. This can be due to concerns that the issuer might not fulfill its debt obligations, causing investors to demand higher yields to compensate for the increased risk (Hull & White, 1995). Consequently, this price decrease reflects the price impact of higher default risk. Conversely, if default risk decreases (perhaps due to improved financial performance or credit upgrades), the demand for the issuer's bonds may rise, leading to higher prices and a more favourable price impact. In this manner, price impact can serve as a real-time indicator of market sentiment and risk perception, including default risk, in the fixed-income market.

2.2.2 Concept of trading quantity

Market depth can be determined by trading volume. When there is a significant and regular flow of trading orders on the buy and sell sides, a stock market is considered to be deep. Extant studies demonstrate several proxies for the depth that include trading value, trading volume, turnover ratio, Amivest measure, Amihud's (2002) measure,

Pastor and Stambaugh measure, a proportion of zero-return days, and FHT measure. The trading quantity is an indicator of trading volume and turnover (Zhang *et al*., 2014). Trading volume and turnover rate are the two key proxies that are utilized by the liquidity literature in order to determine the magnitude of the transaction. The trading volume, which is measured in thousands of shares, refers to the total number of stock i shares that were bought and sold on a given day. The turnover rate is calculated by looking at the percentage of total outstanding shares that are traded. The bid-ask spread and intraday price range both serve as indicators of illiquidity, whereas trading volume and turnover rate serve as measurements of liquidity. This is due to the fact that the amount of liquidity associated with a stock rises as more of its shares are traded.

It has been argued that greater trade volume may translates into more liquidity (Fisher, 1959). The liquidity ratio, which is calculated as yearly trading volume divided by market capitalization, has also been employed as a measure of liquidity by certain researchers. More recently, studies), researchers have used stock trading turnover as an indicator of liquidity (Abdullahi & Fakunmoju, 2019; Dinh & Tran, 2023). A higher turnover, like a higher trade volume, shows that there is better liquidity. Stock turnover is the number of shares traded as a percentage of the number of shares outstanding.

Trading quantity in proportion to market capitalization (the market price of listed shares) is occasionally seen as a relative indicator that can be used to compare markets or through time. The daily average of the shares outstanding to shares traded ratio is used to compute the turnover ratio. Because turnover is inversely connected with the bid-ask spread, previous research (Datar, Naik & Radcliffe, 1998; Banerjee, Gatchev & Spindt, 2007) have used turnover ratio as a proxy for trading liquidity. Where higher turnover ratio is an indicator of improved stock liquidity and vice versa.

Amihud and Mendelson's (1986) contend that an asset's return is a reducing function of its turnover rate. Investors continually rebalance their portfolios in response to changes in the investment opportunity set in an intertemporal environment with no transaction costs. Transaction costs make such rebalancing occur less frequently, which reduces the liquidity of the assets at stake. In fact, a number of research (Haugen & Baker, 1996; Datar *et al*., 1998; Rouwenhorst, 1998; Chordia *et al*., 2001) demonstrate that in a cross-sectional comparison, stock returns are a decreasing function of turnover. Bartov and Bodnar (1996) claim that asymmetric information may be related to the turnover. The authors claim that if stock turnover decreases, there may be an increase in asymmetric information. While Taradonpiphat and Jumroenvong (2020) noted that increased information asymmetry causes a greater reliance on bank debt and a decrease in bond issuance, and vice versa.

2.2.3 Concept of Transaction Cost

Gan, Leung and Zhou (2021) define transaction cost as the cost that buyers or sellers must cross to match the bid and ask orders, which is measured in quoted spreads (Qspread) and effective spreads (Espread). Explicit and implicit costs are the two categories that make up total trading costs. Explicit costs are those that can be identified and calculated in advance of trading, and these include order processing fees, taxes, and brokerage fees. However, implicit costs are easier to miss in comparison to explicit costs, despite the fact that they might contribute significantly to the overall cost of the transaction. Order-driven or quote-driven trading models are both viable options for stock exchanges. While He, Wang, and Wu (2013) argue that in an order-driven market, orders are responsible for providing all of the market's liquidity, but in a pure quote-driven market, dealers are responsible for providing market liquidity. On the other hand,

certain markets for trading securities are a combination of being driven by quotes and being driven by orders. These markets allow limit orders and specialists to coexist.

Marshall, Nguyen and Visaltanachoti (2013) claim that spread is the best metric for transaction cost. Spreads are used to record transaction costs at the best bid and ask prices. These costs relate to the quantity of securities that were traded at the best bid and ask price. Investors also must assess depth, which informs them how much can be traded at a specific price. When a limit order is not fully executed, it is larger than the quantity of the best limit order, the remaining amount is placed at the same price and time priority as the original order (Hmaied, Sioud & Grar, 2004).

The variations in these executed prices and the shares exchanged at each price have an effect on transaction costs. The bid-ask spreads are the most widely used indicator of trading costs, as they account for total costs involved in trading stocks (Lybek & Sarr, 2002). The three elements that make up bid-ask spreads are order processing, information asymmetry, and inventory cost components. Researchers have extensively examined spread components and their behaviour in theoretical and empirical literature ever since the late 1960s (Demsetz, 1968; Stoll, 1978; Easley & O'Hara, 1987; Huang & Stoll, 1997; Gregoriou, 2013).

The quality of a market's trading may be broken down into two categories: the price category, which is represented by the bid–ask spread, and the quantity category, which is represented by market depth. The bid–ask spread, also known as transaction costs, and market depth both have a role in determining the quality of trading opportunities available to investors. Some researchers (Easley, Kiefer, O'hara & Paperman, 1996; Huang & Stoll, 1997) contend that bid-ask spread is composed of three components: the cost of information asymmetry, the cost of inventory, and the cost of liquidity. The

transaction cost for investors rises in direct proportion to the bid-ask spread, which can be seen of as a kind of compensation for market makers, as well as the cost of maintaining inventory and obtaining liquidity. According to empirical evidence, the bid-ask spread may be impacted by factors related to the informed trading cost or the cost of the inventory and liquidity.

As suggest by the transaction cost theory, there is no cost associated with the transaction provided all of the economic parties involved have complete and accurate information (Williamson, 1985). Because economic agents operating in the real capital market have access to only a limited amount of information, transaction costs are present in markets (Coase, 1937). Firms opt for debt financing when the cost is more than the benefits, which will result in an excessive debt load.

In an effort to lower transaction cost, stock exchanges and market participants are gradually utilizing digital technologies such as distributed fault tolerance, data immutability, and smart contract event triggering, can improve the growth of securities registration, trading, clearing, and settlement infrastructure in the capital markets domain (Chiu & Koeppl, 2019). The enabling capabilities of digital technologies have made this outcome conceivable. This might have the immediate effect of greatly lowering the transaction costs associated with equity financing. Furthermore, financial intermediaries like brokers and digital platforms—which were previously only partially available—help to improve market efficiency and, consequently, lower transaction costs. This might have the immediate effect of greatly lowering the transaction costs associated with equity financing. Furthermore, financial intermediaries like brokers and digital platforms—which were previously only partially available—help to improve market efficiency and, consequently, lower transaction costs. (Schenk, Guittard &

Pénin, 2019). These kinds of platforms, which were previously only available to a limited extent, bridge the gap that previously existed between suppliers and customers.

Schmidt and Wagner (2019) applied the transaction cost hypothesis in their study to demonstrate how blockchain technology can affect supply chain relationship. The findings of this study revealed that blockchain technology lowers transaction costs since it enables more valid and transparent financial dealings. Another element that was taken into account over the course of this investigation was that of financial middlemen. When the cost of financing debt is higher than the cost of financing equity, the motivation for firms to raise debt financing will decrease because it will be more expensive for them to raise equity financing.

2.2.4 Concept of Trading Speed

Trading speed denotes the degree of trade continuity that secondary market places offer varies. Continuous trading and periodic (or call/batch) trading are the two main regimes. The trading-speed component is related to how quickly stocks are traded, with faster and more frequent trading indicating more liquidity (Lam, Tam & Dong, 2019). Trading discontinuity is a useful measure of the stock liquidity's trading speed, according to Zhang *et al*., (2014). Furthermore, Uno and Shibata. (2011) contend that high-speed transmission improves liquidity providers' ability to change their limit order conditions according to varying market.

Trading (buying and selling) only occurs at specific times within a given trading day on call markets. Contrarily, continuous trading occurs throughout a trading day. The majority of stock markets use a continuous process, which involves continuous trading and transaction execution. An agent can send its order whenever this mechanism is in action. When this order finds a counterpart, it is carried out. Contrary to call markets,

whereby transactions are multilateral, the continuous mechanism only permits bilateral transactions. A continuous market allows traders to monitor bid and ask prices, transaction prices, and trading volume throughout the trading day (Chandrasekhar, 2009). They can then evaluate the state of the market before placing their orders as a result. Additionally, the availability of quotes in a continuous mark*et al*lows traders to set market orders and guarantee trade execution. Usually, the shares with the highest level of activity are the ones that trade continuously. Typically, an auction is held before the market opens in the most of the major markets.

Since 1980, scholars have been considering how trading methods affect volatility. Amihud and Mendelson (1987) found that call market return variance (subject to the call technique) was bigger than continuous market return variance (subject to the continuous method) after analyzing the price behaviour of the stocks that make up the Dow Jones Industrial Average. Amihud *et al.,* (1990) evaluated return volatility for equities over the same time period under two trading methods (under the call market and the continuous market) and at various times of the trading day. They concluded that the call market offers an earlier price discovery mechanism that is more efficient than the continuous auction technique.

One important aspect of stock liquidity is trading speed. By lowering the potential benefits from trading against mispriced quotes, an increase in trading speed, according to Baldauf and Mollner (2020), crowds out information gathering. Faster speeds consequently have two effects on established market performance metrics. First, because there are less informational asymmetries, the bid-ask spread decreases. Second, given that there is less information available to be included into prices, price efficiency declines.

The rise of High-Frequency Trading (HFT) is one of the most significant changes to the nature of the stock market triggered by modern technology. Although there is no official definition of HFT, typical features that are thought to be indicative of HFT include trading activities conducted through extremely rapid computer systems, short holding times, and frequent order cancellation. Recent years have seen a lot of research on how HFT affects various aspects of market quality, more especially, liquidity and pricing efficiency (Brogaard *et al*., 2014). HFT is said to supports market liquidity and execution efficiency in terms of five microstructure properties of the financial market: tightness, immediacy, depth, breadth, and resiliency (Ibikunle, 2012; Sarr & Lybek 2002).

The prevailing theory in the literature is that HFT improves price discovery and liquidity by speeding up the process of impounding information into pricing. A variety of theoretical and empirical research support this viewpoint. Hendershott and Moulton (2009) who assessed the impact of changing trading speed within a stock market found that increasing trading speed results in prices becoming more efficient. As documented by Jovanovic and Menkveld (2015), HFT may lower the cost associated with adverse selection. HFT's stronger signal processing capabilities are also said to hasten the assimilation of information into prices (Foucault *et al.*, 2015). Brogaard *et al*., (2015) found that increased speed available to market makers improves liquidity in NASDAQ OMX Stockholm. Studies also demonstrate that HFT incorporates information into pricing more quickly (Zhang, 2013). HFT may be more effective than human traders since they are not constrained by cognitive issues. HFT appears to lessen inefficiencies surrounding low-attention announcements, according to research by Chakrabarty *et al*. (2015).

Asset price changes are driven by information gathering and dissemination, which enables business managers to get insights from prices. The speed at which traders can gather and factor in information important to value into pricing is impacted by the usage of technology in trading. Algorithms trading (AT) play a first-order function in managerial learning. However, the impact of AT on management learning is not just confined to how rapidly they can analyze various pieces of information and factor that into asset values, but also to how they affect other market participants' information-seeking behaviour. On the one hand, Menkveld (2016) contends that removing market makers from conventional market microstructure models will reduce the cost of adverse selection, tighten the bid-ask spread, and incentivize other market players to gather information. On the other hand, Weller (2018) argues that AT may impede the acquisition of new information by other market participants and result in lower information content in prices

2.3 Concept of Growth Opportunities

According to a model presented by Myers and Majluf in 1984, managers are aware of the worth of the firm's current assets and its potential for growth. Conversely, only rational investors know the probability distributions of these variables. The authors demonstrate under this framework that managers acting in the best interests of their shareholders only sell securities when the company's stock price is excessively high. Investors interpret the decision to issue securities as bad news about the firm's "intrinsic" worth since they are aware of managers' incentives, which causes the stock price to drop when the firm issues new securities. The riskier the asset being sold, the larger the price decline in the stock. Myers and Majluf (1984) further contend that stock price does respond differently to security offerings based on growth opportunities, but only at extremes. When the NPV of growth prospects is the only source of uncertainty

or when growth opportunities are exceedingly valuable in every situation, the stock price reaction is nonnegative. In the more general situation, the stock price reaction is unfavourable since the decision to issue signals bad news about the firm's intrinsic value.

The optimal default strategy of a firm, according to Lyandres and Zhdanov (2013), depends on the combination of growth options and assets already in place. They find that shareholders are more willing to wait before a company default on its contractual obligations when it has valuable investment opportunities than when it does not.

The growth model, which McGuire (1963), Christiansen-Scott (1964), and Steinmetz (1969) initially introduced, subsequently built upon by Greiner (1972), Scott and Bruce (1987), Hanks *et al*. (1994), Lewis and Churchill (1983), provides a better understanding on firms' growth and financing options at each stage. The model assumes the existence of discrete phases that enterprises go through. Furthermore, the models presented in the research vary with respect to each growth stage. Timmons and Spinelli (2003) put forth four stages, Kuratko and Hodgetts (2007) puts forth five stages, and Baron and Shane (2005) propose six stages, whereas Sahlman *et al*., (1999) put forth three stages. Levie and Lichtenstein (2010) asserts that the concepts of "growth stages" enjoyed extensive acceptance throughout the 20th century. Despite this, no evidence exists to substantiate the existence of these stages. Conversely, these models elucidate a conceptual growth process as opposed to an empirical one. The stage of a company's development can be ascertained with the aid of checklists and other similar instruments that address critical issues pertinent to each phase (Kozien 2017).

Gibrat (1931) theory of proportional development provides a framework for understanding the progression of enterprise expansion. As per this theoretical framework, the enterprise's future size is ascertained through the incorporation of a

stochastic variable into its current magnitude. This indicates that the rate of company development is not correlated with company size over time (the law of proportionate effect). Extensive testing of this concept has been conducted by a multitude of researchers. For example, Lotti, Santarelli and Vivarelli (2003) found that in order to achieve a size sufficient for their survival, start-up enterprises must undergo rapid expansion. Therefore, in the initial stages of development, the principle of proportional growth does not hold true. However, in the years that followed, subsequent to the period of accelerated progress, the assessed companies expanded in adherence to the Gibrat law. Consolidating all companies into a solitary sample could potentially undermine the validity of statistical methodologies, resulting in insignificant findings. Nevertheless, through the process of segmenting the assessed models into developed, lesser, and younger firms, it becomes feasible to ascertain the most suitable parameters.

The ability of a firm to grow is determined by the various sources of capital utilized during its various phases of development, with investors considering the growth potential that the company has identified. In addition, allocating resources towards nascent and emerging enterprises carries a larger degree of risk, resulting in an expected rate of return that is comparatively higher than that of well-established corporations.

Kallapur and Trombley (1999) demonstrated that book-to-market measures and capital expenditure to assets ratios are constantly related with subsequently realized growth. However, they observed that R&D intensity and E/P ratios do not exhibit any consistent association with subsequent growth. Jones, Danbolt and Hirst (2004) also noted importance of investment opportunities in the process of market price determination. Furthermore, when growth opportunities are present, conventional methods for calculating necessary rates of return overestimate hurdle rates, according to Hirst, Danbolt and Jones (2008). It was demonstrated that, on average, the growth potential

of British enterprises was approximately 33% of their equity value. Furthermore, when the effects of these development opportunities are considered, the average cost of capital for investment purposes falls.

Danbolt, Hirst and Jones (2011) observed that, though many empirical studies incorporate growth opportunity measures into their analyses, there was limited evidence as to the validity of the various growth proxies used. They applied eight growth opportunity-related metrics was conducted using a sample of UK-based enterprises. They reported that while all growth metrics exhibit a certain degree of ability to predict the increase in a firm's revenue, total assets, or equity, substantial discrepancies exist between models. In particular, Tobin's Q demonstrated below-average performance, while metrics derived from dividends frequently exhibit superior performance. Despite this, none of the indicators had demonstrated the ability to predict the growth of earnings per share with precision, even when mean reversion and other long-term earnings patterns are considered. Although growth enterprises undeniably undergo expansion, they failed to demonstrate the anticipated growth in the principal dimension (profits) as postulated by the theory.

Some capital structure studies have also used growth opportunity as a control variable (Rayan & Zingales, 1995; Kyissima *et al.*, 2020; Do, Lai & Tran, 2020) More recently, Ahmed and Sabah (2021) found a negative relationship between market leverage and growth opportunities (measured as market to book value). Firms with a low Tobin's q ratio exhibits an inverse relationship between leverage and growth, whereas neither high-q enterprises nor firms operating in high-q industries do.

Scholars assert that the use of leverage did not impede the expansion of companies whose investment prospects were already recognized as promising. Nevertheless, this

development hindered the expansion of companies whose potential for growth was either disregarded by financial markets or insufficiently valuable to compensate for the interest expense associated with their current liabilities.

In their study, Martínez-Sola, García-Teruel and Martínez-Solano (2014) found that small and medium-sized enterprises (SMEs) that possess greater growth potential adjust their cash reserve level more swiftly to preserve financial flexibility and seize advantageous investment opportunities as they arise. Conversely, the growth of the firm was positively influenced by the improvement of supply chain management (Wahyuni & Sumarmi, 2018). Moreover, firm that possess substantial potential for growth face heightened degrees of risk and, as a consequence, adopt a more progressive strategy towards profit generation (Huang, Ozkan & Xu, 2023). The institutional environment is of paramount importance in facilitating the progress of enterprises and generating prospects for expansion (Aparicio, Urbano & Stenholm, 2021).

When considering a capital market in which exchanges enforce stringent requirements for corporations seeking to issue shares, the growth patterns of organizations can differ significantly between stages of development. Although growth opportunities are of considerable importance, there has been a dearth of research determining the proportion of a company's value that is attributable to such growth opportunities.

The KBM model, which was developed by Kester (1984) and Brealey and Myers (1981), is a strategy for dividing a company's total market value into two parts: the value of existing assets and the value of potential growth opportunities. This decomposition has been illustrated by Kester (1984, 1986) and Brealey and Myers (1996) through the use of a restricted set of notable American companies within a specific period of time. Kester (1984) determined, through an examination of a

representative sample of 15 companies, that the present value of growth opportunities (PVGO) generally constitutes more than fifty percent of the overall market value of said companies. Kester (1986) found that PVGO comprises approximately 56% of the market value for electronics companies, 43% for chemical companies, and 48% for paper companies. This conclusion was reached on the basis of a sample of nine firms representing three distinct industries. Brealey and Myers (1996) demonstrated that PVGO comprises around 34% of the overall market value of the five "income" equities in their collection. The PVGO factor accounts for approximately 66% of the aggregate market values attributed to the five "growth" companies.

2.4 Theoretical Background

This study is grounded on several theories, which comprise of the feedback theory, pecking order theory, the static trade off theory and the market timing theory.

2.4.1 The Static Trade-Off Theory

The static trade-off the theory was developed by Kraus and Litzenberger (1973). According to this theory, firms typically assess the tax benefits of debt against the deadweight costs of financial strain and insolvency. The ability of a company to deduct interest payments from its overall tax burden makes debt a more desirable investment than stock. The value of the company is increased by a tax shield, which is defined as the present value of the gains that result from selecting debt over equity. This tax benefit would suggest 100% debt financing if there were no additional or compensating costs of debt.

Bankruptcy is a clear candidate for a cost of debt offset. Bankruptcy is a clear option for an offset cost of debt. In essence, debt raises a firm's risk of financial distress, potentially reducing the need for excessive debt financing. The likelihood of a firm

going bankrupt increases with its debt ratio. Direct and indirect costs can be used to separate the effects of financial distress (Haugen & Senbet, 1978). Legal fees, reorganization expenses, and credit costs are only a few of the direct costs associated with bankruptcy. Indirect costs encompass negative consequences such as diminished customer confidence, poor vendor relationships, and workforce attrition.

Agency costs are another type of cost that should is contrasted against the tax advantages of debt. Managers are motivated to emphasize the maximization of stock value rather than the maximization of overall firm value, as stated by Jensen and Meckling (1976). Managers of firm that use borrowed funds often use risk-shifting tactics when they have excess cash flow. They usually support investments with high levels of risk that, if successful, yield advantages for shareholders but lead to losses for bondholders in the case of failure. Bond investors with sound judgment require a risk premium, leading to a higher interest rate, as a form of compensation for the potential risks associated with overinvestment. These higher costs make it less attractive for firms to issue debt.

The static trade-off theory contends that when firms raise capital, they balance the net cost of equity against the net cost of debt (Modigliani & Miller, 1958; Clayman, Fridson & Troughton, 2012; Mortal & Lipson, 2009). Arguably, firms whose stocks are more liquid offer equity financing options that are more tempting due to the reduced floatation cost for equity issue. Amihud and Mendelson (1986) contend that an increase in the liquidity of a firm’s stock results in a lower cost of equity and a reduced requirement for debt in the capital structure of an organization. Andres *et al*. (2014) assert that the liquidity of a company's stocks has a direct influence on the equity returns, capital costs, and subsequently, shareholder value. Conversely, illiquidity is linked to an increased cost of equity capital (Frieder & Martell, 2006). Previous studies

(Brennan, Chordia & Subrahmanyam, 1998; Brennan & Subrahmanyam, 1996) have shown that equity investors require a higher return in order to be compensated for the costs of illiquidity that they are required to bear (Brennan & Subrahmanyam, 1996). Stoll and Whaley (1983) postulate that despite the higher transaction costs, small, illiquid equity holdings should be expected to produce a higher rate of return. Because of this, equity financing for companies with illiquid equities typically ends up being more expensive and less desirable than debt financing, which results in increased leverage.

Similar argument is supported by Myers' (1977) underinvestment hypothesis. Management of highly leveraged firms are motivated to avoid positive net present value (NPV) projects as long as bondholders are the only beneficiaries. Managerial moral hazard can manifest itself in a number of ways, with the overinvestment and underinvestment issues being two examples. These issues are most noticeable for highly indebted companies that are experiencing financial crisis. Committed interest payments, unlike dividend payments or share repurchases, provide as a dependable signal to the market that a company has a positive outlook. Managers can assess the agency costs of stock and debt to make optimal financing decisions. The agency costs of equity encompass the possibility of risk shifting and underinvestment.

Conventionally, firms follow the static trade-off theory if the level of its leverage is decided by a one-period trade-off between the tax benefits of debt and the deadweight costs of bankruptcy, in addition to the agency costs of debt and equity. This theory is also referred to as the one-period trade-off theory. Nevertheless, the theory fails to factor target adjustment but simply concentrates on a single-period decision. More specifically, it has a solution for leverage, but the firm can never be anywhere other than this optimum. The consideration of multiple periods is a logical expansion that

results in theories of dynamic trade-offs. It is possible that there is a debt-to-income ratio that is optimal; but it will be very expensive for a company to sustain this ratio over the long run. In accordance to the static trade-off model, more liquid companies have reduced floatation costs for equity issue. Since equity financing is more attractive than debt financing, this indicates that more liquid companies have less floatation costs for equity issuance. This is because more liquid firms have a greater ability to attract and retain investors. As a consequence of this, firm that have highly liquid stock are likely to have lower levels of debt. Empirical studies have also show that stock liquidity has a negative effect on the capital structure. (Lipson & Mortal, 2009; Udomsirikul *et al.,* 2011).

2.4.2 Market Timing Theory

Market timing theory, proposed by Baker and Wurgler (2002), is the most recent capital structure theory, and it is gaining prominence in the corporate finance. The main premise of this theory is that managers engage in "market timing" before issuing securities. The theory suggest that managers tend to exploit the potential mispricing of their company's securities to raise finances for investment activities. The primary proposition advanced by proponents of this theory is that the existing capital structure is a direct consequence of earlier efforts to forecast the behaviour of the equity market. Baker and Wurgler (2002) argue that the concept of an optimal capital structure is flawed because market value is economically significant and has a long-term impact on capital structure. As a result, they believe that the concept of an optimal capital structure is inaccurate. The market timing theory claims that a high market-to-book value indicates that it is the right time to issue equity (in this case, through an initial offering), so it tends to reduce the proportion of funding originating from debt (leverage) to fund all activities. Halling, Yu and Zechner (2016) point out the possibility of an interaction

between supply-side effects and issuer-driven financing decisions. Baker and Wurgler (2002) suggest that management-initiated financing decisions result in capital structure modifications that are undertaken in an effort to take advantage of "windows of opportunity." Following a run-up in stock prices, more and larger equity issuances are compatible with market timing behaviour in particular (Baker & Wurgler, 2002; Bessler, Drobetz & Grüninger, 2011).

Hovakimian (2006) asserts that additional equity issuances are required to reach the new objective, and the firm's target leverage is lower when its equity valuation is high and/or following a stock price run-up. The market timing hypothesis predicts that a firm issues new equity (repurchases stock) when its equity is overvalued (undervalued). Thus, a firm probability of default changes due to a firm's market timing action, which is positively related to stock market liquidity.

Proponents of the market timing theory assert that high growth firms will prefer to issue shares in order to profit from overvaluation, regardless of prior risk adjustments, provided those adjustments do not significantly affect their mis-valuation. If management believes that when a firm's market-to-book ratio is abnormally high, the possibility of a firm's equity being overpriced increases, and according to the market-timing theory, when the level of risk grows, there is a reduced likelihood of issuing stock, but when the level of risk reduces, there is an increased likelihood of issuing equity.

In their study, Graham and Harvey (2001) documented that majority of CFOs, specifically two-thirds, agreed that the degree to which their stock is undervalued or overvalued is a crucial when deciding when to issue equity. Jenter (2005) and Jenter, Lewellen, and Warner (2011) further present empirical evidence showing that managers

engage in market timing when making financing decisions. Baker and Wurgler (2002) argue that market timing is the primary determinant of changes in capital structure. Although market timing's intuitive nature and significant influence on corporate financing, there is a dearth of theoretical and quantitative models that formalize and analyze its implications.

The market timing theory appears to be consistent with the trade-off theory. Both theories predict that corporations will issue stock when their market performance is robust. Based on the market timing, companies are motivated to issue new shares of stock when their assessments of the market are comparatively higher than their book values or previous market values (Taggart, 1977; Baker and Wurgler, 2002). An effective approach to assess market timing behaviour is analyzing the association between market value or past stock performance and the issuance of shares. There is sufficient information available that clearly demonstrates how companies strategically choose the timing of their securities issuing decisions based on the performance of the stock market. Companies usually issue equity when the cost of equity is low or when the market values are significantly higher than their book values or past market values.

Asquith and Mullins (1986) reported that corporations have a tendency to issue more shares of stock once their stock prices increase. Hovakimian, Hovakimian and Tehranian (2004) found a positive association between high stock returns and the likelihood of companies issuing new shares of stock. Gomes and Phillips (2012) found that market timing behaviour is a significant attribute of public equity markets. They demonstrated that the likelihood of a company issuing equity rises when there is a bigger stock return in the preceding year. Baker and Wurgler (2002) studied the impact of equity market timing on capital structure. They concluded that timing of equities market has just a temporary influence on the capital structure of a firm and the company

later adjusts the effect of its market timing decisions, then market timing did not have a lasting impact on the financial structure over extended periods of time.

Despite the relevance of the market timing theory, Frank and Goyal (2003) claim that the theory of market timing cannot be considered a theory of capital structure due to a lack of empirical evidence to evaluate its theoretical assumptions. This study employs market timing to propose that companies with significant growth opportunities are more inclined to invest in these opportunities when the stocks are extremely liquid. This would allow them to issue additional equity rather than debt. By taking such action, these companies are reducing the probability of facing default risk.

2.4.3 Feedback Theory

In their seminal study on "Feedback from Stock Prices to Cash Flows", Subrahmanyam and Titman (2001) advanced the feedback theory. They argue that stock trading affects firm cash flows since stakeholders including employees, suppliers, and customers base their decisions on price levels, according to Subrahmanyam and Titman (2001). The feedback theory claims that stock trading impacts stakeholders' perceptions of a firms; hence, their investment decisions and firm's cash flow (Subrahmanyam & Titman, 2001).

As noted by Khanna and Sonti (2004) and Fang *et al*., (2009), liquid markets encourage informed investor trading, which improves pricing transparency and business decision-making, increasing firm performance. Cheung, Chung and Fung (2015) noted that stock liquidity can increase the informative value of stock prices, enabling managers to make actions that will increase the value of the company. While, Hirshleifer Subrahmanyam and Titman (2006) argue that there are valid reasons why stock prices can impact future cash flows. An increase in stock price may aid firms in attracting clients, hiring

employees, and financing projects at a reduced cost. Generally, the level of stock trading has an impact on stock prices, which affects cash flows through securities prices.

Attari *et al*., (2006) found that institutional investor trading and large traders affects stock price movements by taking value-enhancing actions. They further observed that a price reduction increases shareholder activism and the value of the company. Hirshleifer *et al*., (2006) documented that irrational traders can thrive in financial markets if their transactions effect firm value by addressing feedback in a model. Loukil (2015) found that high stock liquidity encourages firms to invest more, linking stock markets to firm business activity. Stock market liquidity affects managerial and investment decisions through price feedback (Nyborg & Wang, 2014). Stock liquidity increases pricing information, which can be advantageous or detrimental. Price rises that have a positive feedback impact indicate sound information and have the potential to draw in capital sources and cut capital expenses. On the other hand, firms incur expensive capital expenses and face more financial limitations if prices decline (negative feedback effect).

Feedback theories suggest that liquidity affects company operations proportionally to stock price information. Fang *et al*., (2009) found that feedback from the stock market enhances corporate performance. They argue that market price information is enhanced by liquidity. According to Khanna and Sonti (2004), informed traders engage in more aggressive trading, which gives managers and other stakeholders better insight into prices. This may alter corporate managers' investment decisions and value due to enhanced prospects. Higher stock prices boost a firm's stock currency, easing its budget restriction

Kyle (1985) studied informed trading and price behaviour. The author illustrated that more liquidity helps informed traders conceal their trading and profit from their private information. Dealers collect and profit from more private data due to higher revenues. Information asymmetry decreases and the stock price becomes more informative as more informed traders engage in stock market activities.

Holden and Subrahmanyam (1992), using Kyle (1985), showed that informed buyers compete more, releasing more information and improving pricing efficiency. Subrahmanyam and Titman (2001) suggest that enhanced stock liquidity may boost the feedback effect and enhance the informativeness of stock prices by promoting more informed trading. This will occur because increased stock liquidity will promote more trading. Goldstein and Guembel (2008) demonstrate, contrary to the findings of Subrahmanyam and Titman (2001), that an uninformed speculator will sell the stock as a result of the feedback loop between stock prices and a firm's investment decisions.

The manager may opt to forfeit an investment project if an uninformed investor drives down the stock price by selling, as a declining stock price could indicate negative news about the company. Making an investment choice based on this inaccurate information is inefficient; the company's future cash flow will decline; and the uninformed investor will profit from the circumstance. Increased liquidity in the stock market facilitates the sale of holdings by uninformed investor, resulting to more misleading and inefficient stock prices.

In the securities market, traders private and public information to make money. Dow and Gorton (1997) drew a distinction between prospective and retroactive stock price roles to improve managers' investment decisions. First, managers learn by watching the

stock market and base their decisions on pricing since it supplies information they lack, such as macroeconomic conditions, industry forecasts, and rivals' intentions.

Then, traders are driven to develop and trade on investment project earnings predictions. Managers can evaluate past investments using stock prices, encouraging good choosing. Subrahmanyam and Titman (2001) observed that stakeholders make decisions depending on stock prices, which affects future cash flows. The feedback effect from stock prices to an enterprise fundamental may influence managers' stock market information gathering motivations and actions. Stock prices affect managers' choices, therefore more informative stock prices can improve investment decisions.

Stock prices may help managers make better investments if stock liquidity enhances price efficiency. Better investment choices can lessen a company's risk of default by increasing cash flows, which affects its ability to pay principal and interest. Thus, stock liquidity may decrease company default risk. Higher stock liquidity may encourage uninformed traders to influence stock prices, distorting company investment decisions. Thus, stock liquidity reduces default risk by making prices more informational. Thus, informative stock prices let managers make value-enhancing corporate decisions. High stock prices may help corporations acquire customers and finance investment. This study employs the feedback theory to postulate that managers of organizations with promising opportunities for growth are inclined to disseminate positive information about the firm to the market. Consequently, enhanced stock liquidity will aid in attracting more equity capital, so enabling the financing for growth prospects, and avert default risk associated with debt financing.

2.5 Empirical Literature Review

This section provides an overview of the existing empirical literature that is relevant to the current study. This section provides an in-depth review of studies that demonstrate a relationship between the various elements of stock liquidity and default risk. This section further provides a review of the research that suggests the potential moderating effect of growth opportunities.

2.5.1 Stock Liquidity and Default Risk

The three characteristics that define the stock market's liquidity include resilience, tightness, and depth (El Kalak *et al*., 2017). Resiliency pertains to the speed at which stock prices revert to their equilibrium after a substantial trade. Tightness refers to the expense of transactions, specifically the bid-ask spread. Depth refers to the market's capacity to endure a substantial volume of trading without significantly impacting the market price. There are many different points of view presented in the existing body of literature concerning the ways in which stock liquidity may affect default risk. Ali *et al.,* (2018) indicate that stock liquidity has been viewed as a means to reducing a firm's reliance on debt and also as a channel for the repayment of debt. The first point of view is connected to the idea of a company's dependence on debt, and it proposes that increased stock liquidity should reduce the likelihood of a default by reducing a company's reliance on debt funding. To be more specific, the cost of equity is reduced as a result of increased stock liquidity, which results in equity being a more cost-effective source of credit.

Ali *et al*., (2018) contend that firm with a high amount of equity financing are less concerned about the debt repayment due to the equity financing, and as a result, they have a lower chance of defaulting on their loan. In addition to this line of reasoning, a number of empirical studies have shown that companies that have a greater number of

tradeable stocks have a lower cost of equity and, as a result, lower levels of debt, and that companies that have lower levels of debt have a reduced risk of default (Lipson & Mortal, 2009). Collett and Hrasky (2005) studies the association between the voluntary sharing of information and the intention to raise external money by using the data of 75 Australian enterprises. They concluded that the main reason for voluntary disclosure of information is to increase a firm's ability of raising equity capital. However, the purpose of raising loan capital was not positively related to voluntary disclosure of information. Based on these findings, it can be argued that better-governed companies have a higher proportion of equity in their capital structures, making them less likely to fail on their debt obligations.

The second view which links stock liquidity to the repayment of debt, indicates that stock liquidity may increase the ability if a firm to get external financing for the repayment of debt when need arises thereby lessening the risk of default. Since the repayment of debt by firms requires firms to have financial resources, it is assumed that the risk of default is higher for firms in an illiquid market since they face a severe discount in selling their assets. Therefore, if a firm with leverage in its capital structure faces reducing availability of internal financing, its ability to repay debt will largely depend on the tradability of its stocks. This indicates that stock market liquidity is a critical factor in accessing external funds for the repayment of debt thereby influencing the firms default risk. Further to this argument, Frino *et al*. (2007) indicates that the stock liquidity of a defaulting company spreads significantly up to seven months before to collapse, indicating the possibility of increasing illiquidity in the defaulted companies.

In addition, increased liquidity may reduce the risk of default by increasing the competitiveness of prices or by enhancing corporate governance by making it simpler

for investors to withdraw their capital. The research conducted by Fang *et al*. (2009) offers empirical proof that liquidity contributes to an increase in firm value. In addition, Brogaard *et al.* (2017) and Ali *et al.* (2018) find that there is a significant reduction in the default risk of a company associated with an increase in the stock liquidity. This suggests that companies with bigger stock liquidity have a lower level of default risk, as the cost of equity is lower for such companies; this, in turn, is favourable for the improvement of firm value. (Ali *et al*., 2018).

According to Arian, Galdipur and Kiamehr (2014), there are significant theoretical justifications to have an opinion that market liquidity will favorably enhance the value of a corporation. This is because stock shares are the currency that commands both cash flow and control rights, and the tradability of this currency plays a fundamental role in the governance, value, and performance of organizations. The reason for this is due to the fact that stock shares are the currency that commands both cash flow and control rights. To put it another way, stock shares are the medium of exchange that determines both the cash flow and the control rights of a company. Previous studies have shown that liquid markets improve managerial compensation (Holmstrom & Tirole, 1993), minimize managerial opportunism (Edmans, 2009; Admati & Pfleiderer, 2009; Palmiter, 2002), boost informed trading and informative share prices (Subrahmanyam & Titman, 2001; Khanna & Sonti, 2004).

On the other hand, studies have shown that stock liquidity can have a positive influence on default risk (Baker *et al*., 2003; Goldstein & Guembel, 2008; Ozdenoren & Yuan, 2008; Polk & Sapienza, 2009). The main argument being that an in increase in liquidity might result in an increase in default risk if it aggravated by noisy trading, large mispricing of stock and higher volatility. Moreover, it has been argued that heightened stock liquidity can potentially result in diminished managerial supervision. This is due

to the possibility that shareholders may become less inclined to actively monitor and oversee managers, as they may be swayed by the improved performance of the stock (Bhide, 1993). Poor internal control measures can potentially lead to a higher likelihood of firm default.

2.5.2 Price Impact and Default Risk

Price impact has been shown to improve firm performance, consequently reducing the default risk of a firm. Prior research indicates that with higher stock liquidity, investors profit more from their private information thus motivating the investors to get more information and trade on it. This in turn leads to more informed stock prices ((Holden & Subrahmanyam, 1992; Holmstrom & Tirole, 1993; Subrahmanyam & Titman, 2001). Further to this, managers are guided on the corporate investments from the information displayed in the stock prices ((Luo, 2005; Chen *et al*., 2006; Bakke & Whited, 2010). In consequence of this, managers are able to make better investment decisions, which ultimately results in higher cash flows, as well as a reduction in the changes in cash flow volatility, which ultimately results in a lower default risk. According to feedback theories, the impact of stock liquidity on a company's cash flows should be proportionate to the degree to which a company's activities are sensitive to the information contained in its stock prices. (Arian *et al.*, 2014).

According to the findings of Brogaard *et al*. (2017), one of the mechanisms via which stock liquidity reduces company default risk is by increasing the informational efficiency of stock prices. The coefficient of change in the price efficiency measure is statistically significant and positive for each specification, and this holds true regardless of the specification. As a consequence of this, there is a correlation between increased price efficiency and a decreased risk of default for a company. Stock liquidity enables informed investors to profit more from their private information, which in turn

encourages investors to acquire more information and trade on it, which in turn leads to more informed stock prices (Holden & Subrahmanyam, 1992; Holmstrom & Tirole, 1993; Subrahmanyam & Titman, 2001). It has been suggested that managers leverage information contained in stock prices to direct the investments of their firms. Consequently, managers make better investment decisions, which results in higher cash flows, less cash flow volatility, and ultimately a lower risk of default (Bakke & Whited, 2010; Chen *et al*., 2007; Luo, 2005). These outcomes all contribute to a reduction in the likelihood of default.

Khanna and Sonti (2004) demonstrated that liquidity can positively affect firm performance by encouraging the entry of informed investors, making prices more informative to investors. The authors assert that informed traders incorporate into their trading strategy the effect the market transaction may have on managerial behaviour. As a result, they trade more aggressively, which results in prices that are more informational. This feedback affects both operational effectiveness and deployment of financial resources.

On the other hand, Goldstein and Guembel (2008) contend that uninformed investors can drive down stock prices through sell orders due to the liquidity of the stock market. They claim that this happens when investors lack sufficient market information. Thus, management may incorrectly interpret the artificially depressed stock price as investor censure, and as a consequence of this, they may respond by abandoning profitable investment projects, which results in lower future cash flow and an increased likelihood of default. To support this claim, Ozdenoren and Yuan (2008) created a model that shows how a large feedback effect may increase volatility and, ultimately, the likelihood that an asset's value may decrease to the point that a company is unable to pay back its debt.

Using data extracted from the Thomson Reuters DataStream and MintGlobal databases for a sample of 92 companies drawn from 19 different business groups between 2003 and 2011, Mohamed and Seelanatha (2014) reported a positive and statistically significant association between price impact (Amihud's illiquidity) and leverage. The authors noted that firms with more liquid equity shares are more likely to use equity capital over debt capital to finance profitable projects. These findings contradict the theoretical assertions of the pecking order theory, which states that external equity financing is the least preferred compared to debt. The authors also noted, in support of the trade-off theory, that firms need to consider the costs and benefits of debt while choosing an optimal capital structure.

2.5.3 Trading Quantity and Default Risk

Trading quantity is an essential dimension of stock liquidity. Trading quantity refers to the turnover of a company's shares (Datar *et al*., 1998). Stock turnover is basically the ratio of the total number of shares (of a particular firm) traded divided by the total number of shares listed in a securities/stock exchange. Studies have shown a relationship between trading quantity and the default risk. For instance, Bilinski and Mohamed (2015) contend that when stock turnover is large, price responses to announcements of debt issues are reduced, which probably reflects fewer benefits of debt financing relative to equity financing. Massa, Yasuda and Zhang (2010) revealed that firms with high stock turnover, high stock return volatility, or a high z-score (distance from financial distress) are less likely to issue bonds than firms with high abnormal returns, large asset base, high asset tangibility, high capital expenditures, or high book leverage.

Using a sample of 108 non-financial companies that were listed on the Tadawul stock market over the period 2007–2018, Abdulla and Ebrahim (2020) studied the effect that

stock liquidity on capital structure. They found no significant association between the liquidity of stocks and leverage.

El Kalak *et al*., (2017) investigated the connection between the stock market's liquidity and the possibility of insolvency among small and medium-sized firms. The authors looked at a data sample that included information on 5,075 small and medium-sized firms in the United States across the span of time from 1984 to 2013. The findings of this research indicate that the level of liquidity of the stocks included in the sample of companies that filed for bankruptcy is much lower than the level of liquidity of the stocks included in the sample of companies that did not file for bankruptcy.

Many liquidity metrics show a strong correlation between the two. When compared to the non-bankruptcies sample, the bankruptcies sample's Amihud's and turnover ratios are roughly 2.5 times higher, its Florackis ratio is twice as high, and its zero-return ratio is 1.5 times higher. All of the liquidity ratios are consistent with the idea that companies with more illiquid stocks are more likely to file for bankruptcy. Gniadkowska-Szymańska (2022) assed the relationship between liquidity of shares and the risk of bankruptcy. The study analyses companies from the WIG index, OMXBBGI index and the DAX index over the period between 31 March 2012 and 31 December 2017. The study found a positive association between stock turnover rate (trading quantity) and the risk of bankruptcy. They concluded that stock liquidity increases bankruptcy risk among the sampled firms.

Using data drawn from the Thomson Reuters DataStream and MintGlobal databases for a sample of 92 firms from 19 industry groups over the period between 2003 and 2011, Mohamed and Seelanatha (2014) found that found that share turnover had a statistically significant negative relationship with market leverage during the pre-GFC

period (2003–2006), but no effect after the post GFC period (2007-2011). The authors concluded that in a stable economic environment, firms with liquid equity shares opt to use equity capital rather than borrowed capital.

Khediri and Daadaa (2021), using a sample of 23 non-financial firms listed on the Tunis Stock Exchange for the period 2000-2009, found that stock turnover had a negative effect on leverage. Eckbo and Norli (2005) assessed the relationship between leverage, turnover, and liquidity after IPO using a sample of 6000 Nasdaq IPOs from the 1972–1998 period. The authors used the average yearly values of monthly turnover, which is calculated as trading volume divided by the number of outstanding shares. They found that stocks with higher stock turnover had lower leverage.

In the same line of research Bouazzama and Torra (2022), who employed a sample of 55 non-financial companies listed on the Casablanca stock exchange market between 2000 and 2020. The author found that the turnover of equity securities traded on the market had a negative, though insignificant, effect on the debt ratio among the selected firm.

Wang (1994) links trading volume information flow pertaining to a firm's financial condition. The author contends that trading volume improves as information regarding its financial difficulties is made public to market participants. Conversely, in their study of the role of market's variables in predicting bank failures between 1989 and 1995, Curry, Fissel and Elmer (2004) found that falling stock prices, poor returns, lowering dividends, and increased return volatility were key predictors of banks failure. However, the authors found that trading volume and share turnover did not predict bank failure.

Udomsirikul *et al.,* (2011) studied the relationship between liquidity and leverage using a sample of 707 non-financial companies listed on the Stock Exchange of Thailand (SET) between the years 2002 and 2008. They found an inverse relationship between stock and leverage. The authors concluded that a lower turnover denotes less liquidity and that firms with illiquid stock tend to employ more debt.

Sharma and Paul (2015) studies of liquidity and leverage among firms in the Indian stock market. The study period was between April 2003 and March 2011 and data was collected from a sample of 279 companies yielding a total of 2,511 firm-year observations. The authors found no empirical evidence in support of the hypothesized inverse relationship between leverage and liquidity (modified turnover) among Indian firms.

2.5.4 Transaction Cost and Default Risk

In reaction to the perceived rise in information asymmetry costs, market makers may widen the bid-ask spread. Uninformed investors are less likely to trade in the securities of firms facing financial distress. As a firm's financial health declines, information asymmetry costs actually tend to increase. When a company's performance and financial health decline, informed investors are likely to dominate trading in the company's stock. For stocks with a high default risk, the liquidity providers might protect themselves by quoting a higher bid-ask spread if they consider that the likelihood of some traders having superior information has increased. By widening the bid-ask spread, Agrawal *et al*., (2004) reported how companies in financial distress experienced decreased stock liquidity. In a nutshell, a firm's stock liquidity worsens as its performance declines and the possibility of financial distress rises.

Using trading volumes and bid-ask price spreads with high-frequency data to measure stock liquidity, Lipson and Mortal (2009) used 30,668 firm-year observations for the years 1994–2006 and 46,685 firm-year observations for the period 1986–2006, and found that firms with more liquid stocks have lower leverage. In addition, Alimoradi, Khademvatani and Gholami (2020) examined the association between stock liquidity (bid-ask quoted spreads) and default risk among petrochemical and petroleum products firms listed on the Tehran Stock Exchange (TSE). The study considered a total of 44 firms over the period 2011 to 2017. The findings of this study revealed significantly negative relationship between stock liquidity and default risk of petrochemical and petroleum product companies listed in TSE. The authors further concluded that stock liquidity influences default risk through lowered information asymmetry in the stock pricing process and improved the corporate governance systems.

Düllmann and Sosinska (2005) examined the roles of credit default swap prices as risk indicators. The study considered three large German private banks serving as reference entities in the CDS contracts, and data for 2001-2005. Data was extracted from the Bloomberg Financials. The authors reported that high sensitivity to bid–ask spreads for the two banks, based on which they concluded it indicated that the CDS market for these obligors did not have a deep liquidity because there was less CDS trading. Using a sample of 108 non-financial firms listed on the Tadawul stock exchange between 2007 and 2018, Abdulla and Ebrahim (2020) assessed the effect of spread (trading cost) liquidity on firm leverage but found no significant relationship between spread and leverage.

Chung, Chen and Chen (2010) evaluated the association between credit risk and equity liquidity using a sample of 276 firms listed on the New York Stock Exchange (NYSE). The authors used data from February 1, 2001 to May 31, 2002. They found a non-linear

link between credit risk (bid-ask spread) and stock liquidity. They concluded that liquidity providers may be forced to charge larger bid-ask spreads due to increased expropriation by management and higher asymmetric information costs, which may lead to increased probability of default.

2.5.5 Trading speed and Default Risk

Borio (2004) argues that a financial market facing turmoil will exhibit any one of the following signs or a combination of them. As spread increases, depth decrease and it becomes more difficult or impossible to complete deals, and momentary order imbalances tend to have a more significant and long-lasting effect on prices. In addition, given that market players value liquidity and that providing the same is expensive, it is expected that an increase in the liquidity premiums engrained into the pricing of financial assets.

Trading speed has been associated with information asymmetry, capital structure decisions, and likelihood of default risk. For example, in theoretical inquiry, Chang and Yu (2010) demonstrate how higher levels of market liquidity often leads firms to opt for equity finance when seeking capital and to choose a lower degree of leverage. Additionally, Bharath, Pasquariello, and Wu (2009), employing a sample of American firms over the period 1973 to 2002, found that firms with high information asymmetry used more debt financing. Lipson and Mortal (2009) offer additional empirical support with panel data for a company whose data was available in the Compustat and the Center for Research in Security Prices (CRSP) over the years 1985 to 2006. Bharath *et al*. (2008) employed an index that captures the market's perception of the risk associated with adverse selection to establish an association between asymmetric information and capital structure.

In a similar vein, Loughran and Schultz (2008) reported that firms located in urban areas are more likely to raise funds by issuing stocks and have lower levels of debt in their financial structure. They attribute this to the reduced information asymmetry in urban locations, as there is a larger pool of potential equity investors who are familiar with the company.

Contrarily, it has been demonstrated that algorithmic trading lowers the issue of equity. Boehmer, Fong and Wu (2012) demonstrated that net equity issuance is lower for firms with higher algorithmic trading, assessed as the ratio of trading volume to messages. The authors considered a global data sample of 12,800 firms across 39 major stock markets over a per span of nine years.

More recently studies have focused on the use of financial innovation in minimizing information asymmetry and enhancing trading speed. Several studies (for instance, Demertzis *et al.,* 2018; Fuster *et al*., 2019; Shao *et al*., 2022) reveal that the growth of FinTech significantly helps firms in reducing information asymmetry. FinTech enhances information flow while decreasing the cost of processing financial information. FinTech usage significantly reduces financial distress through increased stock liquidity, according to Lai *et al.,* (2023), who used a sample of Chinese listed companies over the years 2007 to 2020 that yielded 25,264 firm-year observations. This is beneficial since it minimizes reliance on borrowed money, which are typically associated with default risk.

2.5.5.1 Growth Opportunities and Default Risk

Growth opportunities is generally construed as the ratio market-to-book value ratio (Abor *et al*., 2009). Consistent with the pecking order theory, high growth companies in need of capital tend to prioritize borrowing over seeking equity financing, because

debt is cheaper (Donaldson, 1961; Myers & Majluf, 1984). Thus, based on the pecking order theory, it is anticipated that growth opportunities and leverage are positively related. Consistent with the agency theory, conflicts between owners and lenders ought to have a detrimental impact on firm's growth and leverage (Jensen & Meckling, 1986). Two of the agency costs of debt includes risk shifting and underinvestment (Mauer & Ott, 2000). Conversely, the trade-off theory suggest that growth and leverage are not correlated, because firms will also consider the cost and benefits of using debt (Yartey, 2006). While Titman and Wessels (1988), despite the fact that growth potential increase value, the company cannot use them as collateral for lenders. Myers (1977) assert that firm with growth opportunities will utilize less debt since there are particularly significant conflicts of interest between debt and equity holders for assets that allow a firm a chance to pursue such growth opportunities in later years.

Akhigbe, Madura and Martin (2007) observed that firms with a higher potential for growth have a much lower likelihood of defaulting. While Herring and VanKudre (1987) demonstrate that firms are less willing to take risks when growth potential are valuable.

Switzer, Wang, and Zhang (2018) used a sample of 37 financial firms and 170 non-financial firms throughout the period of 2008 to 2013 and found that firms with more growth opportunities have lower default probabilities. The authors concluded that increased chances for growth are favourable not only for stockholders but also for bondholders. Badayi *et al*., (2021) used a sample of 496 companies from 17 developing nations during the period of 2010–2017 using the two-step system generalized method of moments (GMM). They found that market-to-book (growth opportunities) is found to be positively associated with the likelihood of default.

Cao *et al.*, (2015) found that higher leverage, more growth opportunities, greater idiosyncratic risk, and smaller relative-to-market firm size exposed the firms to higher default risk. They used a sample of 97 firms from the Risk Metrics database and 97 firms cited in the Securities and Exchange Commission's (SEC's) Accounting and Auditing Enforcement Releases (AAERs) for the years 1998 through 2005.

2.6 Moderating Role of Growth Opportunities

The stock market is the venue in which traders make use of the information they possess in order to make a profit from trading. The activities of traders are directly responsible for changes in stock prices, which reflect the incorporation of the traders' information. Dow and Gorton (1997) describe two roles of stock price in increasing the efficiency of managers' investment decisions: a prospective role and a retrospective role. Both of these roles focus on improving the efficiency of managers' investment decisions.

Managers have a tendency to actively gather information from the stock market and base their decisions. This is because the stock market provides information that managers may not have, such as the current state of the macroeconomy, the future prospects of the industry, and the strategies being used by competitors. Stock market participants have an incentive to create information about the predicted profitability of the investment project so that they can trade on that information. Managers can also utilize information relating to stock prices to assess the performance of previous investments, which may encourage them to make future decisions in a more efficient manner.

The feedback theory developed by Subrahmanyam and Titman (2001) suggests that a firm’s stakeholders make decisions based on the information engrained in stock prices. Their decisions may cause variations in the firm’s future cash flows. The authors claim

that the feedback effect from stock prices to firm's fundamentals can have a significant impact on managers' incentives to acquire information from the stock market in order to direct their actual actions, and they provide evidence to support this argument. Because the information contained in stock prices influences the practical decisions that managers make, stock prices that carry more information, which has the potential to improve the efficacy of investment decisions.

Since stock liquidity affects price efficiency managers tend to make investment decisions based on information already reflected in stock prices. For instance, managers can use stock liquidity in determining whether or not a company can afford the costs of debt service and principal payments. Similarly, managers who intend to exploit growth opportunities can leverage stock liquidity in assess the possibility of financing the project through issuance of shares, which minimizes the danger of bankrupt if additional debt is used.

Ali *et al.,* (2018), who utilized a large panel consisting of 1086 non-financial companies spanning the years 2001 to 2013, found firms with strong corporate governance mechanism are have lower default risk. They also reported that the inverse relationship is even higher among firms with high growth opportunities. Besides, they noted that stock liquidity played an intervening effect.

Billett, King, and Mauer (2007) studied the effect growth opportunities on a firm's investment opportunity set and the overall choice of leverage, debt maturity, and covenants that the company makes. They documented that covenant protection considerably reduced the negative relationship between leverage and growth prospects. This finding supported to the notion that debt covenants have the potential to reduce the agency costs of debt for those firms with profitable growth prospects.

2.7 Control Variables

The study also included a number of important variables whose effects on firm default risk have been demonstrated by empirical research. The sections that follow discuss the literature.

2.7.1 Tangibility and Default Risk

Corporate finance theories suggest that a firm's ideal financing mix is determined by the owner's capacity to act opportunistically at the disadvantage of creditors and other stakeholders (Abor & Biekpe, 2009). It is expected that firms with high fixed asset to total asset ratios tend to have significant proportion of long-term debt. In accordance to the trade-off theory, tangibility and debt levels should be positively related because of tangible assets typically offer higher collateral values than intangible ones; implying that they can support higher levels of debt. Furthermore, it is challenging to change the volatility of the cash flows produced by tangible assets than by intangible assets. In line with agency theory, firms having tangible assets will be able to support higher debt (Yartey, 2006; Abor & Biekpe, 2009). Asset tangibility minimizes the potential for risk shifting as a result. However, Titman and Wessels (1988) present an agency theory-based event for a conflict between the tangibleness of the firm's assets and leverage. They contend that it is less difficult to monitor the usage of tangible assets than intangible ones, hence firms with intangible assets will typically employ more debt for oversight reasons (Yartey, 2006). Asset tangibility, according to Chung, Elder, and Kim (2010), is advantageous for enhancing liquidity since the payout of tangible assets is easier to see than that of intangible assets and it can reduce information asymmetry, potentially lowering the likelihood of default.

Abinzano *et al*., (2021). Who considered a sample of 1,132 companies in the New York Stock Exchange (NYSE) for the period 2002-2016, reported a positive association

between capital expenditure and default risk. Atif and Ali (2021) assessed whether environmental, social and governance (ESG) disclosure is related to default risk, and controlled for tangibility. The authors used a sample of US nonfinancial institutions from 2006 to 2017, that yielded 5206 firm-year observations. The authors found that tangibility had a positive, but insignificant effect on default risk.

Mateev, Poutziouris and Ivanov (2013), who assessed firm characteristics that determines SMEs' capital structure by employing a sample of 3,175 SMEs from seven CEE countries over the period 2001–2005 reported that the relationship between tangibility and debt behaves differently based on whether the debt is short-term or long-term. Based on the findings, long-term debt was positively related with tangibility, while there was a negative relationship between the tangibility and short-term debt.

Gul and Cho (2019) studied the effect of the capital structure of Korean manufacturing firms on default risk based on Moody's KMV option pricing model where the probability of default is calculated by calculating the distance to default as a covariant in logit model proposed by Merton (1974). The study employed panel data of manufacturing firms publicly listed on Korea exchange during 2005-2016. The results revealed that the rise in short-term debt to assets led to raise the risk of default whereas the growth in long-term debt to assets led to a decrease in default risk. The authors concluded that benefits of short-term debt financing over a short-term period disappear in the presence of information asymmetry. However, long-term debt financing lessens information asymmetry and firms benefit from tax advantage associated with long-term debt. Additionally, the study reported that firm size, tangibility and interest coverage ratio were significant determinants of default risk among the selected firms.

Huang (2021) investigated whether asset tangibility influenced the way that mergers and acquisitions (M&As) manage risk and whether this effect varies depending on the influence of creditors. According to the author, when faced with greater income uncertainty, firms are more likely to use mergers and acquisitions (M&A) as a risk management strategy when they have more physical assets.

2.7.2 Firm Profitability and Default Risk

The level of a company's profitability, as measured by its return on assets (ROA), reflects the extent to which it is able to create returns that are adequate for the company to continue operating effectively. Previous research has indicated that companies with greater ROAs are more likely to reflect a lower default risk. This is because profitable firms are in a position to meet both the principal and interest obligations.

According to the Pecking Order Theory, firms with high levels of profitability will require less outside funding and hence have lower debt ratios. The trade-off argument contends that if firms use debt to lower their tax obligations, their debt ratios should be greater and vice versa. Higher profits lower the danger of bankruptcy and give the company larger corporate tax benefits. Generally, profitability and the debt ratio have a negative association, according to capital structure studies (Pindado, Rodrigues & De la Torre, 2006). Heyman, Deloof, and Ooghe (2008) used a sample of 4,706 firm-year observations for 1132 Belgian companies during the years 1996–2000. Their findings indicated that more profitable companies have lower levels of debt. A study by Atif and Ali (2021, which used a sample of 7412 firm-year observations, for the period of time from 2006 to 2017, and panel data that was obtained from Bloomberg and Singapore National Universal liquidity data for US firms listed in the New York and Chicago exchanges, shows that larger, more profitable, and high growth firms all have a lower default risk.

2.7.3 Institutional Ownership and Default Risk

There has been a large body of evidence regarding the effect of institutional shareholders on share liquidity. According to Almazan *et al*., (2004), institutional investors are frequently limited to buying liquid stocks with high market capitalization and consistent dividend payouts. Selling among institutional investors is prompted by a rise in a stock's probability of default. Without a corresponding rise in demand from other investors, a sudden shift in the clientele of a stock causes one group of investors to sell their holdings. Market makers will have to step in and provide liquidity as a result of this imbalance, which will result in significant price concessions for providing immediacy.

Mendelson and Tunca (2004) contend institutional shareholders encourage investors' interest, minimizes confusion about the actual price of assets and liabilities through deals. This leads to an enhancement of assets' liquidity on the market. Agarwal (2007), on the other hand, conducted research on the effect that institutional owners on liquidity through adverse selection and information efficiency. The author found a nonlinear association between institutional shareholders and stock liquidity. The findings confirmed an important association between stock liquidity and the degree of institutional ownership. The findings can be attributed to improved information efficiency. Additionally, Daryaei and Fattahi (2022) found that institutional investors have more incentives to supervise management and can, as a result, improve market performance. However, if institutional investors have a higher level of dominance, they may as well convince the board of directors to make choices that are inefficient. In other words, lower proportion of institutional ownership may have a positive effect on firm value, which is of course matched with the efficient monitoring hypothesis (Melis & Nijhof, 2018; Vadasi, Bekiaris & Andrikopoulos, 2020). On the other hand, a larger

ownership by institutional investor may have an adverse effect on firm outcomes. This argument is consistent with the "Convergence of interest hypothesis" (Manzaneque, Merino & Priego, 2016).

Maug (1998) contends that institutional investors accumulate large amounts of shares in a highly active stock market, as this reduces the costs associated with acquiring shares. Consequently, this creates more incentives for them express their opinions or intervene. Through the collection stock market data, institutional investors may influence stock prices to align more accurately with the intrinsic value of the firm. Edman, Fang and Zur (2013) used the context of activist hedge funds to illustrate that the liquidity of stocks improves the block holder's governance through both exit and voice mechanisms.

Brogaard *et al*., (2017) proposed two ways through which stock liquidity decreases the likelihood of a company defaulting: by enhancing the effectiveness of stock price information and by enabling block holders to exercise better corporate governance. Selling shares can serve as a governance mechanism, whereby block holders utilizes private information to trade, so causing the stock price to align more accurately with the firm's underlying value. Increased liquidity makes it simpler for institutional investors to sell stocks, and the possibility of an exit can be an efficient tool for corporate governance (Admati & Pfleiderer, 2009; Edmans, 2009). Strong institutional investors governance instills managerial accountability. It encourages them to participate in value-enhancing investments and deters them from opportunistic management actions, which could potentially reduce the likelihood of default. (Edmans & Manso, 2011).

Acharya, Amihud, Bharath (2013) found that stock liquidity increased the effect of block ownership on firm value. Liquidity promotes block formation and trade (exit), but also reduces block holders' incentives for active engagement (voice), according to Edman *et al.*, (2013). Liquidity boosts block holders' corporate governance efficacy through disciplinary trading, which increases management effort (Edmans & Manso, 2011).

Mikkelson and Ruback (1991) studied American companies and concluded that major shareholders tend to support for managerial actions that prioritize the interests of shareholders. Consequently, these major shareholders will enhance the value of companies by curbing any exploitative behaviour exhibited by management. Parker, Peters and Turetsky, (2005) observed that firms with significant block holdings were more likely to endure compared to firms with lesser block holdings. In other words, large owners can act as monitors to mitigate the risk of default. On the other hand, a study done by Bozec and Laurin (2008) on Canadian companies claim that when major shareholders exploit the wealth of minority shareholders, it would result in a decline in the performance and long-term value of the firm. Chiang, Chung and Huang (2015) found that the primary drivers of financial dress among Taiwanese firms was the improper use of resources or the misallocation of assets by major shareholders. These may also contribute to an increased default risk.

Arian, Galdipur and Kiamehr (2014) demonstrated that liquidity, in addition to acting as a lubricant for share acquisitions by external stakeholders, it also speeds up the exit process for existing block holders who are potentially activists. Therefore, the availability of liquidity may encourage block holders to sell their shares even if they are dissatisfied with the performance of the company. Goldstein and Guembel (2008) demonstrate that negative feed-back trading can also occur when speculators take

advantage of liquidity by engaging in short-selling techniques that have the effect of reducing a company's overall performance.

Kabir *et al*., (2020) used a sample of 2902 listed non-financial firms over the period of 2004 to 2017 and the recently available Nikkei NEEDS CGES database. In line with the wealth redistribution hypothesis, the findings of this study revealed a positive association between institutional and foreign shareholdings and the probability of default.

Corporate governance processes can mitigate firms' default risk by enhancing managerial oversight by institutional investors, hence minimizing agency costs, and/or by lessening information asymmetry between the firm and capital sources through the trading activity of institutional investors. Bhojraj and Sengupta (2003) found that companies with greater institutional ownership experience reduced bond yields and improved ratings on their new bond offerings from Ashbaugh-Skaife, Collins and LaFond (2006) found that institutional ownership did not have a statistically significant effect on firms' credit ratings. Erkens, Hung, and Matos (2012) reported a positive link between institutional holdings and firms' propensity for taking risks over the period of 2004-2006, which was immediately before the crisis of 2007-08. Aebi, Sabato, and Schmid (2012) demonstrated that institutional ownership was ineffective in monitoring the risks assumed by banks throughout the crisis 2007-08 GFC.

2.7.4 Firm size and Default Risk

The trade-off theory hypothesizes a link between firm size and default risk. It suggests that large firms typically have higher levels of leverage. However, due to their consistent financial flows, large firms are less likely to fall into default (Handoo & Sharma, 2014). Compared to small firms, larger firms can typically raise long-term

capital at lower transaction costs (Wald, 1999). Marsh (1982) observed that small enterprises have a preference for short-term debt, while large firms tend to lean towards long-term debt.

On the other hand, Pettit and Singer (1985) observed that while it is normal for small firms to have greater agency costs of debt, it is also possible that these costs will be higher for agency costs of equity. The size of the firm and the debt ratio are often found to be closely linked in some empirical studies on the capital structure of small firms (Van der Wijst & Thurik, 1993; Vithessonthi, C., & Tongurai, 2015; Zhang *et al*., 2020).

Compared to smaller firms, large firms have more diversified business activities and sources of funding. For instance, Buera, Kaboski and Shin (2011) found that large-scale industries, like the manufacturing industries, exhibit higher levels of external financial dependence than small-scale ones, like the service industry. Large firms have fewer credit restrictions than small firms (Chan, Dand & Yan, 2012). Studies have also shown that the probability of default values of small firms are therefore higher than those of large firms. Gharghori, Chan, and Faff's (2007) found that smaller firms were more likely to default than larger ones. They argue that smaller firms have more unstable cashflows and have less opportunities to raise equity capital. Zhang *et al.*, (2020) found that larger firms had a lower probability of default. The authors used a sample of 981 Chinese listed firms and panel data for the period 1998 to 2013. They concluded that larger firms, in comparison to smaller ones, have a wider variety of businesses and possibilities for obtaining finance.

Chan, Dang and Yan (2012) found that larger firms had less financing constraints than smaller ones. Thus, small firms have a higher chance of defaulting compared to large

ones. Nie, Ling, and Chen (2023) studied the effect that FinTech on the likelihood of corporate loans going into default using data collected from A-share companies that were listed in China between the years 2011 and 2020. They found that the risk of defaulting on debt was more prevalent in smaller businesses than it was in larger companies. Abinzano, Corredor, and Martinez (2021) studied publicly traded firms on the New York Stock Exchange (NYSE) between 2002 and 2016, and reported positive relationship between firm size and default risk. Dasilas and Papasyriopoulos (2015) also documented that the firm size might be used to explain the inverse relationship between earnings volatility and the likelihood of bankruptcy. Conversely, Degryse *et al*. (2012) suggest that larger firms exhibit greater diversification and experience less fluctuation in their revenues. Hence, the costs associated with bankruptcy are offset by the stability of their earnings.

The size of a firm is positively associated with leverage because large firms have access to trustworthy and high-quality information, which leads to a reduced cost of debt (Lee & Son, 2015; Palacín Sánchez, Ramírez-Herrera, & di Pietro, 2013). In their study, George and Hwang (2010) found that the default risk premium in equity returns is determined by the size of the firm. While, Harris and Raviv (1991) found that larger enterprises and firms with a substantial quantity of tangible assets (TANG) experience less financial difficulty and are hence more likely to secure long-term loan funding. In contrast, companies with lower tangibility of assets (TANG) and limited development prospects tend to avoid debt financing because of the significant costs associated with financial hardship. Furthermore, companies that have a higher level of tangibility and a larger size are more prone to get favourable credit ratings. These firm are also able to secure long-term loans due to their capacity to minimize information asymmetry and reduce the risk of financial distress.

2.7.5 Firm Leverage and Default Risk

Because constrained free cash flows restrict managerial choice, firms can benefit from an optimal level of leverage (Jensen, 1986). However, if the levels of leverage exceeded, the cost of debt would rise due to the increasing bankruptcy cost, which could have a negative impact on the value of the firm (Titman, 1984). Caskey, Hughes, Liu (2012) found that when leverage was broken down into its optimal and excess components, excessive leverage has a tendency to produce a negative effect on future returns. Durand, Liang and Ngo (2016) add that when a firm uses more leverage than is necessary, it places the shareholders at risk of significant agency costs that outweigh the gains that can be gained from mergers and acquisitions.

Merton's (1974) model was originally used to study the connection between leverage and default. This model's central premise is that a company defaults on its debt when the value of its assets hits a predetermined default level. Ivaschenko (2003) revealed that increased corporate default and probability of recovery are interrelated with a rise in corporate indebtedness. This is in line with the corporate debt model developed by Anderson, Sundaresan and Tychon (1996) which claims that there is a correlation between balance sheet leverage and the likelihood of default. Moreover, Molina (2005) noted that there a significant positive relationship between the likelihood of default and balance sheet leverage.

Furthermore, Traczynski (2017) documented that market return volatility and financial leverage are the major determinants default risk across all sectors. Also, Cathcart *et al.*, (2020) reported that defaulting firms are always more levered than unlevered ones. Kabir, Rahman, Rahman and Anwar (2021) used a sample of firm included in the ASSET4 ESG database for the period 2004 to 2018. They found that firms highly leverage were more exposed to default risk compared to firms with non-levered firms.

Switzer *et al.,* (2018) studied the effect of corporate governance variables on default risk of Canadian firms after the 2008 financial crisis. Ownership structure, (e.g., institutional ownership and insider ownership), has a significant impact on the default risk of financial firms but not on nonfinancial firms. Nonfinancial firms with more independent boards are associated with lower default risk, while financial firms with larger boards and more independent boards have higher default risk. For firm characteristics, the market to book ratio, the return on assets, firm size, and cross-listing dummy are negatively related to default risk, while volatility, illiquidity, leverage ratio, and HI index are positively related to default risk.

In their study, Chiu, Wang, and Peña (2017) assessed the impact of the source of debt financing (banks or public debt markets) on the default risk of enterprises in the U.S. market between 2006 and 2010. They found that firms with a greater access to bank financing have a higher likelihood of falling into default.

2.7.6 Firm Age and Default Risk

Literature suggests that firm age may influence default risk. For instance, Koopman and Lucas (2008 claim that younger enterprises have a lower default rate than older firms, who in turn have a lower default rate than yet older firms. According to Jungherr and Schott (2021), older and bigger firms have a lower default risk since they are more profitable. This lowers the cost of borrowing at long maturities, enables them to increase their leverage, and enables them to repay lower credit spreads than smaller and younger firms. However, Lisboa, Costa, and Santos (2021) contend that older firms have a higher risk of default because they are more likely to be mature firms and find it more challenging to keep up with emerging markets, particularly if they are family-owned firms that find it hard to abandon old habits. In the same vein, Bandyopadhyay (2006) found that young firms have less time to establish a relationship with their

creditors and investors, which raises the likelihood that they may experience financial difficulties during a credit crisis. A study done by Zeitun and Tian (2007) that used a sample of 59 publicly traded companies in Jordan over the years 1989 to 2002 found that firm age had no significant effect on the likelihood of default. Atif and Ali (2021), who used a sample comprising of nonfinancial institutions in the United States spanning from 2006 to 2017 and data that was obtained from Bloomberg and the Singapore National Universal and the New York and Chicago exchanges observed that firms companies had a lower likelihood of default, while younger firms have an increased likelihood of default.

2.8 Conceptual Framework

A conceptual framework is a visual representation of the key variables to be researched, including the outcome variable, the predictor and intervening variables as well as the hypothesized relationships (Roberts, 2000; Hamad, Draz & Lai, 2020). The conceptual framework of this study shows that default risk is the dependent variable, the dimensions of stock market liquidity (namely price impact, trading quantity, transaction cost and trading speed) are the independent variables, while growth opportunity is moderating. The conceptual framework further shows that firm profitability, tangibility, firm size, institutional ownership, leverage and firm age are the control variables. The hypothesized relationships of the study are shown in figure 2.1 below

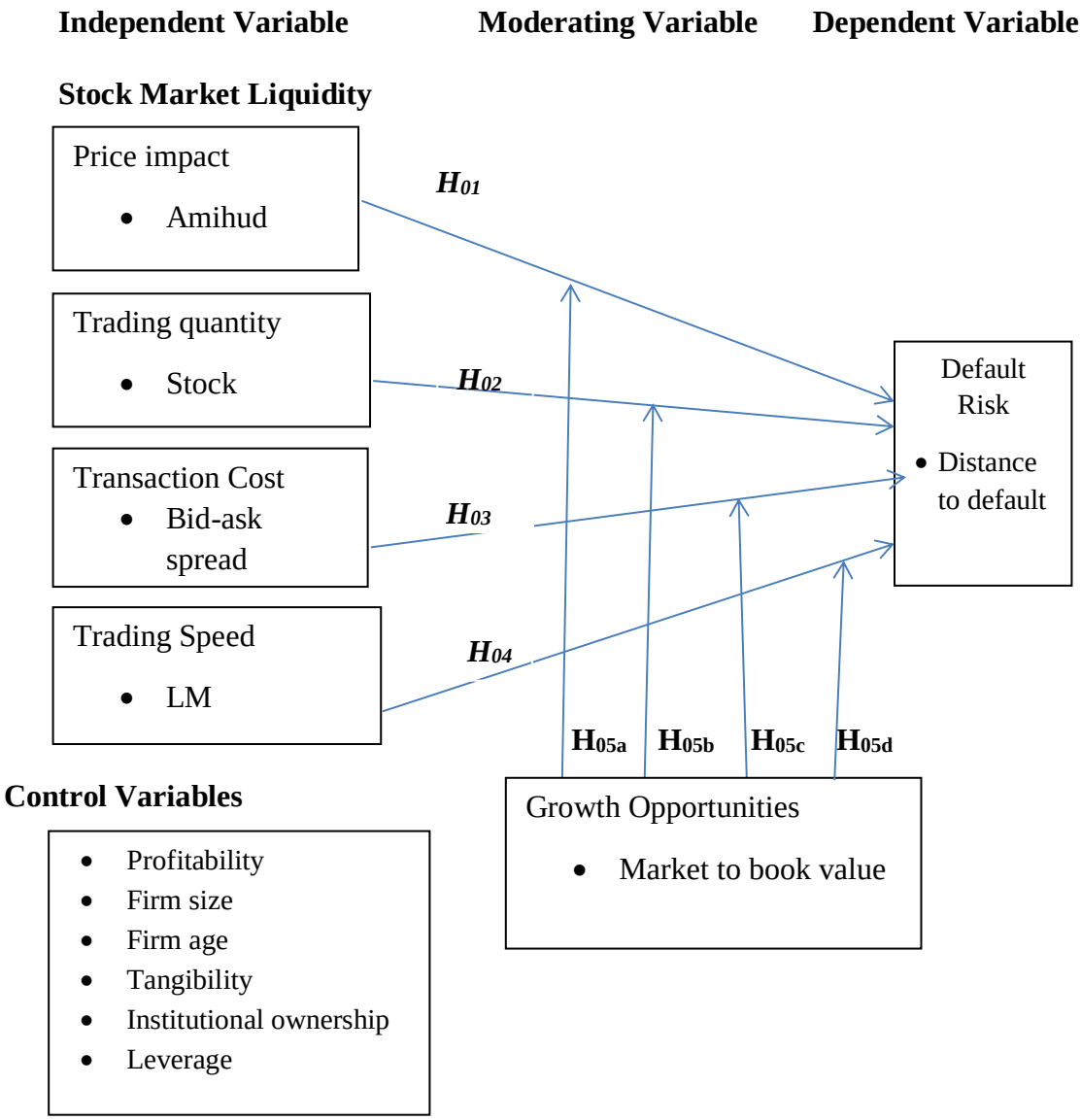

Figure 2.1: Conceptual Framework

Source: Researcher, 2023

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Overview

This chapter outlines the methodology used in the study. The chapter discusses the research philosophy, research design, target population and sample, data types and sources, measurement of variables, data analysis and presentation, regression models and the underlying assumptions.

3.1 Research Philosophy

A research paradigm is "the set of common beliefs and agreements shared between scientist about how problems should be understood and addressed" (Kuhn, 1970). According to Guba, (1990) a research paradigm can be characterized by the "way Scientists respond to three basic questions: ontological, epistemological and methodological questions." Erickson and Kovalainen (2015) content that a research paradigm is direct the selection of research design and methodologies. This study adopted that positivism paradigm. The positivism paradigm is the widely used paradigm in business research (Orlikowski & Baroudi, 1991) is premised on the argument that that reality can be measured by viewing it through a one way, value-free mirror (Perry, 2002). Positivism paradigm encompasses the study of the observable components of social reality, and its goal is to create research findings that focus on the formulation of general principles and on the relationship between causes and effects. In addition, Saunders, Lewis and Thornhill (2009) claim that only observable phenomena led to the collecting of reliable data and the practical application of existing theory to build hypotheses. The paradigm holds that data collected should answer the observable social reality, and serves as the basis for testing of hypotheses and making generalizations (Bhattacherjee, 2012).

The positivism research paradigm was chosen for several reason. First, the main objective of the study was to examine the relationship between the liquidity of the stock market on default risk among nonfinancial firms listed in Nairobi Securities Exchange, and the potential moderating effect of growth opportunities. This objective sought to assess a cause-effect relationship between variables. Second, the study was based on well-grounded theories that aided in the formulation of hypotheses. Third, was carried out in an objective manner, with the researcher maintaining a neutral stance about the data gathering procedure. No human participants were involved in the study as data was quantitative and secondary in nature (Bhattacherjee, 2012; Saunders *et al*., 2009). Third, the hypotheses were tested using regression results which were obtained through the application of panel data estimation techniques with the aid of statistical software. Fourth, the findings of this study were used to make generalization.

3.2 Research Design

A research design is a blueprint that defines data collection and analysis methods. The purpose of a research design is to guide the research process. Zikmund *et al*., (2013) claim that a research design makes the process of data collection, measurement, analysis, and interpretation systematic and simpler. This assertion emphasizes the importance of a research design.

This study was anchored on both the explanatory and longitudinal research design. The purpose of an explanatory research design is to develop causal explanations by testing hypotheses, as well as to explain the correlations that exist between the variables being studied. Saunders *et al*. (2009) assert that a causal effect occurs when shifts in the independent variable directly induce modifications to the values of the dependent variable. While Zikmund *et al*., (2013) contend that the use of an explanatory design

enables researchers to generate informed hypotheses on the cause-and-effect relationships that will be investigated. These hypotheses will be tested during the research process. In the context of this study, the main objective was to investigate both the moderating influence of growth possibilities on the link between stock market liquidity and default risk, as well as the effect that stock market liquidity on default risk of nonfinancial firms listed in Nairobi Securities Exchange. Based on the objectives, hypotheses were developed and tested using the results of regression analysis to establish cause-effect relationships between the variables. Therefore, this design was ideal for the study.

A longitudinal research design was utilized in the study. The choice of this design was informed by the data that were used. This design allows for the examination of both the cross-sectional and longitudinal characteristics of the units (Gujarati, 2004). This design is ideal for panel data and panel data regression methods, that analyzes a group of successive observations of the research variables throughout the course of a particular time period (Frees, 2004; 2004; Baltagi, 2008). Panel regression estimation models help establish the relationship between variables over a time period (Saunders *et al*., 2009; Bhattacherjee, 2012). The study's data was both cross-sectional and time-series in nature. Specifically, the data was for 31 non-financial firms for the period between 2011 and 2020. Consequently, the research design was also appropriate for the study.

3.3 Target Population and Sample

A target population is defined as the totality of elements that are under. Thus, target population denotes the group of individuals or entities that contain the specific

information that the researcher is seeking and, from which meaningful conclusions can be derived.

The study focused on the entire set of non-financial companies that are publicly listed in Kenya. Appendix II displays a list of non-financial companies that are listed on the Nairobi Securities Exchange. In line with previous research (Kabir *et al.,* 2020; Vivel-Búa *et al.,* 2023), financial institutions such as banks, insurance companies, and investment firms were not considered due to their unique operational and financial circumstances. Furthermore, these entities are highly regulated in terms of core capital requirements and are less likely to fall into default. In December 2020, there were a total of 43 non-financial firms listed in NSE.

3.4 Inclusion/Exclusion Criteria

The study employed an inclusion/ exclusion to select the final sample. First, for a firm to be selected it shares must have traded consistently between 2011 and 2020. Second, the firm's financial and stock market information for the entire study period was available. After applying the criteria, the final sample comprised of 31 non-financial firms for a period of 10 years, yielding 310 firm-year observations.

3.5 Data Types and Sources

This study employed secondary data extracted from the annual financial reports found on the firms' website, the African Financials Database and the NSE monthly bulletins. Data related to stock liquidity data was obtained from the Nairobi Securities Exchange. The rest of the data was hand-picked from the individual firm's audited annual financial reports.

3.6 Measurement of Variables

Default risk was the dependent variable. The study considered price impact, trading quantity, transaction cost, and trade speed as the predictor variables. The study employed growth opportunities as the moderating variable. Furthermore, the study accounted for factors such as profitability, tangibility, institutional ownership, firm age, and firm size as control variable. The subsequent subsections discuss how the variables were measured and operationalized.

3.6.1 Dependent Variable

Default risk is measured using both market and accounting based models. Those market-based models that make use of data obtained from the bond market and option pricing theory. Predicting default risk with accounting-based models involves analyzing financial information. The option pricing model is the structural model and market-based technique developed by Merton (1974) that provides estimates for the likelihood of defaulting on a financial obligation. Market based models have widespread application in predicting the likelihood of default (Nishi & Peabody, 2019; Sghaier & Hamza, 2018). In this model, the equity of the company is treated like a call option, and the "strike price" of the option is set to be equal to the face value of the firm's debt obligations. This method is used in relation to how much the company is actually worth. Following Beaver's seminal work in 1966, other accounting and market-based default risk models have been developed and used in empirical literature. Because accounting-based models are formed from financial statements, which only look in the past, their validity has been questioned. This is because financial statements are used to create accounting-based models.

On the contrary hand, market-based models which utilize use of the option pricing technique that was devised by Black and Scholes (1973) and Merton (1974) offer a reliable alternative tool that can predict the likelihood of a firm falling into default risk. Merton (1974) distance to default models uses both the market data and the accounting data. The model's foundation is the option pricing model theory.

After all of the company's obligations have been satisfied, the stockholders are still entitled to a portion of the remaining assets. Consequently, shareholders are seen as buyers of put options because they purchase them. They are given the opportunity to purchase the asset of the company in exchange for the payment of liabilities, which serves as the strike price. The market data is reflective of expectations for a company's future cash flows. Therefore, it should be more acceptable for use it in predicting default risk. The provision of a 'finer' volatility evaluation that assists in the forecast of the risk of default is another important aspect of such Merton (1974) model.

Empirical studies (Gharghori, Chan & Faff, 2006; Hillegeist *et al*., 2004) confirm that Merton (1974) market-based model is superior to their accounting models in predicting default irrespective of the context. Merton (1974) distance to default (DD) was used to measure default risk as shown below.

$$DD(t) = \frac{\ln\left(\frac{V_A}{D}\right) + \left(r - 0.5\sigma_A^2\right) * T}{\sigma_A \sqrt{T}} \qquad (1)$$

and the probability of default (PD) is:

$$PD(t) = \mathcal{N}\left(-\frac{\ln\left(\frac{V_A}{D}\right) + \left(r - 0.5\sigma_A^2\right) * T}{\sigma_A \sqrt{T}}\right) \qquad (2)$$

where N denotes the cumulative standard normal distribution, VA is the current value of the asset of the company, D is the face value of the debt (default point), r is the risk-free rate, σA is the annualized company value volatility and T is the length of the horizon (1 year).

The study utilized the approach of Vassalou and Xing (2004) to calculate DD. It employed the firm's asset volatility as an initial estimate, which was determined by analyzing the stock return volatility based on daily data from the previous twelve months. By utilizing the intial estimation with the equity's market value, the default-triggering asset value, and the risk-free rate, one can calculate the firm's asset value using the Black and Scholes (1973) call option formula for each trading day in the preceding twelve months. The time series of asset values enables us to calculate a new estimation of the firm's asset volatility.

We repeat this procedure until the estimation of asset volatility reaches a point of convergence (Jessen & Lando, 2015). A higher value of DD indicates a larger distance to default and, hence, a reduced probability of default (PD). Both measurements, DD and PD exhibit an inverse relationship: as the distance to default increases, the probability of default decreases.

3.6.2 Independent Variables

The study used four measures of liquidity that comprise of price impact, trading quantity, transaction cost and trading speed measured annually, which are low-frequency measures of stock liquidity. Studies have shown a high correlation between high frequency and low frequency measures of stock liquidity. For example, Fong, Holden and Trzcinka (2017) conducted a study in which they compared the daily and monthly liquidity metrics that were calculated from the Datastream daily stock data to

the daily and monthly liquidity indices that were computed from the Thomson Reuters Tick History (TRTH) intraday stock data for 43 different exchanges all over the world. They show that the basic bid-ask spread measure suggested by Chung and Zhang (2014) has significantly greater correlations with intraday effective, quoted, and realized spreads when compared to alternative low frequency measures. Fong *et al.,* (2017) found that the mean cross-sectional correlation for the simple bid-ask spread measure was 0.691 on average, while the correlation for the portfolio time series was 0.809.

3.6.2.1 Price Impact

Amihud illiquidity ratio (ILLIQ) was as the proxy measure of price impact. According to the "illiquidity" measure developed by Amihud in 2002, the average ratio of the daily absolute return to the trading volume on a specific day would be lower when the stock liquidity is higher. According to previous research (Fong *et al*., 2017; Goyenko *et al*., 2009; Marshall, Nguyen, & Visaltanachoti, 2012), Amihud's (2002) measure is one of the accurate proxy measures of price impact. This is because it has a significant association with other benchmark indicators of stock liquidity. A suggested by earlier studies (Acharya & Pedersen 2005; Bekaert, Harvey &Lundblad 2007; Goyenko, Holden & Trzcinka 2009; Lischewski & Voronkova 2012; Lesmond 2005), this indicator was utilized in its absolute form.

It is defined as the ratio of the absolute value of the daily return to the average daily trading volume in shillings for a particular month's trading days.

$$|R|\frac{P_{it}}{P_{t-1}}$$

The firm’s average illiquidity ratio over the years is defined as follows:

$$\text{ILLIQ} = \frac{1}{Y}\sum_{t=1}^{y} {|R_t|}/{P_t * V_t}$$

Where *Rt* is the absolute return, *Pt* is the price at year *t*, and *Vt* is the trading value at year *t*. ILLIQ is Amihud's illiquidity. According to this measure, firm would have low liquidity when the measure has a high value. Goyenko, Holden and Trzcinka (2009) find that Amihud's measure is the most representative measure that captures the price impact, and it is the only one among other price impact proxies that has statistically significant correlations with high- frequency liquidity benchmarks.

One of the shortcomings of the price impact is as a measure of illiquidity is that it cannot be computed on days with zero trading, which significantly reduces its utility as a measure of stock liquidity. Lesmond (2005) contends that this measure's is based on the price impact of order flow, which is further supported by Kyle (1985). However, the price impact reflects illiquidity owing to it is positively correlation with the bid-ask spread. This study measured the Amihud illiquidity as the annual simple average of daily ratio of the absolute stock return to its shillings volume. Its is worth noting that when the price impact is high, stocks are considered illiquid and vice versa.

3.6.2.2 Trading quantity

The trading-quantity denotes the amount of stock trading. Higher (lower) trading-quantity stocks may signal lower (higher) liquidity risk. Datar *et al.,* (1998) recommend using the turnover ratio to proxy for the trading-quantity dimension of stock liquidity.

Prior studies, including Brennan and Subrahmanyan (1996), Bertsimas and Lo (1998), Pastor and Stambaugh (2003), Acharya and Pedersen (2005), and Sadka (2006), used turnover ratio as a metric for assessing stock liquidity. When an instrument possesses a turnover ratio of 100%, it can be said that every share was exchanged during the period

(Sadka, 2006). A higher turnover implies higher stock market liquidity. Moreover, Bartov and Bodnar (1996) contend that stock trading volume and information asymmetry are related, with decreased trading volume potentially resulting from an increase in information asymmetry as uninformed investors limit their trading in these equities.

Despite its popularity (Bekaert *et al*., 2007; Levine & Schmukler; 2003) turnover ratio does not account for the cost per trade, which varies considerably across assets. Summers (2000) and Froot, O'connell and Seasholes (2001) argue that stock turnover is likely to increase in liquidity crisis rather than decrease to reflect the decline in market liquidity. Nevertheless, this measure remains the key indicator of trading quantity as demonstrated by earlier studies (Mehta, Jain & Yadav, 2014; Campbell, Grossman & Wang, 1993; Chordia & Swaminathan, 2000; Chae, 2005).

$$TQ_{i,t} = \frac{ni,t}{Si,t}$$

Where ni; t is the number of shares traded for security i on day t, and Si; t is the shares outstanding values as of the year and remain constant for 12 months. Following Campbell and Wasley (1996), before transformation, a small constant of 0.000255 is added to accommodate zero-trading volume.

3.6.2.3 Transaction Cost

Transaction cost indicators are used to quantify the cost of trading financial assets in a secondary market, and one of the methods that is utilized to measure transaction cost is the difference in price between the bid and the ask. The transaction cost was determined by comparing the quoted bid-ask spreads to the actual spreads that were seen in the market. Demsetz (1968) was the first scholar to propose using the bid-ask spread as a

method for determining how liquid stock markets are. According to Amihud and Mendelson (1986), relative bid-ask spreads are calculated by taking the yearly average of the daily ask price minus the daily bid price and dividing that number by the daily quote mid-point. This formula is used to determine the spread for each company. According to research on bid-ask spreads, the spread is composed of three distinct categories of costs that the dealer is required to bear: expenses related to order processing and holding, expenses related to inventory keeping, and charges related to adverse selection. The bid-ask spread was designed to solve the problem of adverse selection, which occurs when investors participate in the buying and selling of company shares while having access to unequal amounts of information. According to Handa, Schwartz, and Tiwari (1998), lower levels of information asymmetry are associated with lower levels of adverse selection, which in turn is associated with lower bid-ask spreads and higher levels of liquidity.

The relative spread was utilized as a measure of the cost of trading in this study. The relative spread is calculated by taking the annual simple average of the daily ratio that represents the difference between the daily closing bid and ask prices and dividing that number by the midpoint of the bid-ask spread. The relative spread is calculated as

$$Relative\ spread_{it} = \frac{Ask_{it} - Bid_{it}}{(Ask_{it} + Bid_{it})/2}$$

The bid-ask spread, directly quantifies transaction costs by measuring the gap that exists between the ask price and the bid price. Consistent with the theory of microstructure, the spread can be broken down into two different components. The first component provides market makers with the ability to generate income from order flow, which may then be used to offset costs associated with order processing and inventory

management. The second component of this measure is known as adverse selection, and it takes place when market makers come into contact with investors who are in possession of more superior information than they are. However, bid-ask spreads are not unique to quote-driven marketplaces. In a trading system in which orders are what drive the market, Glosten (1994) demonstrated a positive link between bid-ask spreads and unfavourable selection costs. This indicates that the difference between the bid and the ask price is a reflection of the cost of delivering fast execution. Handa, Schwartz and Tiwari (1998) assert that bid-ask spread is an intrinsic property of an order-driven market because players are willing to pay for the certainty of a precise price. In other words, an order-driven market will always have a bid-ask spread.

Studies confirm (Javadpour et al., 2020; Groß-KlußMann & Hautsch, 2013; Li, Niu & Chu, 2016) the bid-ask spread is a representation of the costs associated with order processing, inventory holding, and asymmetric information. While, the bid-ask spread is frequently used as a measurement of liquidity, it has a few drawbacks that should be taken into consideration. In a manner analogous to that described by Grossman and Miller (1988), the act of purchasing and the act of selling is not instantaneous but rather take place at random and at distinct moments in time. There is a possibility that the transaction price will be lower than the ask price or more than the bid price. This arises due to the fact that limit order clients, when purchasing assets, may be inclined to give a greater price than the bid price in order to offset the potential price volatility that comes along with waiting. As a result, the spread should not be relied upon as an accurate indicator of the costs associated with trading. Brennan and Subrahmanyam (1996) suggest that the bid-ask spread is an imperfect indication due to the inherent noise in the market. In addition, stocks trading at higher prices tend to have wider bid-ask spreads, even if this does not necessarily point to a lack of liquidity in the market.

The challenge that the stated spread may widen when the stock price rises can be circumvented by the utilization of proportionate spread. In order to quantify liquidity while maintaining uniformity.

3.6.2.4 Trading speed

The trading-speed dimension is related to how quickly stocks are traded, with faster and more frequent trading indicating more liquidity. Liu (2006) proposes a liquidity measure (LM) to represent the trading frequency of stocks.

$$LM_{it} = [NoZV_{it} + \frac{1/(x - month\ turnover)}{Deflator}]x\frac{21}{NoTDt}$$

where NoZVi,t is the number of zero daily trading volumes for stock i in month t; turnoveri,t is the stock turnover rate for stock i in month t. The total number of trading days on the market during month t is denoted by NoTDt, and the deflator is calculated to be 480,000, as recommended by Liu (2006). On a daily basis, volume data for each stock is compiled and analyzed. NoZV is a measure of liquidity; the lower the number of daily trades with a volume of zero, the higher the frequency of trades and, as a result, the greater the stock's liquidity. It is a reflection of the continuity of trading as well as the potential delay in carrying out a trade (Liu, 2006). To some extent, the turnover metric is able to reflect the concept of how much total quantity has been exchanged hands. It serves as a tiebreaker in situations where two equities have an identical number of zero daily trading volumes. Therefore, LM considers the most liquid stocks to be those that are traded often and have a significant turnover throughout the relevant month. Multiplication by the factor 21/ NoTD brings the number of trading days in a month to a standardized level of 21, which, in turn, makes LM similar across time periods. To summarize, LM determines the liquidity of stocks by counting the number

of zero daily trading volumes, and then it utilizes turnover to differentiate between stocks that are categorized as having the same level of liquidity based on the number of zero daily trading volumes. The function of NoZV is a representative of the number of zero daily returns (Lesmond, Ogden & Trzcinka, 1999). As a result, the trading cost dimension of liquidity is also reflected by LM. The turnover component of LM is what allows it to triumph over the possible size influence in the number of zero daily trading volumes. The number of days with zero trading volumes in the preceding x months is a good indicator of the consistency of trading as well as the likelihood for a delay or difficulty in executing an order. Furthermore, the absence of trade in a security is a good indicator of the degree to which it is illiquid: the more frequent the absence of trade, the less liquid the security is. The "lock-in risk," which refers to the possibility that assets will not be able to be sold, is captured by the measure in circumstances where there are zero trade volumes. In order to annualize LM, the percentage of days with zero returns is measured over the course of a whole year. The sign is further flipped in order to measure trading speed as a dimension of stock liquidity. Nonetheless one of the main limitations of LM as a measure of trading speed is that it does not take into account the fluctuation of the stock price.

3.6.3 Moderating Variable

Growth opportunities was the moderating variable. The market-to-book asset ratio is used as a proxy measure of the firm's growth prospects. Lyandres and Zhdanov (2013) suggest that the market-to-book ratio (MTB) is calculated by dividing the current market value of an equity by its book value. Importantly, Adam and Goyal (2008) provide empirical support of market-to-book value as an appropriate proxy measure for growth opportunities. They demonstrate that it has the highest correlation with a company's actual investment opportunities.

3.6.4 Control Variables

The study controlled for several firm specific factors as suggested by empirical literature and the measurement of these variables is covered in the following subsections.

3.6.4.1 Profitability

Probability ratios are financial measurements that assess a company's capacity to produce profits by successfully and efficiently utilizing the resources at its disposal. Profitability ratios demonstrate a company's capacity for revenue generation and shareholder value. Profitability ratios have been employed in a number of studies to predict financial distress (Atif & Ali, 2021; Dar, Anuradha & Qadir, 2019). This study used return to asset (ROA) as a proxy measure of profitability. ROA is calculated as the ratio of net profit to total assets.

3.6.4.2 Tangibility

The study further controlled for the ratio of net fixed assets to total assets, which is a proxy for tangibility. The trade-off theory suggest that tangible assets insert a positive impact on external borrowing because they have value in the event of bankruptcy (Kraus & Litzenberger, 1973). A large number of studies supported the positive association between tangibility and leverage, thus default risk (Wang, Chiu & Peña, 2017; Gopalakrishnan & Mohapatra, 2020).

Dasilas and Papasyriopoulos (2015) contend that tangible assets (TANG) can lower the cost of bankruptcy and credit risk and that the firm's tangibility has a positive correlation with its debt. TANG has a positive relationship with leverage and can alleviate with information asymmetry problems (Degryse, Goeij & Kappert, 2012). In addition, many studies found that tangibility increases borrowing capacity because it

allows creditors to use fixed assets as collateral (Rajan & Zingales, 1995). Koussis and Makrominas (2015) assert that increasing capital expenditure raises the probability of default. Higher values of capital expenditure are expected to be associated with higher default risk (Shih *et al.,* 2021; Wang, Chiu & Peña, 2017). Tangibility was measured as the ratio of net property, plant and equipment to total assets (Koussis & Makrominas, 2015).

3.6.4.3 Firm size

Existing literature suggest that larger firms are more stable and tend to have lower default risk. In line with extant literature, firm size was measured as the logarithm of total assets (Kabir *et al.,* 2020).

3.6.4.4 Institutional Ownership

According to Larcker, Richardson, and Tuna (2007) and Dittmar and Mahrt-Smith (2007), institutional ownership refers to the fraction of shares that are held by institutional owners. Consequently, this variable was measured as the ratio equity shares that held by institutional owners to total shares at the end of each financial year.

3.6.4.5 Firm leverage

Leverage is the main determinant of default risk and bankruptcy. Consistent with previous literature, leverage was measured as the ratio of total debt (current liabilities+long-term liabilities+other liabilities) to total book value of asset (Abinzano, Corredor & Martinez, 2021).

3.6.4.6 Firm age

The study further controlled for firm age as suggested by empirical literature (Koopman & Lucas, 2008, Jungherr & Schott, 2021; Bandyopadhyay, 2006). This variable was

measured as the natural logarithm of the number of years a firm has existed since incorporation (Nadarajah *et al*., 2021; Brahmana, You & Lau, 2022).

3.6.5 Operationalization of the Research Variables

The study consisted of four sets of variables: one dependent variable, four independent variables, one moderator variable, and six control variables, as indicated in table 3.1 below.

Table 3.1 Operationalization of the Research Variables

Variable Type	Variable	Measurement	Abbreviation	Source
Dependent	Distance to default	distance to default (DD), cumulative normal distribution N(-DD)	PD	Merton (1974)
Independent Variables	Price impact	Amihud's illiquidity ratio (ILLIQ)	PI	Amihud (2002)
	Trading quantity	Trading turnover	TQ	Datar *et al.*, (1998)
	Transaction cost	effective bid-ask spread	TC	Le and Gregoriou (2020)
	Trading speed	turnover-adjusted zero daily volumes (LM)	TS	Bilinski, Liu and Strong, (2012)
Moderating variable	Growth opportunity	Market to book value	GO	Lyandres and Zhdanov (2013)
Control variables	Tangibility	Ratio of property, plant and equipment to total assets	TAN	Koussis and Makrominas (2015); Koussis and Makrominas, (2015).
	Firm age	Natural logarithm of number of years since incorporation	FA	Nadarajah *et al.*, (2021); Brahmana *et al.*, (2022)
	Firm size	Logarithm of total assets	FS	Kabir *et al.*, (2020)
	Performance	Return on assets	FP	Siriopoulas and Tziogkidis, (2010); Rashid and Abbas, 2011; Dar and Qadir (2019)
	Institutional ownership	Proportion of institutional ownership	INOW	(Larcker *et al.*, (2007); Dittmar and Mahrt-Smith, (2007).
	Leverage	Ratio of debt to total assets	LEV	Abinzano, Corredor & Martinez (2021)

Source; Research data, 2023.

3.7 Data Analysis and Presentation

The study employed both descriptive and inferential statistics. The objective of descriptive statistics was to summarize data as well as provide a description of things and constructs that were utilized in the research. The field of inferential statistics focused on drawing conclusions or making predictions about a population based on the observations and analyses of a sample from that population. This made it possible to generalize beyond the sample data to a more extensive population.

3.7.1 Descriptive Statistics

Healey (2014) argues that descriptive statistics enables the researcher to condense large quantities of data using methods that are understandable to the observer. While, Chatzipetrou *et al.,* (2020) contend that descriptive statistics entail computation of simple summary statistics like minimum and maximum values, the mean, standard deviation, and the median of the data. As a result, the raw data was summarized using the mean, standard deviation, minimum and maximum values

3.7.2 Correlation Analysis

A correlation analysis was performed in order to ascertain whether or not the variables of the study were related. Saunders *et al*., (2009) state that correlation analysis enables scientists to accurately quantify the extent of the linear relationship between two variables. The coefficient is bounded between -1 and +1. A correlation coefficient of +1 signifies a perfect positive correlation, implying that the two variables are precisely related. It suggests that an increase in the values of one variable will result in a corresponding increase in the values of the other variable. On the contrary, a coefficient of -1 signifies a perfect inverse correlation. To determine the correlation between the dependent, independent, moderator and control variables, the study used the Pearson pairwise correlation. The significance level was 5%

3.7.3 Regression Analysis

The study utilized hierarchical multiple regression analysis to test the hypotheses. Regression analysis quantifies the extent to which the independent variables may account for the variability observed in the dependent variable. Hair *et al*., (2010) asserts that the coefficient of multiple determinations (R2) quantifies the extent to which the variability in the dependent variable may be accounted for by the multiple regression equation. The study applied the hierarchical regression analysis. The results of the regression analysis were used to test the hypotheses at a significance level of 5%.

3.7.4 Testing for moderation

According to the definition provided by Baron and Kenny (1986). A moderator is a variable that has an effect on the magnitude and/or the nature of the relationship that exists between a dependent variable and an independent variable. Moderation is premised on the argument that the relationship between two variables is may be influenced by a third variable. A moderator may affect the relationship between the dependent and the predictor variable by either enhancing, buffering or antagonizing the relationship. A moderator is said to enhance the relationship when it makes the influence of the independent variable on the dependent variable stronger. On the other hand, moderator is said to be buffering when it makes the influence of the independent variable on the dependent variable weaker. While it is said to be antagonistic when it reverses the direction of the relationship between the dependent and independent variable (Aiken & West, 1991).

The presence of moderation is determined by the fulfillment of the three conditions (Baron & Kenny, 1986). First, there must be a relationship that can be moderated. This means that the effect of the independent variable on the dependent variable must be significant. Second, the moderation variable must have a significant effect on the

dependent variable. Third, the interaction term must be beta coefficient of the interaction term must be nonzero and should have a significant effect on the dependent variable.

The study adopted set of regression models to test for moderation. The first regression model tested the effect of the control variables on the outcome variable. The second model tested for the effect of the independent variables on the dependent variable. In this stage, both the control and independent variables were loaded in a hierarchical regression analysis in order to determine the direct effects. In the third model the study examined the effect of the moderator on the dependent variable. The control variables, independent variable, and moderator variable were loaded during the third stage. In the fourth to seventh models, the interaction variables were subsequently introduced individually in order to examine for moderated effects. The independent variables and the moderator were mean centered before creating the interaction terms (Baron & Kenny, 1986; Dawson, 2014; Saunders *et al*., 2009). After each interaction term was loaded, the beta coefficient of the interaction term and the change in R^2 was examined to see whether moderation was present or not. The regression models used as discussed in the subsequent section on model specifications.

3.8 Model Specification

Model specification show the empirical relationship, in the form of an equation, between the study variables that comprise of the dependent variable (on the left as an outcome), the independent variables, the moderator variable as predictor variable. The model specification used was guided by the conceptual framework presented in previous chapter. The study employed hierarchical multiple regression models to test the hypotheses. Given that the main objective of the study was to examine the effect of

stock liquidity on default risk, as well as the moderating effect of growth opportunities, the study employs seven hierarchical regression models are as follows:

Model 1. Testing the effect of control variables on default risk.

$$PD_{it} = \beta_0 + \beta_1 FP_{it} + \beta_2 TAN_{it} + \beta_3 FS_{it} + \beta_4 FA_{it} + \beta_5 INOW_{it} + \varepsilon_{it}$$

Model 2. Testing the effect of stock liquidity on default risk.

$$PD_{it} = \beta_0 + \beta_1 FP_{it} + \beta_2 TAN_{it} + \beta_3 FS_{it} + \beta_4 FA_{it} + \beta_5 INOW_{it} + \beta_6 PI_{it} + \beta_7 TQ_{it} + \beta_8 TC_{it} + \beta_9 TS_{it} + \varepsilon_{it}$$

Model 3. Testing the effect of the moderator (growth opportunities) on the outcome variable (default risk).

$$PD_{it} = \beta_0 + \beta_1 FP_{it} + \beta_2 TAN_{it} + \beta_3 FS_{it} + \beta_4 FA_{it} + \beta_5 INOW_{it} + \beta_6 PI_{it} + \beta_7 TQ_{it} + \beta_8 TC_{it} + \beta_9 TS_{it} + \beta_{10} GO_{it} + \varepsilon_{it}$$

Model 4. Introducing the first interaction term between price impact and growth opportunities

$$PD_{it} = \beta_0 + \beta_1 FP_{it} + \beta_2 TAN_{it} + \beta_3 FS_{it} + \beta_4 FA_{it} + \beta_5 INOW_{it} + \beta_6 PI_{it} + \beta_7 TQ_{it} + \beta_8 TC_{it} + \beta_9 TS_{it} + \beta_{10} GO_{it} + \beta_{11} PI * GO_{it} + \varepsilon_{it}$$

Model 5. Introducing the second interaction term between transaction quantity and growth opportunities.

$$PD_{it} = \beta_0 + \beta_1 FP_{it} + \beta_2 TAN_{it} + \beta_3 FS_{it} + \beta_4 FA_{it} + \beta_5 INOW_{it} + \beta_6 PI_{it} + \beta_7 TQ_{it} + \beta_8 TC_{it} + \beta_9 TS_{it} + \beta_{10} GO_{it} + \beta_{11} PI * GO_{it} + \beta_{12} TQ * GO_{it} + \varepsilon_{it}$$

Model 6. Introducing the third interaction term between transaction cost and growth opportunities.

$$PD_{it} = \beta_0 + \beta_1 FP_{it} + \beta_2 TAN_{it} + \beta_3 FS_{it} + \beta_4 FA_{it} + \beta_5 INOW_{it} + \beta_6 PI_{it} + \beta_7 TQ_{it} + \beta_8 TC_{it} + \beta_9 TS_{it} + \beta_{10} GO_{it} + \beta_{11} PI * GO_{it} + \beta_{12} TQ * GO_{it} + \beta_{13} TC * GO_{it} + \varepsilon_{it}$$

Model 7. Introducing the fourth interaction term between transaction speed and growth opportunities.

$$PD_{it} = \beta_0 + \beta_1 FP_{it} + \beta_2 TAN_{it} + \beta_3 FS_{it} + \beta_4 FA_{it} + \beta_5 INOW_{it} + \beta_6 PI_{it} + \beta_7 TQ_{it} + \beta_8 TC_{it} + \beta_9 TS_{it} + \beta_{10} GO_{it} + \beta_{11} PI * GO_{it} + \beta_{12} TQ * GO_{it} + \beta_{13} TC * GO_{it} + \beta_{13} TS * GO_{it} + \varepsilon_{it}$$

Where; PD = Probability of default

FP = firm performance of firm i at year t

TAN = Tangibility of firm i at year t

FS = Firm size of firm i at year t

INOW = Institutional Ownership of firm i at year t

PI = Price impact of firm i at year t

TQ= Transaction quantity of firm i at year t

TC= Transaction cost of firm i at year t

TS= Transaction speed of firm i at year t

GO= Growth opportunities of firm i at year t

B0 = constant

β1… β13 = Coefficients of the equations

t = Time

i = Firm

ε_{it}= error term

3.9 Regression Assumptions and Panel Data Diagnostic Tests

Regression analysis is based on several assumption that if not are not upheld, the results may be biased (Baltagi, 2008). Similarly, panel data must be tested to ascertain it suitability for inferential analysis. Panel data diagnostic tests are essential to ensure the model is reliable and produces accurate results. If diagnostic tests show that the model assumptions are not being met, adjustments may be necessary to ensure the model is valid. Therefore, the study began by validating the assumptions of linear regression and panel diagnostic tests that include linearity, normality, multicollinearity, unit root,

auto/serial correlation, heteroscedasticity, and model mis-specification before regression analysis (Seddighi, 2013).

3.9.1 Testing for normality

Non-normal distributed variables can introduce bias in relationships and significance tests (Chatterjee & Hadi, 2012; Osborne & Waters, 2002). Before conducting statistical tests, it is important to determine the distribution of values for variables that contain numerical data. One can observe this by graphing either a frequency polygon or a histogram for continuous data. If the diagram exhibits a clustering towards the left and an elongated tail towards the right, it indicates that the data is positively skewed. If the contrary is valid, then the data exhibit a negative skew. If the data is symmetrically distributed around the highest frequency, it can be considered normally distributed. Statistically, the Shapiro-Wilk test proposed by Villaseñor and González-Estrada (2009) is widely employed to assess for normality of a distribution. The null-hypothesis of this test is that the population is normally distributed, while the alternative hypothesis is that the data is non normality distributed. This study used Shapiro wilk test to test for normality,

3.9.2 Test for Homoscedasticity

Homoscedasticity assumes that the error variance is equal across the observations and implies that the errors have no dependency on covariate (Hapuhinna & Shang, 2023). When the underlying assumption is not valid, it results in the occurrence of heteroscedasticity or heterogeneity problem. Heteroscedasticity undermines the validity of inference, diminishes the statistical power of hypothesis tests, and compromises the quality of the regression coefficients' confidence intervals. The study employed the Breush-Pagan test to assess the presence of homoscedasticity. The null

hypothesis (Ho) for this test suggests homoscedasticity, while the alternative hypothesis (Ha) hypothesis supports heteroscedasticity. If the p-values of the Chi^2 test are more than 0.05, we cannot reject the null hypothesis and can conclusion is that the error component has a constant variance.

3.9.3 Test for Linearity

The linearity assumption holds utmost significance in regression analysis because it has a direct correlation with the bias of the overall analysis results. Linearity refers to the relationship between the dependent variable and the predictor (independent) variables, where the dependent variable is defined as a linear function of the predictor variables. The linearity assumption states that the change in the response variable associated with a one-unit change in the predictor variable (James *et al.,* 2023). Multiple regression is a reliable method for effectively estimating the linear relationship between dependent and independent variables and residual plots provide a direct method for assessing linearity. The residual plots depict the portion of the dependent variable that remains unexplained.

Any non-linear aspect of the relationship is evident in the residual plot. If a non-linear relationship is identified, it may be necessary to transform the data values in order to attain linearity. To assess the linearity assumption, residuals were plotted against anticipated values of the outcome variable.

3.9.4 Testing for Multicollinearity

Multi-collinearity refers to the presence of significant correlations among predictor variables (Streukens & Leroi-Werelds, 2023). Strong perfect correlations across predictor variables cause multi-collinearity, which in turn leads to a shared variance between variables and diminishes the ability to reliably predict the dependent measure. Multicollinearity is the presence of a robust relationship among two or more

independent or predictor variables. This correlation makes it challenging to discern the distinct effects of each individual variable.

Multicollinearity can also arise from the cumulative impact of two or more distinct independent factors. The study assessed multicollinearity using the tolerance and Variance Inflation Factor (VIF). Hair *et al.,* (2006) suggested that a tolerance value of 0.10 or lower or a VIF value of 10 or higher indicates a significant presence of collinearity. The study additionally analyzed the correlation matrix of the independent variables. Hair *et al*., (2006) further notes that another important is to check the strength of the correlation, if greater than 0.8 there is a likelihood that there is multicollinearity.

3.9.5 Unit Root Test

Unit root tests examine if a time series variable is not stationary and has a unit root. Ensuring the stationarity of data is crucial in the study of panel and time series data, as it improves the accuracy of forecasting and the ability to describe future behaviour based on statistical analysis. A stationary time series is characterized by a constant mean and variance across time. The covariance between two time periods is only determined by the gap or lag between them, rather than the specific time at which the covariance is calculated (Gujarati, 2004). Put simply, the average, variance, and covariance (at different time intervals) for a stable time series remained constant throughout time, and the time series returned to its average value over time. Stationary time series data is characterized by the absence of unit roots. Therefore, a preliminary step in panel data analysis is to perform unit root tests to determine the stationarity of the data (Gujarati, 2004). This study utilized the Harris-Tzavalis unit root test, Levin-Lin-Chu unit root test, and Fisher-type unit-root test. The null hypothesis of the three tests is that the series possesses a unit root ($H0: \alpha = 0$), while the alternative hypothesis

is that the series is stationary. If the null hypothesis is rejected, it implies that the variable does not possess a unit root or the panels are stationary (or Ha: $\alpha > 0$) (Levin, Lin & Chu, 2002).

3.9.6 Model misspecification

Ramsey (1969) advanced the “Regression Specification Error Test” (RESET) for the linear regression model as a conventional misspecification test. This test was advanced to detect both omitted variables and improper functional form. In order to determine whether the model specification is erroneous, the testing approach compares the residuals' distribution under the correct model specification against that under the alternative hypothesis. The null hypothesis of no misspecification is premised on the existences of an efficient, consistent, and asymptotically normal estimator of the regression parameters. Conversely, the alternative hypothesis of model misspecification, hold that the estimator was biased and inconsistent. The null (Ho) of the Ramsey RESET test is that there is no mis-specification in the model, whereas the alternative (Ha) is that there is mis-specification. Consequently, we fail to reject the null hypothesis if the p-value of the test is greater than 0.05.

3.9.7 Autocorrelation Test

The terms autocorrelation and serial correlation are used interchangeably. Consistent with Gujarati (2012) autocorrelation is defined as the "correlation between members of a series of observations ordered in time." The presence of autocorrelation renders the estimated values of t, F, and $\chi 2$ incorrect. The study employed the Wooldridge test for autocorrelation. The null hypothesis of the Wooldridge test is no first serial correlation in idiosyncratic errors; the alternative hypothesis (Ha) is the presence of serial/autocorrelation. If the p-value is greater than 0.05, then fail to reject the null

hypothesis and conclude absence of serial correlation. If autocorrelation is detected it is usually eliminated through first differencing.

3.10 Panel Data Estimation Models

Panel data models comprise an extensive array of methodologies, including but not limited to the random effect model, fixed effect model, between estimators, within estimator, dummy variable estimator, first differencing estimator, ordinary least square (OLS), and Monte Carlo approaches (Wooldridge, 2015). OLS, the fixed effect, and random effect estimation models are frequently utilized estimation approaches. When there is a correlation between the independent variable and the random error disturbance, the OLS estimator is unfortunately occasionally unreliable. Hence, both the fixed effect and the random effect were incorporated into this study.

Individual effects are treated as constant terms that remain unaltered over time in the regression model under the fixed effects approach. Conversely, a random model can be constructed if it is possible to anticipate that the unobserved individual effects are unrelated to the variables. Individual effects are random variables, similar to disturbance, based to the random effects model. Unobserved individual effects may exhibit a correlation with the variables included in the fixed effects model. It may be acceptable to represent the individual specific constant terms as randomly distributed across the units if there is no correlation between the regressors and the individual effects (Greene, 2003).

The utilization of the random effect model or the fixed effect model is commonly determined by the Hausman test results. Random effects are the preferable model, according to the null hypothesis (Green, 2003), which contrasts with fixed effects. To examine whether there is a significant difference in the slope coefficients of the models

being compared, the Hausman specification, as explicated by Baum (2001), is applied. In instances where the slope coefficients differ, it additionally incorporates fixed effects. Thus, in cases where the probability (Prob.) of $\chi 2$ is less than the predetermined significance level of 0.05, the null hypothesis is rejected. Fixed effects regression is considered appropriate in this particular scene.

3.11 Ethical Consideration

Ethical issues revolve around voluntariness, privacy, confidentiality and anonymity of respondents in a research study. This study had few ethical issues since data was secondary in nature and was publicly available. Besides, no human participants were involved. However, the researcher sought approvals from the relevant authorities. Permission was sought from Moi University School of Business and Economics. The researcher further sought approval from the National Commission for Science, Technology, and Innovation (NACOSTI) for authorization to acquire and analyze data.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.0 Overview

This chapter discusses the findings of the study. The findings are provided in four key sections; descriptive statistics, diagnostic tests, correlation analysis and regression analysis.

4.1 Descriptive Statistics

The descriptive statistics for the research variable for the period 2011 to 2020 are presented in table 4.1.

Table 4. 1: Summary Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
PD	310	.2787133	.3009113	0.000	1.000
TAN	310	.3691107	.2728815	0.001	.9415659
INOW	310	.7066368	.1643937	0.000	0.970
LEV	310	.4440806	.1359944	.02609	.9379133
FA	310	61.145	39.41155	0.000	152.000
ROA	310	.0642881	.1529423	-0.420	.5909452
FS	310	7.095973	.8466186	5.198698	9.405137
PI	310	.1063325	.0464336	.0054704	.2216345
TQ	310	.18933	.1458865	0.06351	.75262
TC	310	.0253353	.0199728	0.000	.1818182
TS	310	.2922759	.6057812	.0005351	4.734821
GOP	310	2.958	7.812	.0038	58.806

Source: Researcher data, 2023

The mean probability of default 0.279 (minimum= .0054704 and maximum = .2216345; standard deviation = .0464336). The average PD is close to 0.328 reported by Shih, Wang, Zhong and Ma (2021) in China and 0.2601 reported by Trinh *et al.*, (2021) among Vietnam firms between 2010 and 2020. However the mean probability

of default is lower than 0.9723, 0.5167 and 0.9057 reported by Gniadkowska-Szymańska (2022) in Germany, Baltic countries and Poland respectively. The standard deviation is an indicator of high variability of in probability of default among nonfinancial firm listed in NSE.

The mean price impact was 0.1063325 (minimum= .0054704 and maximum = .2216345; standard deviation = .0464336). The mean price impact is close to 0.169 reported by Doostian and Farhad Toski (2022) in the Tehran Stock Exchange. Further, the average trading quantity (measured by turnover ratio) was 0.18933 (minimum= 0. 06351 and maximum = 0. 75262; standard deviation = 0. 1458865). The figure is higher than that of 0.011 reported by Sharma and Paul (2015) in Indian firms and Gniadkowska-Szymańska (2022) who found a mean trading quantity (turnover ratio) of 0.0189 in Poland. While the mean value of trading cost was 0.0253353 (minimum= 0.00 and maximum = .1818182; standard deviation = 0.0199728). Gniadkowska-Szymańska (2022) reported a mean trading cost (bid-spread) of 0.0530 among German firms, while Chai, Faff and Gharghori (2010) found a mean of 0.0373 in the Australian equity market. The value is higher than that of 0.014424 reported by Li and Xia (2015) among U.S. listed firms between 1993 and 2008.

Besides, the average trading speed was 0.2922759 (minimum= 0.0005351 and maximum =4.734821; standard deviation = 0.6057812). The mean trading speed is close to 0.21 reported by Khan, Rehman and Khan (2023) in Pakistan.

Growth opportunities had a mean value of 2.958 (minimum= .0038 and maximum = 58.806; standard deviation = 7.812) and related to 2.0989 reported by Bokpin (2013) among firms listed in Ghana stock exchange. Ghorbani *et al*., (2015) who studied firms listed in the Tehran Stock Exchange found a mean market to book value of 2.77. While

Sharma and Paul (2015) found a mean of 1.569 among Indian firms. The high standard deviation signifies high variability in growth opportunities of nonfinancial firms listed in Nairobi Securities Exchange. The average firm size was 7.189 (minimum= 0.929 and maximum = 9.023; deviation = 5.104). The average tangibility of the selected firm was 0.3691107 (minimum= 0.001 and maximum = 0. 9415659; standard deviation = .2728815) and close to 0.3131 reported by Nguyen, Alpert and Faff (2021) and that of 0.3690 found by Khediri and Daadaa (2011) in Tunis stock exchange (TSE). Khan *et al*., (2023) reported a mean of 0.46 among listed firms in Pakistan. While Haddad (2012) found an average tangibility of 0.4166 from a sample of 38 industrial companies listed on Amman Stock Exchange (ASE) from 2000 to 2009.

The firm age was 61.145 (minimum= 1.000 and maximum = 152; standard deviation = 39.41155). The mean institutional ownership was 0.3691107 (minimum= 0.001 and maximum = 0. 9415659; standard deviation = .2728815). The mean institutional ownership is close to that reported by Alimoradi *et al.,* (2020) among Iranian petroleum firms. The table further demonstrates that mean firm performance was 0.0642881 (minimum= -0.420 and maximum = 0.5909452; standard deviation = 0.1529423) and similar to 0.0667 reported by Bokpin (2013) among firms listed in Ghana. Finally, the mean leverage was 0.4440806 (minimum= .0260912 and maximum = 0.5909452; standard deviation = 0.937913) and close to 0.38 reported by Ali, Liu and Su (2018) who used a sample of 1,086 non-financial Australian firms, while Khediri and Daadaa (2011) found a mean leverage of 0.4188 Tunis stock exchange (TSE). Alimoradi *et al.,* (2020) found a mean ROA of 0.0429 among Iranian petroleum firms.

4.2 Diagnostic Tests

Before conducting the regression analysis, the data was subjected to a series of linear regression test and panel data diagnostic tests that included linearity, normality, multicollinearity, unit root, heteroscedasticity, autocorrelation, and model specification error.

4.2.1 Unit Root Test

When applied to non-stationary data, econometric models produce regression results that are either incomprehensible or incorrect (Gujarati, 2012). According to Hossain and Hossain (2015), non-stationary data is defined as a data series that does not demonstrate a constant mean, variance, and covariance at different time intervals. This makes it difficult to analyze the data using traditional statistical methods. Temporal or seasonal disturbances may that take place in one period may have a substantial impact on subsequent periods in the disciplines of economics and finance. The Levin-Lin-Chu test, the Harris-Tzavalis test, and a Fisher-type unit root test were all applied in this work. In order to evaluate the unit root hypothesis, the following hypotheses were utilized.

Null hypothesis (Ho): Panel data contains unit root [non-stationary].

The alternative hypothesis (Ha): Panel data is stationary.

The null hypothesis was rejected at 5% significance levels for all of the research variables, which indicates that there was no unit root in the panel data and that the data was appropriate for further statistical analysis. The results for the unit root tests are presented in Table 4.2.

Table 4.2: Results of Unit Root Test

	Harris-Tzavalis	Levin-Lin-Chu	Fisher-type unit-root test
PD	-5.0271	-10.01	-2.2820
p value	0.00	0.00	0.01
TAN	-27.23	-4.9400	-3.0250
p value	0.00	0.00	0.00
INOW	-22.52	-22.52	-4.74
p value	0.00	0.00	0.02
LEV	-9.5543	-17.94	-4.4625
P value	0.00	0.00	0.00
FA	-13.73	-47.910	-8.76
p value	0.00	0.00	0.00
FS	-4.0006	-10.0260	-8.2913
p value	0.00	0.00	0.00
ROA	-6.4911	-53.73	-47.39
p value	0.00	0.02	0.00
PI	-8.6071	-4.62	-62.40
p value	0.00	0.00	0.05
TQ	-14.1416	-8.5890	-9.8549
p value	0.00	0.00	0.02
TC	-7.4349	-10.6562	-4.8806
p value	0.00	0.00	0.02
TS	-7.59	-8.8252	-11.9109
p value	0.00	0.00	0.02
GOP	-17.4299	-12.1240	-7.7863
p value	0.00	0.00	0.02

Source: Research data, 2023

4.2.2 Normality Tests

The study employed the Shapiro-Wilk normality test to evaluate the normality. The data shown in table 4.3 shows that the ρ-value is higher than the threshold of 0.05. Consequently, as the null hypothesis of normally distributed residuals cannot be rejected, we can infer that the data adheres to a normal distribution.

Table 4.3: Shapiro Wilk Normality test

Skewness/Kurtosis tests for Normality				------- joint ------	
Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)	Prob>chi2
Resid	310	0.8053	0.0543	3.90	14.26

Source: Research data, 2023

4.2.3 Autocorrelation Test

The Wooldridge test for autocorrelation was utilized to examine the existence of autocorrelation. The data presented in table 4.4 shows that the ρ-value is 0.3543, which above the threshold of 0.05. Therefore, the test fails to reject the null hypothesis, which asserts the absence of a first-order correlation.

Table 4.4: Wooldridge test for autocorrelation

Wooldridge test for autocorrelation in panel data

H0: no first order autocorrelation

F(1, 30) = 0.885

Prob > F = 0.3543

Source: Research data, 2023

4.2.4 Multicollinearity

Multicollinearity is the occurrence of a significant correlation between two or more predictor variables. The study utilized the Variance Inflation Factor (VIF) and the correlation matrix to evaluate the existence of multicollinearity. Multicollinearity is identified when the Variance Inflation Factor (VIF) surpasses 10 (Gujarati, 2012), or when the pairwise correlation coefficients are more than 0.8. The VIF (Variance Inflation Factor) values, as indicated in Table 4.5, vary between 1.12 and 1.72. All of

these values are less than 10, suggesting that the study variables are not influenced by multicollinearity.

Table 4.5: Variance Inflation Factor

Variable	VIF	1/VIF
TC	1.72	0.582880
TS	1.62	0.617870
GOP	1.52	0.657383
FS	1.51	0.662856
TQ	1.36	0.734347
ROA	1.35	0.741581
LEV	1.33	0.752714
INST	1.28	0.778259
PI	1.28	0.783072
TAN	1.15	0.872466
FA	1.12	0.889529
Mean VIF	1.38	

Source: Research data, 2023

4.2.5 Test for Heteroskedasticity

The Breusch-Pagan/ Cook-Weisberg test was utilized to assess the existence of heteroskedasticity, and the results are presented in Table 4.6. The Chi2 (1) value of 0.12 and the ρ-value was 0.724 revealed that the null hypothesis could not be rejected. Thus, the assumption of homoscedasticity remained valid.

Table 4.6: Breusch-Pagan / Cook-Weisberg Test for Heteroscedasticity

Ho: **Constant variance**

Variables: Myresiduals	
chi2(1) =	0.12
Prob > chi2 =	0.724

Source: Research data, 2023

4.2.6 Specification Error Test

The findings of the Ramsey RESET test are displayed in Table 4.7. The p-value of the estimated statistics in the Ramsey RESET test, as shown in the table, is higher than the threshold value of 0.05. Therefore, the null hypothesis that of no omitted variables could not be rejected.

Table 4.7: Ramsey RESET (test using powers of the fitted values of PD)

Ho:	model has no omitted	Variables
	F(3, 295) =	1.35
	Prob > F =	0.2577

Source: Research data, 2023

4.2.7 Correlation Analysis

The purpose of correlation analysis is to understand the nature and the strength of the association between variables. Table 4.8 displays the results of the Pearson pairwise correlation analysis. Tangibility (*r= 0.2097; ρ< 0.05*), leverage (*r= 0.2349; ρ< 0.05*), institutional ownership (*r= 0.3366; ρ< 0.05*), price impact (*r*= 0.3503*; ρ< 0.05*), trading cost (*r= 0.6171; ρ< 0.05*) and default risk is positive and statistically significant. The correlation results further indicated that default risk was negatively and significantly correlated with firm age (*r*= -0.1615*; ρ< 0.05*), firm size *(r*= -0.5281*; ρ< 0.05*), firm performance (ROA) (*r*= -0.3452*; ρ< 0.05),* trading quantity (*r*= -0.4629*; ρ< 0.05*), trading speed (*r*=-0.6185*; ρ< 0.05*), and growth opportunities (*r*= -0.5815*; ρ< 0.05*).

Table 4. 8: Pairwise Correlation Matrix

	PD	TAN	LEV	ROA	FS	FA	INOW	PI	TQ	TC	TS	GOP
PD	1.0000											
TAN	0.2097*	1.0000										
LEV	0.3950*	0.1274*	1.0000									
ROA	-0.3452*	-0.0875	-0.2273*	1.0000								
FS	-0.5413*	0.1040	-0.1225*	0.3866*	1.0000							
FA	-0.1615*	-0.1384*	-0.1223*	0.0471	0.1246*	1.0000						
INOW	0.3503*	-0.0165	0.2659*	-0.0868	-0.2263*	-0.0182	1.0000					
PI	0.3503*	0.0586	0.0514	-0.0130	-0.0686	-0.0685	0.0934	1.0000				
TQ	-0.4629*	-0.1447*	-0.2044*	0.2223*	0.4067*	0.1952*	-0.039	-0.0591	1.0000			
TC	0.6171*	0.1330*	0.2927*	-0.2569*	-0.2852*	-0.2159*	0.2622*	0.3383*	-0.3028*	1.0000		
TS	-0.6185*	-0.1173*	-0.3123*	0.3632*	0.3569*	0.2670*	-0.1253*	-0.2359*	0.2111*	-0.4971*	1.0000	
GOP	-0.5815*	-0.1030	-0.2240*	0.2756*	0.2464*	0.0994	-0.0952	-0.4162*	0.1048	-0.4480*	0.4409*	1.0000

***p<0.05**

Source: Research data, 2023

4.3 Regression Analyses

Since the purpose of the study was to examine whether growth opportunities moderated the relationship stock liquidity and default risk of nonfinancial firms listed in Nairobi Securities Exchange, several regression analyses were carried out. The first regression analysis aimed at determine the effect of the control variables on default risk. The second model was utilized to ascertain the effect stock liquidity dimensions on default risk. In the third model, the effect of growth opportunities on default risk was assessed. The interaction terms were loaded into the regression model in a stepwise manner from model 4 to 7. The regression results and discussed in subsequent subsections.

4.3.1 The Effect of the Control Variables on default risk.

Table 4.9 displays the regression results for default risk on the control variables. The random effect model was used to test the effect of the control variables on default risk based on the results of the Hausman Test (Appendix III).

Table 4.9: Testing the Effect of the Control Variables of default risk

Random-effects GLS regression	Number of obs	= 310
Group variable: FIRMID	Number of groups	= 31
R-sq: within = 0.3166	Obs per group: min	= 10
between = 0.5107	Avg	= 10.0
overall = 0.4500	Max	= 10
	Wald chi2(6)	= 156.32
corr(u_i, X) = 0 (assumed)	Prob > chi2	= 0.0000

PD	Coef.	Std. Err.	Z	P>z	[95% Conf.	Interval]
TAN	.1124243	.0317252	3.54	0.000	.050244	.1746046
LEV	.2419577	.0434787	5.56	0.000	.1567409	.3271744
ROA	-.1521684	.0393996	-3.86	0.000	-.2293902	-.0749466
FS	-.7363135	.1446957	-5.09	0.000	-1.019912	-.4527151
FA	.0005372	.0245704	0.02	0.983	-.0476199	.0486943
INOW	.1427526	.0509492	2.80	0.005	.042894	.2426111
_cons	2.225106	.4156207	5.35	0.000	1.410504	3.039707
sigma_u	.08299545					
sigma_e	.06821641					
Rho	.59681255	(fraction of variance due to u_i)				

Source: Research data, 2023

Consistent with the findings of Nadarajah *et al.,* (2021) and Goyal and Wang (2013), the study found that the probability of default risk (PD) is lower for profitable firms (β = -0.1553 *and* ρ*-value<0.05)*. The relationship between financial leverage and default risk was positive and significant (β = 0.2000 *and* ρ*-value<0.05).* This means that less leveraged firms are less likely to fall in default and vice versa. The results further revealed that firms high tangibility (have a higher proportion of fixed assets to total assets) are more likely to default (β*=0.1154078 and* ρ*-value<0.05)*. However, Shih, Wang, Zhong and Ma, (2021) found no association between tangibility and default risk among listed firms in China. The results are in line with Rajan and Zingales (1995) who found a positive relationship between tangibility (measured as the ratio of fixed to total

assets) and leverage among firms in G-7 economies. Bradley, Jarrell and Kim (1984) and Titman and Wessels (1988) found positive relationships between tangibility and leverage. Consistent with Scott (1977), Williamson (1988), Harris and Raviv (1990) firms high tangibility serves as a collateral for external debt, which enables a firm access more borrowed funds. Consequently, increased tangibility may expose a firm to more default risk.

Additionally, the study document that firm size is negatively and significantly related to default risk ($\beta = -0.0334$ *and* ρ*-value<0.05).* Firm age has no statistically significant effect on default risk ($\beta = 0.0018432$ *and* ρ*-value<0.05),* however, the positive beta coefficient suggest that mature firms have a higher propensity of falling into financial distress. Institutional ownership has a positive and significant effect on default risk (β = .1817874 *and* ρ*-value<0.05).* The results agree with those of Switzer and Wang (2013) who found that higher institutional shareholdings increase default risk for US commercial banks. However, they disagree with Chiang, Chung and Huang (2015) who found an inverse relationship between default risk and institutional ownership in Taiwanese non-financial firms. According to the findings of a study conducted by Switzer and Wang (2013), institutional shareholdings in US non-financial companies minimize the probability of default. In a comparable manner, Switzer *et al.,* (2018) analyzed a sample of Canadian companies and concluded that a higher ownership by institutional investors was related with a reduced default risk for financial firms, but this was not the case for nonfinancial firms.

In line with the wealth distribution theory, institutional shareholders may not adequately oversee management and may even put pressure on them to participate in hazardous initiatives in order to extract private gains at the expense of debtholders and minority shareholders. This is consistent with the fact that institutional shareholders

may own a disproportionate fraction of a company's total assets. This, in turn, causes future cash flows to be more volatile and concurrently raises the risk of default. There are a number of causes for the positive effect of institutional shareholdings on default risk. First, despite increasing monitoring costs, investors are not imposing disciplinary pressure on management. Almazan, Hartzell and Starks (2005) suggest that monitoring costs are often cheaper for active institutional investors, such as independent investment advisers and investment companies, than for passive institutional investors, such as bank trust departments and insurance groups.

Additionally, they might form an alliance with managers and put insiders' interests ahead of other minority shareholders' goals of maximizing their wealth. This occurs more frequently when management and institutional investors are linked by political or commercial connections (Cornett *et al*., 2007). Second, the institutional investors who are well-diversified may practice moral hazard. They might persuade managers to assume greater risk since, while the additional risk posed by a marginal firm won't have a large impact on their portfolio, the additional earnings from riskier enterprises could have a significant impact if they succeed.

Prior to the global financial crisis, Erkens, Hung and Matos (2012) examined the impact of institutional shareholding on firms' risk-taking and discovered that institutional shareholders encouraged managers to take on more risk, which led to greater losses for shareholders.

4.3.2 Testing the Effect of Stock liquidity on default risk

Table 4.10 displays the findings of a regression analysis that was conducted on the effect of stock liquidity on default risk. The choice of the random effect model to test the direct hypotheses was validated by the Hausman Test, which can be found in

Appendix III. According to the overall R2 value, the control factors and the independent variables together explain 69.66% of the variation in default risk of nonfinancial firms listed in Nairobi Securities Exchange throughout the course of the study period. In addition, the Wald chi2 (10) 438.97 Prob > chi2 =0.0000 provides further evidence that the model is correct. Coefficients of the price impact (PI) and trading cost (TC) are inverse measures of stock liquidity, which means that a high score indicates poor stock liquidity and vice versa (Lipson & Mortal, 2009). In general, PI and TC are inverse measures of market liquidity. Therefore, a negative association between stock liquidity and default risk is indicated by the positive coefficients, and vice versa. Trading quantity (also known as TQ) and trading speed (also known as TS), on the other hand, have a direct bearing on stock liquidity.

Table 4.10: Testing the Direct Effects

Random-effects GLS regression	Number of obs	= 310
Group variable: FIRMID	Number of groups	= 31
R-sq: within = 0.5662	Obs per group: min	= 10
between = 0.7608	Avg	= 10.0
overall = 0.6966	Max	= 10
	Wald chi2(10)	= 438.97
corr(u_i, X) = 0 (assumed)	Prob > chi2	= 0.0000

PD	Coef.	Std. Err.	Z	P>z	[95% Conf.	Interval]
TAN	.0940017	.0253388	3.71	0.000	.0443386	.1436648
LEV	.1202484	.0359331	3.35	0.001	.0498208	.1906759
ROA	-.0914605	.0317153	-2.88	0.004	-.1536212	-.0292997
FS	-.0232778	.0045783	-5.08	0.000	-.0322512	-.0143045
FA	.0362616	.0201576	1.80	0.072	-.0032465	.0757698
INOW	.0991377	.040914	2.42	0.015	.0189478	.1793276
PI	.1499235	.0228465	6.56	0.000	.1051451	.1947019
TQ	-.1268923	.0312591	-4.06	0.000	-.1881591	-.0656255
TC	.7745711	.1203161	6.44	0.000	.5387558	1.010386
TS	-.0707215	.0128593	-5.50	0.000	-.0959253	-.0455177
_cons	.6870938	.115716	5.94	0.000	.4602946	.9138929
sigma_u	.0556034					
sigma_e	.05467535					
Rho	.50841496	(fraction of variance due to u_i)				

Source: Researcher data, 2023

The results of the fixed effect regression presented in Table 4.10 were used to test the four direct hypotheses as discussed below

Hypothesis (H_{01}) stated that: *Price impact has no significant effect on default risk of nonfinancial firms listed in Nairobi Securities Exchange*. The results presented in Table 4.10 show that price impact had a significant positive effect on default risk ($\beta 1$ = 0.1499235*and* ρ*-value<0.05)*; hence, (H_{01}) was rejected. Further, a unit increase in price impact leads to a 0.1499 unit increase in default risk. The findings of this study suggests that firms with stocks with a high price impact are less likely to report default risk. Gniadkowska-Szymańska (2022) also found that liquidity (expressed as ILLIQ)

had a positive impact on the risk of bankruptcy. The author concluded that the greater the liquidity of the company's shares, the lower the risk of bankruptcy. Consequently, high liquidity lowers a firm's exposure to default risk.

Price impact is a measure of the daily price impact of the order flow—the premium that a buyer must pay or the discount that a seller must offer in order to fulfill a market order—caused by unfavourable selection costs and inventories. According to earlier research on informed trading, such as that by Huang and Stoll (1996), the price impact of trade captures information asymmetry since it transmits private information. A significant trade may draw additional traders because it is possible that it is driven by information.

A high price impact indicates lower liquidity and higher cost of equity. Furthermore, price impact in the stock market is positively related to the investor risk aversion and the stock return volatility, and negatively related to the equity premium and the stock market liquidity. Chung, H.,

Hypothesis (H_{02}) stated that: *Trading quantity has no significant effect on default risk of nonfinancial firms listed in Nairobi Securities Exchange*. The results indicate a significantly negative association between trading quantity and default risk (β= -0.1268923, $\rho < 0.05$); therefore, H_{02} is rejected. Based on the regression results a unit increase in trading quantity reduces default risk by 0.127 units. A high trading quantity denotes high liquidity since a large number of shares are being traded, which is attributed to a large pool of buyers and sellers. Market depth usually enables market participants to execute transactions fast with minimal slippage. Consequently, increase trading quantity increases a firm's prospect of using equity finance instead of debt thus lowering the probability of default.

The trading frequency, as measured by the number of trades, exhibits a consistent negative correlation with all types of spreads, as supported by previous studies (Kim and Ogden, 1996; Heflin and Shaw, 2000; Giouvris and Philppatos, 2008). These studies also discovered a significant negative association between the number of trades per day and the various components of the bid-ask spread. The concept of number of trades can be understood as a mechanism for mitigating information asymmetry in the market. When a stock is traded often, traders consider it to be highly liquid, resulting in a narrower spread between the bid and ask prices.

Using a sample of 6,300 Nasdaq IPOs between 1972 and 1998, Eckbo and Norli (2005) found that IPO stocks are significantly less leveraged and exhibit significantly greater liquidity (stock turnover) than non-IPO firms that are matched on stock exchange, equity size, and book-to-market ratio. The authors concluded that increased stock liquidity is crucial because it raises the possibility of a liquidity-based explanation for the lower projected returns on IPO equities. The authors further observed that firms that issued IPOs had lower debt levels and fewer assets.

Hypothesis (H_{03}) stated that; *Trading cost has no significant effect on default risk of nonfinancial firms listed in Nairobi Securities Exchange*. The regression results in Table 4.10 illustrate that trading cost has a significantly positive impact on default risk ($\beta 3 = 0.7745711 and\ \rho < 0.05$); thus H_{03} was rejected. In their study of 280 US enterprises, Arakelyan and Serrano (2016) also noted that transaction cost, as determined by the bid-ask spread, was a crucial factor in determining the illiquidity of both CDS spreads and risk premia. In a similar vein, Frieder and Martell (2006) concluded that a company would want to increase its level of leverage when the transaction cost of issuing equity is higher and that when stocks are expensive and difficult to issue, they will prefer to do the opposite. Likewise, Hadad (2012) using

Amman Stocks Exchange data found that higher stocks' liquidity results in lower issuance costs and hence, greater reliance on equity financing. Similar findings were made by Hadad (2012) using data from the Amman Stocks Exchange, who found that increasing dependence on equity financing results from higher stock liquidity, which lowers issuance costs.

The bid-ask spread may be thought of as the price of providing immediacy, according to Glosten (1994), who noted that it is positively correlated with adverse selection costs in an environment where trading is driven by orders. The bid-ask spread is a natural characteristic of an order-driven market, according to Handa, Schwartz, and Tiwari (1998), who contend that market players are prepared to pay for price certainty. As a result, when the bid-ask price is high, less people will buy a company's equity, which forces the company to look for debt financing and increases the likelihood that it would default. In order to protect themselves from informed investors, market makers widen the difference between the bid and the ask price.

Conversely, Amihud and Mendelson (1986) demonstrated that investors prefer a higher rate of return for firms with higher bid-ask spreads (lower liquidity), even though this entails a higher cost of capital and a lower shareholder value. Moreover, the authors show that investors prefer firms with a large bid-ask gaps (lower liquidity) to have lower market capitalization. Amihud and Mendelson (1989) suggest that a rise in the bid-ask spread is not necessarily a "second order effect" since frequent trading in the stock may significantly lower investors' value. This argument is based on the fact that frequent trading in the stock may reduce investors' value.

Along with the other repercussions of a worsening financial situation, shareholders may suffer from a probable decline in trading by uninformed investors. Consequently, firms

with greater stock liquidity (smaller relative effective spread) typically have capital structures that have more equity or use less financial leverage. Another reason transaction costs may lead to a trade-off between debt and equity financing, ultimately default, is that investors anticipate eventually selling their shares and are aware that doing so will incur transaction costs. These expenses may result from issues with adverse selection or from the inventory considerations of market makers who are risk averse. Investors logically devalue the questioned asset by a bigger amount when the transaction costs are higher. The more liquid stock may have a somewhat higher price and hence lower predicted returns since it has consistently lower bid-ask spreads and price impact than the other stock, as well as higher turnover.

Empirical literature reveals that trading costs discourage investors from taking part in stock markets (Guiso, Haliassos & Jappelli, 2003; Vissing-Jorgensen, 2004; Alan, 2006; Hsu, 2012). Therefore, lower transaction costs, and the resulting increased stock liquidity, could boost investor involvement in a particular market. Increased market activities increase the depth of the funds available in that market and firm's ability to access equity financing. Therefore, the stock liquidity can significantly affect a firm's likelihood of falling into default. Chen and Chen (2010) contend that a high probability of default combined with worsening economic prospects leads to increased expropriation by managers, which in turn leads to increased asymmetric information costs. As a consequence of this, liquidity providers typically have relatively greater costs, and as a direct result, they offer bid-ask spreads that are higher.

Hypothesis (H_{04}) stated that; *Trading speed has no significant effect on default risk of nonfinancial firms listed in Nairobi Securities Exchange*. As illustrated in Table 4.10, the regression output shows that trading speed had a significantly negative effect on default risk *($\beta 4$ =*-0.0707215*and $\rho<0.05$)*; thus, H_{04} was rejected. The empirical results

show that firms with greater trading speed are less likely to experience default risk. The success of contemporary market makers depends on trading speed: If liquidity providers, also known as high frequency market makers, are excessively slow, their prices will be "stale," and better-informed (and quicker) traders, also known as high frequency bandits, might "adversely select" them, which would probably result in trading losses. A number of studies, including those by Lipson and Mortal (2009), Udomsirikul *et al.,* (2011), and Mohamed and Seelanatha (2014), Advocate the notion that possessing liquid stocks decreases the overall cost of equity, hence incentivizing firms to employ more equity financing and diminishing the quantity of debt in the capital structure.

Trading discontinuity carries the risk of being unable to liquidate a position promptly or for a fair price. The considerable premium associated with the discontinuity measure is consistent with Huang's (2003) theoretical work, which shows that investors' failure to account for the time before a security is liquidated can have a major impact on asset returns.

4.3.3 Testing the effect of growth opportunities on default risk

Since the study's main objective was to examine whether growth opportunities moderate the relationship between stock liquidity and default risk, the study determined the relationship between growth opportunities and default risk. This is in accordance with Baron and Kenny (1986) who contend that the moderator must be significantly related to the outcome variable. To achieve this, the study regressed the outcome variable against the moderating variable while controlling for the independent variable. The regression results are presented in table 4.11 as shown below.

Table 4. 11: Testing the Moderating Effects

Random-effects GLS regression	Number of obs	= 310				
Group variable: FIRMID	Number of groups	= 31				
R-sq: within = 0.6335	Obs per group: min	= 10				
between = 0.7842	Avg	= 10.0				
overall = 0.7335	Max	= 10				
	Wald chi2(11)	= 560.52				
corr(u_i, X) = 0 (assumed)	Prob > chi2	= 0.0000				
PD	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
TAN	.0734584	.0236438	3.11	0.002	.0271173	.1197995
LEV	.0955139	.0333399	2.86	0.004	.0301689	.1608589
ROA	-.0865838	.0293382	-2.95	0.003	-.1440856	-.029082
FS	-.5003549	.1056239	-4.74	0.000	-.707374	-.2933359
FA	.0380498	.0186452	2.04	0.041	.0015058	.0745938
INOW	.1003586	.0378242	2.65	0.008	.0262245	.1744928
PI	.0704873	.0236345	2.98	0.003	.0241646	.11681
TQ	-.1368776	.0289324	-4.73	0.000	-.1935841	-.0801711
TC	.5370322	.1169672	4.59	0.000	.3077808	.7662836
TS	-.0640409	.011896	-5.38	0.000	-.0873567	-.0407251
GOP	-.0759153	.0103646	-7.32	0.000	-.0962296	-.0556009
_cons	1.454297	.305965	4.75	0.000	.8546167	2.053977
sigma_u	.05451225					
sigma_e	.05032519					
rho	.53987506	(fraction of variance due to u_i)				

Source: Research data, 2023

According to table… growth opportunities have a negative and significant effect on default risk (β= *-0.0756447 and* $\rho<0.05$). In addition, we find that firms with a higher market-to-book ratio have lower default risk .This results agree with those of Hsu *et al*. (2015) and Nadarajah *et al*., (2021). The findings of this study indicate that high growth firms are less likely to experience default risk owing to reduced borrowing since they can easily attract equity funds from investors. Based on the findings, high growth firms will avoid external borrowing that may subject them to financial distress and debt covenants. On the other hand, low growth firms facing financial distress may be willing to borrow more, thus increase the greater degree of covenant protection in their outstanding debt issues.

The findings are also supported by Myers (1977), who contends that firms with high gearing would tend to overlook positive NPV (net present value) investment opportunities as a result of information asymmetries, and the assumptions made by Jensen and Meckling (1976), based on agency theory. Myers contends that firms with many investment prospects (also known as growth opportunities) would typically have low leverage ratios.

4.3.4 The moderating effect of growth opportunities on the relationship between stock liquidity and default risk

Hypothesis H_{05} sought to determine whether growth opportunities moderates the relationship between stock liquidity and default risk. To establish the moderating effect the interaction terms were entered in a stepwise manner from model 4-model 7. The random effect results of model 7 were used to test the moderating effect. The summarized moderation results are reported in model 7 shown in table 4.12 and the hypotheses tested as follows:

Hypothesis ($H5_a$) stated that; *Growth opportunities does not significantly moderate the relationship between price impact and default risk of nonfinancial firms listed in Nairobi Securities Exchange*. The regression results show that growth opportunities significantly moderate the relationship between price impact and default risk (β= *-0.1314334and* $\rho<0.05$); hence hypothesis $H05_a$ was rejected. The moderation results are further analyzed using a modgraph as shown below.

Figure 4.1 below shows that default risk is minimal with low for firms whose stock have low price impacts (liquidity) and have high growth opportunities.

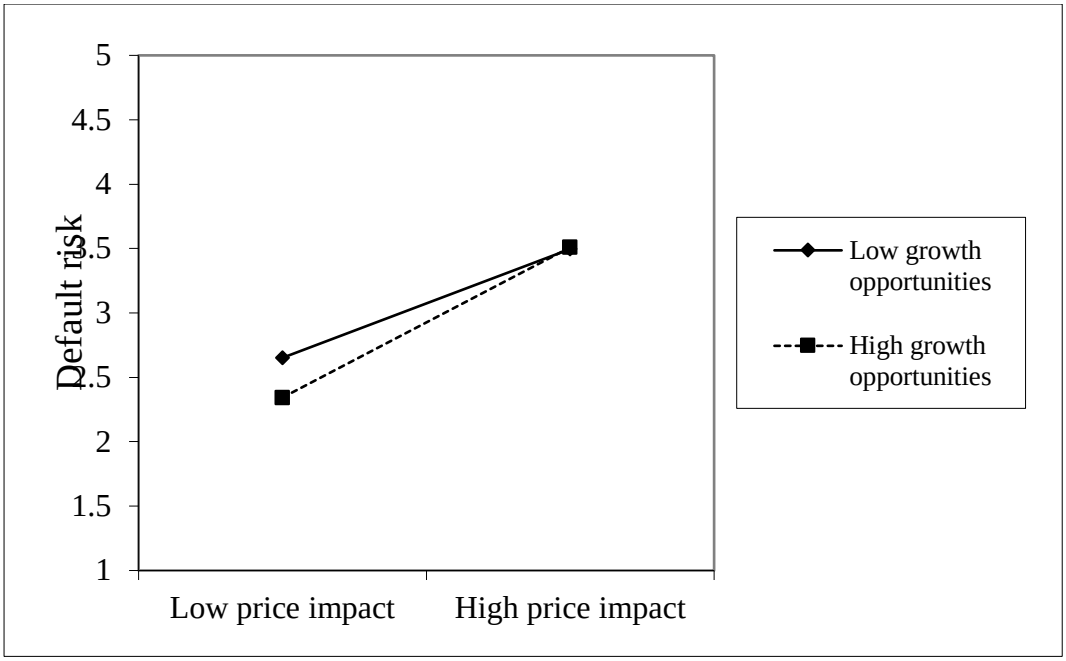

Figure 4.1: Modgraph for price impact, growth opportunity and default risk

Hypothesis ($H5_b$) stated that; *Growth opportunities does not significantly moderate the relationship between trading quantity and default risk of nonfinancial firms listed in Nairobi Securities Exchange.*. The results growth opportunities moderate the relationship between trading quantity and default risk (β= *-0.0405521and* $\rho<0.05$). Consequently, hypothesis $H05_b$ was rejected. According to research findings by Pagano *et al*. (1998; Fischer, 2000; Bharath and Dittmar (2006), firms with significant growth are likely to gain from listing on a market since it will help them get past their financial constraints by offering them access to low-cost external finance. Aslan and Kumar (2011), Marosi and Massoud (2007), and Bharath and Dittmar (2006) find firms with good prospects for growth opt to stay active in the stock market to raise additional funding. Therefore, growth opportunities enables firms to easily offload their share in the stock market, thus use less debt associated with default risk

Figure 4.1 below shows that firms characterized by high stock trading or stock turnover and high growth opportunities have a low likelihood of default.

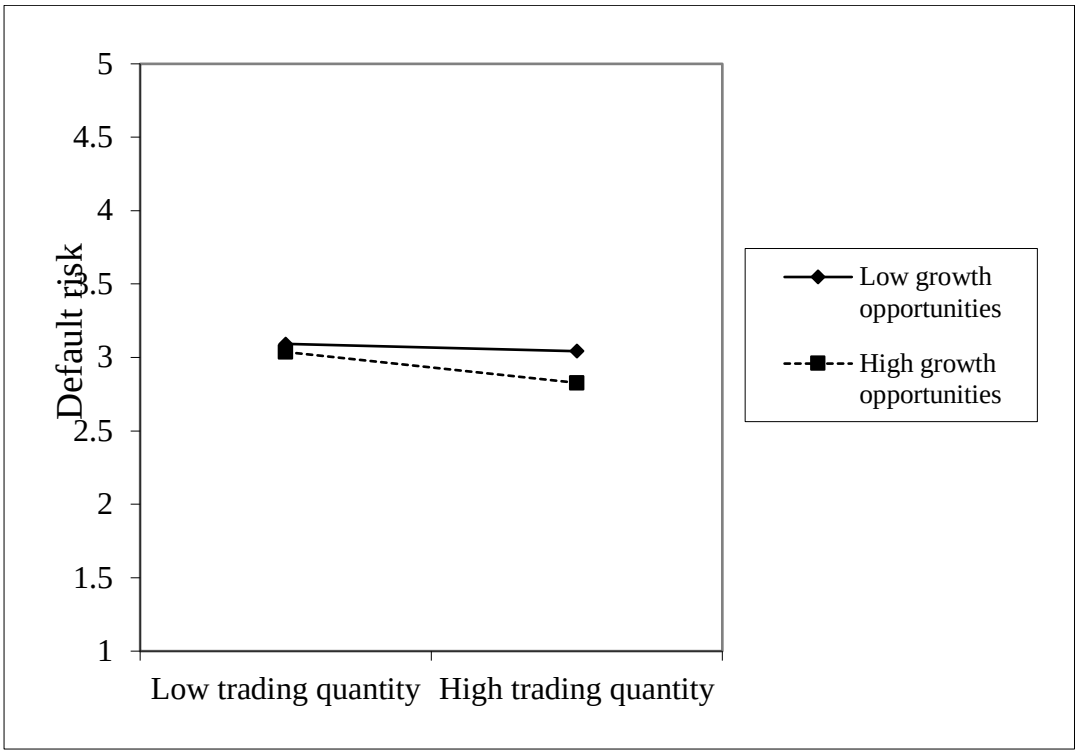

Figure 4.2: Modgraph for trading quantity, growth opportunity and default risk

Hypothesis ($H5_c$) stated that; *Growth opportunities does not significantly moderate the relationship between trading cost and default risk of nonfinancial firms listed in Nairobi Securities Exchange*. Based on the regression results of model 7 (β= *-0.0785986and* $\rho<0.05$) $H05_c$ was rejected and the study concluded that growth opportunities moderated the relationship between trading cost and default. Therefore, hypothesis **$H5_c$ is** rejected.

Figure 4.3 below shows that firms whose stock have a low trading cost and have a high growth opportunity have a low likelihood of falling into default risk.

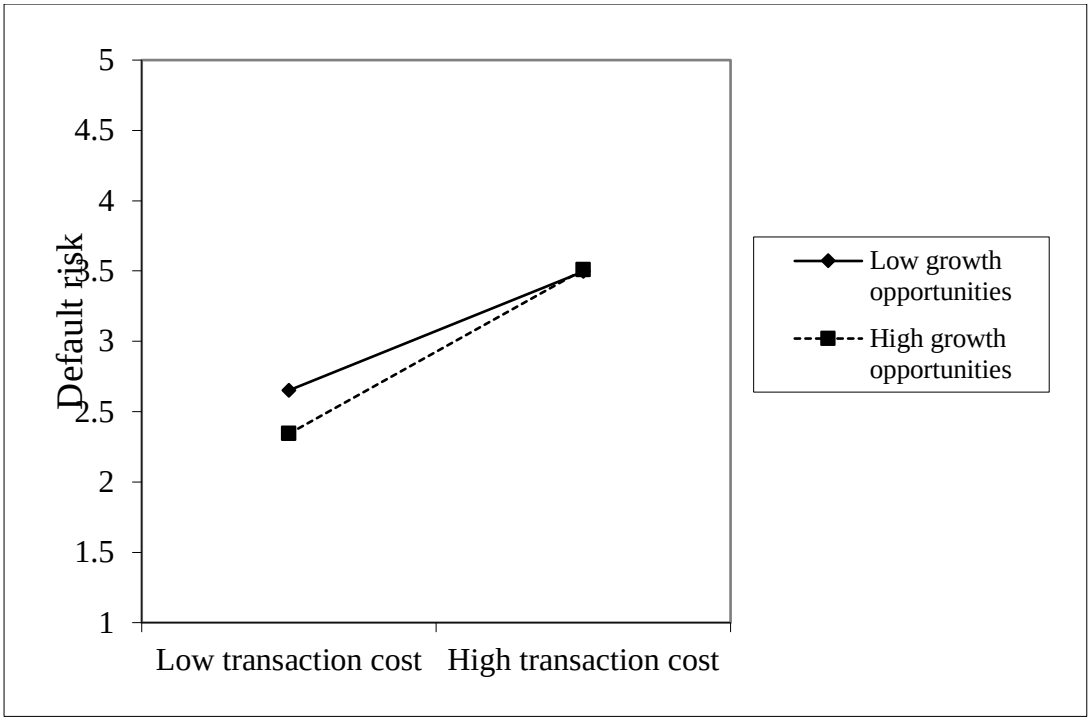

Figure 4.3: Modgraph for trading cost, growth opportunity and default risk

Hypothesis ($H5_d$) stated that: *Growth opportunities do not significantly moderate the relationship between trading speed and default risk of nonfinancial firms listed in Nairobi Securities Exchange*. The random regression results presented in model 7 of table 4.12 (β= *-.0309232 and* $\rho<0.05$) indicated that growth opportunities moderated the relationship between trading speed and default risk of nonfinancial firms listed in Nairobi Securities Exchange. Consequently H05d was rejected.

Figure 4.3 below shows firms whose stocks have a high trading spped and they have high growth opportunities the likelihood of default is minimal.

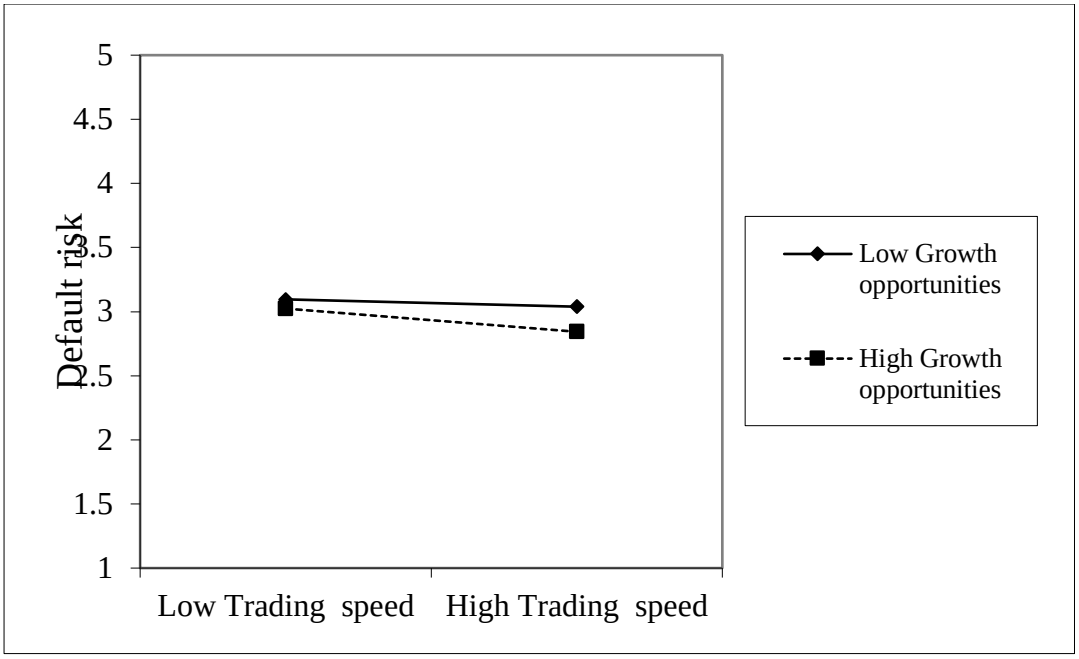

Figure 4.4: Modgraph for trading speed, growth opportunity and default risk

Table 4. 12: Summary Table for Moderation

PD	Model 1 Coef.	Model 2 Coef.	Model 3 Coef.	Model 4 Coef.	Model 5 Coef.	Model 6 Coef.	Model 7 Coef.
CONSTANT	2.225(0.416)**	.687(0.116)**	1.454(0.306)**	1.543(0.300)**	1.451(0.256)**	1.356(0.261)**	1.281(0.252)**
TAN	.112(0.032)**	.094(0.025)**	.073(0.024)**	.073(0.023)**	.068(0.022)**	.069(0.022)**	.064(0.021)**
LEV	.242(0.043)**	.120(0.036)**	.096(0.033)**	.088(0.032)**	.082(0.032)**	.079(0.032)**	.081(0.031)**
ROA	-.152(0.039)**	-.091(0.032)**	-.087(0.029)**	-.066(0.030)**	-.062(0.029)**	-.065(0.028)**	-.062(0.028)**
FS	-.736(0.145)**	-.023(0.005)**	-.500(0.106)**	-.526(0.104)**	-.484(0.088)**	-.449(0.90)**	-.415(0.087)**
FA	.001(0.025)	.036(0.020)	.038(0.019)**	.031(0.018)**	.019(0.018)	.016(0.019)	.017(0.018)
INOW	.143(0.051)**	.099(0.041)**	.100(0.038)**	.091(0.037)**	.106(0.036)**	.100(0.036)**	.084(0.035)**
PI	-	.150(0.023)**	.070(0.024)**	.068(0.023)**	.079(0.022)**	.074(0.022)**	.075(0.022)**
TQ	-	-.127(0.031)**	-.137(0.029)**	-.121(0.028)**	-.085(0.030)**	-.082(0.030)**	-.064(0.030)**
TC	-	.775(0.120)**	.537(0.117)**	.535(0.114)**	.482(0.107)**	.451(0.108)**	.477(0.105)**
TS	-	-.071(0.013)**	-.064(0.012)**	-.060(0.012)**	-.060(0.012)**	-.058(0.011)**	-.059(0.011)**
GOP	-	-	-.076(0.010)**	-.077(0.010)**	-.071(0.010)**	-.072(0.010)**	-.067(0.009)**
GOP*PI	-	-	-	-.165(0.038)**	-.163(0.038)**	-.126(0.040)**	-.131(0.039)**
GOP*TQ	-	-	-	-	-.035(0.010)**	-.036(0.010)**	-.041(0.010)**
GOP*TC	-	-	-	-	-	.072(0.027)**	.080(0.026)**
GOP*TS	-	-	-	-	-	-	-.032(0.008)**
sigma_u	.08299545	.0556034	.05451225	.05390563	.03824397	.03964709	.03760345
sigma_e	.06821641	.05467535	.05032519	.04889725	.04857404	.0480992	.047212
Rho	.59681255	.50841496	.53987506	.54860299	.38267568	.40456104	.38814778
R^2	0.4500	0.6966	0.7335	0.7465	0.7753	0.7799	0.7979
Δ-R^2	-	0.2466	0.0369	0.013	0.0288	0.0046	0.018
Chi2	156.32	438.97	560.52	611.38	681.69	695.60	752.18
Prob > chi2	0.000	0.000	0.000	0.000	0.000	0.000	0.000
No obs	310	310	310	310	310	310	310

**p<0.05; Standard error (Std. Err) in parentheses

Source: Research data, 2023

Table 4. 13: Summary Results of Hypotheses Tests

Hypotheses	β	P<5%	Decision
$H_{01:}$ Price impact has no significant effect on default risk	0.150	0.000	Rejected
$H_{02:}$ Trading quantity has no significant effect on default risk	-0.127	0.000	Rejected
$H_{03:}$ Trading cost has no significant effect on default risk	0.775	0.000	Rejected
$H_{04:}$ Trading speed has no significant effect on default risk	0.071	0.000	Rejected
$H_{05a:}$Growth opportunities does not moderate the relationship between price impact and default risk	-0.131	0.000	Rejected
$H_{05b:}$ Growth opportunities does not moderate the relationship between trading quantity and default risk	-0.041	0.000	Rejected
$H_{05c:}$ Growth opportunities does not moderate the relationship between trading quantity and default risk	-0.079	0.000	Rejected
$H_{05d:}$ Growth opportunities does not moderate the relationship between trading speed and default risk	-0.031	0.000	Rejected

Source: Research data, 2023

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.0 Overview

This chapter presents a summary of the findings, conclusions, recommendations limitations and suggestions for further studies.

5.1 Summary of Findings of the Study

This study aimed to investigate the potentially moderating effect of growth opportunities on the relationship between stock liquidity and default risk of non-financial firms listed in the Nairobi Securities Exchange in Kenya. The main independent variables consisted of price impact, trading volume, transaction cost, and trading speed. The target population comprised all nonfinancial firms that were listed on the NSE. The study period spanned from 2011 until 2020. The study's findings demonstrated that stock liquidity had a significant impact on the default risk of listed firms. Additionally, the study revealed that growth opportunities had a moderating effect on the relationship between stock liquidity and default risk in non-financial firms.

5.1.1 Effect of price impact on default risk

The study's first specific objective was to assess the effect of price impact on default risk. The findings revealed that price impact had a positive and significant effect on default risk ($\beta = 0.1499; \rho < 0.05$); suggesting that firms with high price impact are more likely to face default risk. The finding was supported by earlier studies (Holden & Subrahmanyam, 1992; Holmstrom & Tirole, 1993; Subrahmanyam & Titman, 2001). When a security's price declines significantly, it can send negative feedback to the market and raise concerns about a borrower's financial health. This can make it more difficult for the borrower to obtain financing on reasonable terms, thereby increasing the risk of default. Moreover, price impact can diminish the value of collateral and

erode the borrower's equity basis, especially for highly leveraged companies, thereby increasing the risk of default. While price impact may not directly cause default, it can exacerbate existing financial challenges and market conditions, making it imperative for borrowers to manage liquidity risk, maintain market confidence, and closely monitor collateral values to mitigate default risk.

5.1.2 Effect of trading quantity on default risk

The study's second specific objective was to assess the effect of trading quantity on default risk. The findings revealed that trading quantity had a negative and significant effect on default risk ($\beta = -0.1269;\ \rho < 0.05$); suggesting that firms with high trading quantity are less likely to face default risk. This study contradicted with another study done by Gniadkowska-Szymańska (2022). When there is a large volume of trading activity in a security, it can indicate increased market scrutiny and potential concerns about the underlying borrower. Higher trading quantity can lead to greater price volatility and price impact, which can have negative implications for default risk. If market participants perceive higher trading activity as a signal of financial distress or uncertainty, they may demand higher yields or interest rates to compensate for the perceived default risk, making it more costly for the borrower to access financing. Additionally, significant trading quantity can exacerbate liquidity risk, especially if the security has low trading volume, making it more challenging for the borrower to sell the security quickly and meet its obligations. Therefore, trading quantity can indirectly contribute to default risk by influencing market sentiment, pricing, and liquidity conditions.

5.1.3 Effect of trading cost on default risk

The third specific objective was to determine the effect of trading cost on default risk. The regression results indicated that the relationship between trading cost on default

risk was significant and positive ($\beta = 0.7745; \rho < 0.05$). The study contradicted with another study done by Ebrahim (2020). Trading expenses include transaction fees, bid-ask margins, and other expenses associated with the purchase or sale of securities. Higher trading costs can reduce market liquidity, making it more difficult for borrowers to raise funds or sell assets to meet their obligations promptly and efficiently. This illiquidity can increase the risk of default, as borrowers may have trouble gaining access to capital or may be forced to sell assets at unfavourable prices, resulting in potential losses and financial distress. In addition, excessive trading costs can impede borrowers' ability to engage in effective risk management strategies or capital restructuring, thereby exacerbating default risk. Therefore, high trading costs can indirectly contribute to default risk by restricting access to capital, reducing financial flexibility, and impeding efforts to mitigate risk.

5.1.4 Effect of trading speed on default risk

The fourth specific objective was to explore the effect of trading speed on default risk. The regression results indicated that the relationship between trading speed on default risk was significant and negative ($\beta = -0.0707; \rho < 0.05$). The findings suggest that firms with a highly moving stock are likely to have low default risk. The study agreed with another study done by Brogaard & Xia, (2017). When trading occurs at a fast pace, it can lead to increased price volatility and price impact. This heightened volatility can introduce uncertainty and market turbulence, potentially affecting the financial stability of borrowers. Rapid trading speed can exacerbate liquidity risk, as it may be challenging for borrowers to respond quickly to changing market conditions or sell securities at favourable prices. This can increase default risk, especially if borrowers are unable to access necessary capital or sell assets promptly to meet their obligations. Therefore, trading speed can indirectly contribute to default risk by introducing instability,

hindering liquidity, and limiting the ability of borrowers to react effectively to market fluctuations.

5.1.5 The moderating effect of growth opportunities on the relationship between stock liquidity and default risk

The overall object of the study was to examine whether growth opportunities moderate the relationship between stock liquidity and default risk.

5.1.5.1 The moderating effect of growth opportunities on the relationship between price impact and default risk

The first moderating objective was to examine whether growth opportunities moderates the relationship between price impact and default risk. The regression results indicated that the interaction term of growth opportunities and trading speed had a positive and significant effect on default risk among nonfinancial listed firms in Kenya ($\beta = 0.1314; \rho < 0.05$). The study agreed with another study done by Wang and Chiu (2019). When a company has substantial growth prospects and attractive investment opportunities, it can mitigate the negative impact of price fluctuations on its default risk. The presence of growth opportunities affords the company the potential for increased cash flows and enhanced financial performance, thereby enhancing its capacity to meet debt obligations despite the impact of price fluctuations. Moreover, growth opportunities can increase market confidence and investor perception, thereby decreasing the probability of default. However, companies with growth opportunities must effectively manage their liquidity, financing, and risk management strategies to ensure they can capitalize on growth opportunities while mitigating price impact risks.

5.1.5.2 The moderating effect of growth opportunities on the relationship between trading quantity and default risk

The second moderating objective was to examine whether growth opportunities moderates the relationship between trading quantity and default risk. The regression results indicated that the interaction term of growth opportunities and trading quantity had a negative and significant effect on default risk among nonfinancial listed firms in Kenya (β= *-0.0406; ρ< 0.05*). The study agreed with those done by Ali, Liu & Su, (2018). Investors may perceive that the company can effectively use the capital raised through trading activity to pursue growth initiatives and generate returns, thereby decreasing the perceived risk of default. However, companies with growth opportunities must continue to carefully manage liquidity, capital allocation, and risk management to ensure they can capitalize on growth opportunities while mitigating risks associated with high trading volume.

5.1.5.3 The moderating effect of growth opportunities on the relationship between trading cost and default risk

The third moderating objective was to examine whether growth opportunities moderates the relationship between trading cost and default risk. The regression results indicated that the interaction term of growth opportunities and trading cost had a positive and significant effect on default risk among nonfinancial listed firms in Kenya (β= *0.0786; ρ< 0.05).* The study agreed with another study done by Wang and Zhang (2018). When a firms has substantial growth prospects and promising investment opportunities, it may be better able to tolerate higher trading costs. The presence of growth opportunities suggests the possibility of increased cash flows and enhanced financial performance, which can mitigate the effect of trading costs on default risk. Moreover, companies with growth prospects are frequently viewed more favorably by

investors, which can reduce the perceived risk of default and lead to improved access to capital on more favourable terms. However, companies must carefully manage their costs, including trading costs, to maximize the value of their growth opportunities while mitigating the risks associated with incurring higher trading expenses.

5.1.5.4 The moderating effect of growth opportunities on the relationship between trading speed and default risk

The fourth moderating objective was to determine whether growth opportunities moderate the relationship between trading speed and default risk. The regression results indicated that the interaction term of growth opportunities and trading speed had a negative and significant effect on default risk among nonfinancial listed firms in Kenya ($\beta = -0.0309;\ \rho < 0.05$). The study agreed with another study done by Badayi *et al.*, (2021). The presence of growth opportunities indicates the possibility of increased cash flows and enhanced financial performance, which can provide the company with greater flexibility to withstand market volatility and reduce default risk. Moreover, growth opportunities can boost investor confidence and market perception, thereby lowering the probability of default. To effectively capitalize on growth opportunities while mitigating potential risks associated with rapid trading speed, companies must implement rigorous risk management practices, guarantee adequate liquidity, and maintain financial discipline.

5.2 Conclusions

There is a significant correlation between the liquidity of shares and the risk of default. The increased liquidity of stock trading may result in excessive volatility in the share price of a particular firm or a reduction in the ability of the managers of a particular company to monitor what is taking place on the market. Both of these outcomes are possible. However, a higher liquidity of shares may, in certain circumstances,

contribute to a decreased risk of bankruptcy by increasing both corporate governance for investors and the efficiency in the valuation of securities issued by the firm. This can be accomplished by enhancing both the efficiency in which the company values its securities and the corporate governance for investors. Research has also demonstrated that an increase in the liquidity of trading in shares of a certain firm may lead to an increase in the value of that company, which is something that investors very much want to see happen. The specific connection between stock liquidity and default risk has not been thoroughly established in empirical literature, despite the fact that the significance of liquidity in describing the risk of default is abundantly obvious. As a consequence of this, the purpose of this research was to investigate whether or not growth opportunities modify the relationship between stock liquidity and default risk.

It was concluded that trading quantity of a security can affect default risk by influencing market perceptions, pricing dynamics, and liquidity conditions. Higher trading quantity may raise concerns about a borrower's financial health, increase financing costs, and impede the borrower's ability to sell securities in the market if necessary. It is crucial for borrowers to be aware of the potential impact of trading quantity on default risk and take appropriate measures to manage liquidity risk, maintain market confidence, and address any concerns raised by significant trading activity. It was concluded that trading costs have a notable impact on default risk by affecting market liquidity, capital availability, and risk management capabilities. Higher trading costs can impede a borrower's ability to raise funds or sell assets efficiently, increasing the risk of default. It is crucial for borrowers to consider trading costs as part of their risk management and financing strategies, seeking ways to mitigate costs and maintain adequate liquidity to minimize default risk.

Additionally, it was concluded that trading speed can have a notable impact on default risk by amplifying price volatility, reducing liquidity, and limiting the financial flexibility of borrowers. Fast-paced trading can introduce instability and challenges in raising capital or selling assets, increasing the risk of default. It is essential for borrowers to consider the potential impact of trading speed on their financial stability and implement appropriate risk management strategies to mitigate default risk in rapidly changing market conditions.

Additionally, growth opportunities can act as a moderating factor in the relationship between price impact and default risk. Companies with promising growth prospects are better positioned to withstand price fluctuations and mitigate default risk due to their potential for increased cash flows and improved financial performance. Nonetheless, it is essential for companies to prudently manage their financial strategies to balance growth ambitions with risk mitigation measures. It was additionally concluded that growth opportunities can act as a mitigating factor in the relationship between trading quantity and default risk. Companies with promising growth prospects are more likely to be viewed positively by investors, which can help offset concerns related to high trading volume. However, it is crucial for companies to prudently manage their financial strategies, capital allocation, and risk management practices to strike a balance between pursuing growth opportunities and mitigating the potential risks associated with trading quantity.

Lastly, Companies with promising growth prospects are better positioned to navigate market volatility associated with rapid trading speed and mitigate the risk of default. Nonetheless, it is essential for companies to prudently manage their risk exposure, maintain sufficient liquidity, and employ effective risk management strategies to

capitalize on growth opportunities while mitigating potential default risks associated with trading speed.

5.3 Recommendations of the Study

5.3.1 Theoretical Implications

The findings of this theory validate the theoretical assertions of the trade-off theory. Firms assess the advantages and disadvantages of utilizing debt. The results of this study demonstrated that companies with highly liquid stock can mitigate the adverse consequences of debt, such as the risk of default, by utilizing equity financing to fund growth opportunities.

A recommendation derived from the theory of feedback would be to employ proactive risk management practices that consider both stock liquidity and default risk. The feedback theory suggests that managers can study market perceptions of opaque information from investors' trading behaviours, which in turn may affect managers' operating decisions. By applying this theory to the opaque cost information, the findings of this study suggest that managers leverage market information to make internal decisions such as when to issues equity, when the stocks are liquid, to finance growth opportunities while minimizing the likelihood of failing into default risk. This involves monitoring and analyzing liquidity metrics such as trading volume, bid-ask spreads, and order book depth, as well as assessing critical default risk indicators such as leverage ratios, cash flow adequacy, and credit ratings. Utilizing feedback theory, managers are able to understand liquidity conditions, characterized by low trading volume or widening bid-ask spreads, can signal increased market skepticism and raise the firm's cost of capital, thereby increasing its default risk. In contrast, a higher perception of default risk can result in a decrease in investor demand, thereby reducing stock liquidity.

To avert negative signals from the market, managers can focus on enhancing stock liquidity through a number of strategies. Increasing market-making activities, cultivating relationships with liquidity providers, and implementing investor relations programs can help increase liquidity and attract investors. In addition, employing robust risk management frameworks, such as prudent capital structure management, maintaining adequate cash reserves, and diversifying funding sources, can reduce the risk of default and improve the firm's financial stability. Regular monitoring, analysis, and modification of risk management strategies are indispensable for maintaining a balanced relationship between stock liquidity and default risk. By utilizing feedback theory, managers can better comprehend the dynamics at play, make informed decisions, and take the appropriate steps to manage both liquidity and default risk effectively.

The market timing (or windows of opportunity) theory, asserts that firms prefer external equity when the cost of equity is low, and prefer debt otherwise. Consistent with this theory, the findings of this study confirm that firms should finance a large proportion of their investments with external equity when the stocks are highly liquid, and finance a large proportion of their project with debt when the stocks are illiquid. The findings of this study further showed that growth opportunities moderated the relationship between stock liquidity and default risk, which supports the market timing theory. Therefore, borrowing from the market timing theory this study suggests that managers of firms facing default risk can finance growth opportunities when they perceive their firm securities are highly liquid.

5.3.2 Policy Implication

Based on the influence that price impact has on the default risk of non-financial companies listed on the Nairobi Securities Exchange, regulatory authorities and

investors are recommended to regularly monitor and evaluate the price dynamics of these firms. An increased price effect, particularly sudden and unpredictable price variations, might be an indicator of probable financial trouble and an increased chance of default. In order to assist investors in making decisions that are fully informed, regulatory bodies should ensure that disclosure methods are transparent and that financial information is disseminated in a timely manner. In addition, investors should conduct extensive research and risk assessment before making investments. This should include taking into consideration qualitative aspects in addition to financial measurements, such as the operations of the firm and the state of the industry. Enhancing market efficiency and stability, protecting investor interests, and promoting sustainable growth are all things that may be accomplished if the stakeholders of the Nairobi Securities Exchange are vigilant in monitoring price effect and default risk.

In light of the influence, that trading volume has on the default risk of non-financial companies that are listed on the Nairobi Securities Exchange, regulatory authorities and market players should prioritize improving market liquidity and establishing sound risk management measures. Having sufficient liquidity is necessary for both the upkeep of a well-ordered market and the reduction of the possibility for default risk that is linked with illiquid securities. The encouragement of market-making activities, the improvement of trading infrastructure, and the guaranteeing of equal access to information for all participants should come from regulatory organizations. Market players should develop appropriate risk management frameworks, such as techniques for diversification and an accurate assessment of trade volumes, in order to further decrease the risk of default. Participants on the market have the ability to promote market efficiency, lower the risk of default, and boost investor confidence in the non-

financial companies listed on the Nairobi Securities Exchange if they foster an atmosphere on the market that is liquid and well-regulated.

In light of the influence that transaction costs have on the default risk of non-financial enterprises listed on the Nairobi Securities Exchange, regulatory authorities and market participants should make the reduction of transaction costs a priority in order to decrease default risk. When transaction costs are high, it can deter people from participating in the market, it can limit liquidity, and it can make firms more likely to fail. It is the responsibility of regulatory organizations to work toward the establishment of a market structure that is both competitive and transparent. This can be accomplished by encouraging lower transaction costs through the implementation of measures such as fee reduction, market access improvement, and the encouragement of technological innovation. Participants in the market should examine alternative trading platforms that have lower transaction costs in addition to thinking about trading tactics that are cost-effective. Market players are able to boost market liquidity, attract a larger spectrum of investors, and minimize the risk of default for non-financial enterprises listed on the Nairobi Securities Exchange if they reduce transaction costs.

In light of the influence that trading speed has on the default risk of non-financial companies that are listed on the Nairobi Securities Exchange, regulatory authorities and market participants are advised to prioritize market stability and implement measures to prevent excessive trading speed. Trading at a rapid pace can enhance market volatility, raise the potential of market manipulation, and increase the default risk for companies that are not financial institutions. In order to minimize excessive trading speed, regulatory organizations should install safeties and circuit breakers. This will ensure that market players have sufficient time to digest information and make trading decisions that are informed. In addition, players in the market are required to implement

responsible trading procedures, refrain from engaging in excessive speculative trading, and place an emphasis on long-term investing strategies. Participants in the market have the capacity to defend the integrity of the Nairobi Securities Exchange and foster the sustainable growth of non-financial companies if they keep a trading speed that encourages market stability and decreases the danger of default.

Given the moderating effect growth opportunities have on the relationship between stock liquidity and default risk of non-financial firms listed on the Nairobi Securities Exchange, regulatory authorities and market participants are advised to prioritize promoting and facilitating growth opportunities for these firms. Improving growth prospects might assist reduce the likelihood of non-financial companies defaulting on their debts by making it easier for those companies to generate sufficient cash flows and fulfill their financial commitments. Establishing a supportive regulatory framework that encourages investment in industries with high development potential, supports innovation, and allows access to financing for companies looking to expand their operations is the responsibility of regulatory agencies. Market actors, such as investors and financial institutions, need to be proactive in identifying and supporting chances for growth by providing finance, forming partnerships, and offering consulting services. The resilience of non-financial enterprises may be bolstered, the danger of default can be reduced, and stakeholders can contribute to the overall growth and stability of the Nairobi Securities Exchange by cultivating an environment that is favourable to growth**.**

The securities markets have undergone a transformation as a result of trading automation. Exchanges and competing trading venues have deployed innovative order display, routing, and execution technologies to handle a bigger volume of orders at a cheaper cost, with faster speed, and with more assurance of execution. Automation is

particularly frequently recognized with lowering transaction costs and enhancing specific indicators of liquidity and informational efficiency in the securities markets.

Stock market participants are benefiting from the new generation of high-frequency and algorithmic trading that has lowered price inefficiencies and information asymmetry. However, automation usually appears as a threat to the stock market's infrastructure use and dependability. High-speed trading also increases the risk of adverse selection for market makers and the risk of front-running to institutional investors, even as popular narratives criticize their capacity to squeeze out gains at the expense of ordinary investors. Additionally, flaws in order display and access systems, as well as intermarket restrictions, may increase the potential of disruptive feedback loops as well as nonlinear reactions to new information, in addition to aggravating opportunities for traditional market disruption or deception.

In view of this, policymakers should increase market surveillance to protect trading from predatory and free-riding trading strategies. Regulators must consider how effectively and fairly they can apply rules that provide individual investors with the same access to information and trading opportunities in order to promote "universal informedness." In addition, authorities should make sure that all nodes along the stock market information chain have equal access to information flows.

5.3.3 Managerial Implication

The findings of this study have validated the positive effect of liquidity in mitigating the risk of default. The presence of stock liquidity facilitates the participation of informed traders, hence contributing to the creation of an informative stock price. Managers may utilize information integrated inside their own stocks to strategically plan and execute valuable future projects. Integrating and timely disclosure of financial

information provide investors with better tools for making financial decisions. Therefore, corporate issuers and intermediaries need to adapt increased public disclosure and dissemination mechanisms in order to reduce information asymmetry, thus improving stock liquidity, improve preference for equity financing and lowered likelihood of default risk.

First, in light of the fact that price impact leads to increased default risk of non-financial companies that are listed on the Nairobi Securities Exchange, it is recommended that managers should actively more company's stock returns volatility be regularly monitored and managed. Active monitoring of the stock liquidity would enable managers make more improved investment decisions, increase firm cash inflow, lower cash flow volatility, lower dependency on external capital and potential default risk.

Second, the findings revealed that trading quantity reduces default risk of non-financial firms listed in the Nairobi Securities Exchange. This implies that increased market activities can mitigate default risk. High stock liquidity can assist in mitigating default risk by promoting orderly trade, lowering price volatility, and assuring effective price discovery. Implementing investor relations programs, improving corporate governance standards, and keeping communication open and up to date are three things that managers should aim to improve in order to make their company more visible to investors and more appealing to them. In addition, it is absolutely necessary to cultivate partnerships with market makers and many other liquidity providers to provide a continuous and steady trading environment. Managers are able to boost market trust, attract a larger investor base, and reduce the risk of default for a non-financial company listed on the Nairobi Securities Exchange if they take an active role in managing the trading volumes and liquidity. In additions cross listing of shares and increased institutional investors improves stock turnover.

Third, transaction costs had a positive effect on the default risk of non-financial firms listed on the Nairobi Securities Exchange. A managerial recommendation drawn from this finding is for managers to place an emphasis on lowering transaction costs in order to reduce default risk and increase market participation. Both current and future traders have the ability to examine bid and ask prices, as well as the depths of the market. Additionally, they are able to identify the broker involved in the buying or selling process. Trading information can be obtained by exchange participants using both floor-based and remote trading terminals. Non-exchange members, on the other hand, obtain the same information through data providers that give real-time updates. Consequently, managers have the ability to enhance stock liquidity by providing investors with more access to market information. Transaction processes should be actively optimized by managers in order to cut associated costs such as brokerage fees and regulatory fees. Managers should actively search out ways to optimize transaction processes. This can be accomplished by engaging in price negotiations with various brokers, investigating various alternative trading platforms, and making use of technology to streamline various trading activities. In addition, managers should work closely with regulatory authorities to push for policies that support fair and transparent pricing processes, as well as steps that boost market access and liquidity. Within the Nairobi Securities Exchange, the management have the ability to encourage higher investor involvement, improve market efficiency, and reduce the risk of default for the non-financial company by lowering the transaction costs.

Fourth, the study recommends the need for increased trading speed to lower the risk of default for non-financial enterprises that are listed on the Nairobi Securities Exchange. Firms should adopt strategies for quicker settlement of deals. However, speculative trading should be discouraged to foster an atmosphere that is sustainable and well-

balanced for trading. It is imperative that a long-term investing strategy be encouraged, while short-term speculative conduct, which can compound market volatility and increase default risk, be discouraged. In addition, managers should make sure that effective risk management processes are in place by routinely monitoring market conditions, assessing trading patterns, and putting suitable risk mitigation techniques into action. Maintaining market stability and mitigating the possible unfavourable effects that quick trading speed may have on default risk can be accomplished by collaboration with regulatory bodies and participation in industry activities to build circuit breakers and other safeguards. Within the Nairobi Securities Exchange, managers may help contribute to the reduction of default risk, the preservation of the company's financial stability, and the cultivation of an environment that is sustainable by placing a priority on market stability and ethical trading practices.

Finally, and based on the moderating effect of growth opportunities on the relationship between stock liquidity and default risk of non-financial firms listed on the Nairobi Securities Exchange, several managerial recommendation can be made, which can assist firms to strategically leverage growth opportunities and stock liquidity to mitigate default risk.

The primary focus of management should be on locating and exploiting growth opportunities that are compatible with the core competencies of the organization as well as the conditions of the market. This may involve expanding into new markets, generating innovative products or services, exploring strategic partnerships and acquisitions, or a combination of these things. Companies have the opportunity to increase their income streams, improve their profitability, and lower the probability of default if they aggressively pursue growth possibilities. In addition, managers should make it their goal to strike a balance between growth and liquidity. This means ensuring

that the company has the financial resources to capitalize on growth opportunities while also properly managing liquidity concerns. In order to evaluate the possible impact of potential changes in liquidity on default risk in the context of growth opportunities, it is vital to carry out exhaustive risk assessments, stress testing, and scenario analysis. Within the Nairobi Securities Exchange, managers are able to improve the company's financial condition, reduce the danger of default, and optimize the value creation for shareholders when they employ a strategic management approach to growth possibilities and liquidity.

The results of this study show that in order to fund growth prospects, managers must practice market timing, investigate broad market trends and firm-specific characteristics, and determine whether it is feasible to issue shares to finance the investments. As a result, there would be less dependence on debt financing, which would lessen the danger of default.

5.4 Limitations and Future Research

Although the results of this investigation are novel, they are not without their limitations. Initially, the study's data is restricted to publicly traded non-financial corporations. Incorporating data from additional developed and emergent economies, in addition to Kenya, could potentially yield valuable insights regarding the influence of contextual variations on the interrelationships among the variables. The investigation of the relationship between stock liquidity and default using a comparable methodology across multiple countries while controlling for institutional differences. Furthermore, it could be beneficial to conduct a comprehensive examination of potential corporate governance factors, such as the gender composition of the board and the compensation of the CEO, which could impact the correlation between stock liquidity and default risk. Fourth, future research may investigate the mechanisms by which institutional factors

influence the relationship between stock liquidity and default. Ultimately, future investigations might scrutinize the impact of board characteristics and ownership structure on the correlation between default risk and stock liquidity.

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APPENDICES

Appendix I: Document Collection Schedule

FOR THE YEAR 2011- 2020

1.0 Dependent variable- distance to default

Year	Current value of asset	Face value of debt	Risk free rate	Annualized volatility
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

1.1 Independent variables

i) Price impact = Amihud's illiquidity ratio (ILLIQ)

ii) Trading quantity= trading turnover

iii) Transaction cost = bid ask price

iv) Trading speed = liquidity measure LM

Year	Price at day *t*	Trading value day *t*	Number of shares traded	Number of shares outstanding	Bid price	Ask price	Number of zero daily trading volume	Total number of trading days
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								

1.2 Moderating variable

Growth opportunities = market to book value

Year	Market value of shares	Book value of the shares
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Control variables

Firm size =Log of Total Assets
Firm performance = Return on assets
Leverage = debt to total assets
Tangibility= net plant, property and equipment scaled to total assets
Institutional ownership= proportion of shares held by institutional owners

Year	Total Assets	Log of Total Assets	Net profit	Total debt	No of shareholders with over 5%	Net PPE
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

Appendix II: Target Population: Firms Listed in NSE

No.	Company	Sector	Year listed	Status
1	Eaagads Limited	Agriculture	1972	Active
2	Kakuzi Limited	Agriculture	1951	Active
3	Kapchorua Tea Factory Limited	Agriculture	1972	Active
4	Limuru Tea Kenya Limited	Agriculture	1967	Active
5	Sasini Limited	Agriculture	1965	Active
6	Williamson Tea Kenya Limited	Agriculture	1972	Active
7	Rea Vipingo Plantations Limited	Agriculture	1998	Active
8	Car and General (Kenya) Limited	Automobiles and Accessories	1950	Active
9	Sameer Africa	Automobiles and Accessories	1994	Active
10	Atlas African Industries Limited	Commercial and Service	2014	Active
11	Express Kenya Limited	Commercial and Service	1978	Active
12	Kenya Airways Limited	Commercial and Service	1996	Suspended
13	Longhorn Publishers Limited	Commercial and Service	2012	Active
14	Nairobi Business Ventures Limited	Commercial and Service	2016	Active
15	National Media Group Limited	Commercial and Service	1973	Active
16	Standard Group Limited	Commercial and Service	1954	Active
17	TPS Eastern Africa Limited	Commercial and Service	1997	Active
18	Uchumi Supermarket Limited	Commercial and Service	1992	Suspended
19	WPP Scan Group Limited	Commercial and Service	2006	Active
20	Deacons East Africa PLC	Commercial and Service	2016	Suspended
21	Hutchings Biemer Limited	Commercial and Service	1993	Active
22	Athi River Mining Cement Limited	Construction &Allied	1997	Active
23	Bamburi Cement Limited	Construction &Allied	1951	Active
24	Crown Paints Kenya Limited	Construction &Allied	1992	Active

25	E.A Cables Limited	Construction &Allied	1973	Active
26	E.A Portland Cement Company Limited	Construction &Allied	1972	Active
27	Ken Gen Company Limited	Energy and Petroleum	2006	Active
28	Kenol Kobil Limited	Energy and Petroleum	1959	Suspended
29	Kenya Power &Lighting Company Limited	Energy and Petroleum	1954	Active
30	Total Kenya Limited	Energy and Petroleum	1988	Active
31	Umeme Limited	Energy and Petroleum	2012	Active
32	B.O.C Kenya Limited	Manufacturing and allied	1969	Active
33	British American Tobacco Kenya Limited	Manufacturing and allied	1969	Active
34	Carbacid Investments Limited	Manufacturing and allied	1972	Active
35	East African Breweries Limited	Manufacturing and allied	1972	Active
36	Eveready East Africa Limited	Manufacturing and allied	2006	Suspended
37	Flame Tree Group Holdings Limited	Manufacturing and allied	2015	Active
38	Kenya Orchards Limited	Manufacturing and allied	1959	Active
39	Mumias Sugar Company Limited	Manufacturing and allied	2001	Suspended
40	Baumann Company limited	Manufacturing and allied	1976	Active
41	Unga Group Limited	Manufacturing and allied	1971	Active
42	Safaricom Limited	Telecommunication and Technology	2008	Active
43	Stanlib Fahari I-Reit	Real Estate Investment Trust	2015	Active

Appendix III: Regression Results

Fixed-effects (within) regression	Number of obs	= 310
Group variable: FIRMID	Number of groups	= 31
R-sq: within = 0.3173	Obs per group: min	= 10
between = 0.5016	avg	= 10.0
overall = 0.4436	max	= 10
	F(6,273)	= 21.15
corr(u_i, Xb) = -0.0736	Prob > F	= 0.0000

PD	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
TAN	.1034904	.0344084	3.01	0.003	.0357508	.17123
LEV	.238084	.0450129	5.29	0.000	.1494675	.3267004
ROA	-.1673315	.0412961	-4.05	0.000	-.2486307	-.0860322
FS	-.7910933	.2169947	-3.65	0.000	-1.218289	-.3638977
FA	.0044358	.025466	0.17	0.862	-.0456988	.0545705
INOW	.1293062	.0535587	2.41	0.016	.0238657	.2347467
_cons	2.390947	.6205477	3.85	0.000	1.16928	3.612615
sigma_u	.08277872					
sigma_e	.06821641					
Rho	.59555351	(fraction of variance due to u_i)				

F test that all u_i=0: F(30, 273) = 13.66 Prob > F = 0.0000

	---- Coefficients ----			
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	fe	re	Difference	S.E.
TAN	.1034904	.1124243	-.0089339	.0133211
LEV	.238084	.2419577	-.0038737	.0116515
ROA	-.1673315	-.1521684	-.0151631	.0123708
FS	-.7910933	-.7363135	-.0547798	.1617091
FA	.0044358	.0005372	.0038986	.0066941
INOW	.1293062	.1427526	-.0134463	.0165141

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg
Test: Ho: difference in coefficients not systematic
chi2(6) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 3.08
Prob>chi2 = 0.7987

Fixed-effects (within) regression	Number of obs	= 310
Group variable: FIRMID	Number of groups	= 31
R-sq: within = 0.5661	Obs per group: min	= 10
between = 0.7543	avg	= 10.0
overall = 0.6897	max	= 10
	F(10,269)	= 35.09
corr(u_i, Xb) = -0.3635	Prob > F	= 0.0000

PD	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
TAN	.0930542	.0280311	3.32	0.001	.0378659	.1482424
LEV	.129617	.037229	3.48	0.001	.0563197	.2029142
ROA	-.1004008	.0337339	-2.98	0.003	-.1668169	-.0339847
FS	-.6821933	.1815261	-3.76	0.000	-1.039586	-.3248006
FA	.0341461	.0213954	1.60	0.112	-.0079776	.0762698
INOW	.1000984	.0434306	2.30	0.022	.0145913	.1856055
PI	.1490974	.0244085	6.11	0.000	.1010415	.1971533
TQ	-.1222505	.0329428	-3.71	0.000	-.1871089	-.057392
TC	.8685739	.1392174	6.24	0.000	.5944796	1.142668
TS	-.0649237	.0133082	-4.88	0.000	-.0911252	-.0387222
_cons	2.088488	.5193834	4.02	0.000	1.065914	3.111061
sigma_u	.06323444					
sigma_e	.0547897					
Rho	.57118646	(fraction of variance due to u_i)				

F test that all u_i=0: F(30, 269) = 10.23 Prob > F = 0.0000

	(b) fe	(B) re	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
TAN	.0930542	.094222	-.0011678	.0118808
LEV	.129617	.1208155	.0088014	.009432
ROA	-.1004008	-.0910884	-.0093124	.0112885
FS	-.6821933	-.549402	-.1327913	.1438017
FA	.0341461	.0368943	-.0027482	.0069723
INOW	.1000984	.0993416	.0007568	.0143194
PI	.1490974	.1485617	.0005357	.0085413
TQ	-.1222505	-.1269218	.0046713	.0101207
TC	.8685739	.7733602	.0952137	.0697254
TS	-.0649237	-.070584	.0056603	.003261

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(10) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 15.32
Prob>chi2 = 0.1210

Fixed-effects (within) regression	Number of obs	= 310
Group variable: FIRMID	Number of groups	= 31
R-sq: within = 0.6353	Obs per group: min	= 10
between = 0.7748	Avg	= 10.0
overall = 0.7249	Max	= 10
	F(11,268)	= 42.44
corr(u_i, Xb) = -0.3776	Prob > F	= 0.0000

PD	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
TAN	.0668645	.0260076	2.57	0.011	.0156592	.1180698
LEV	.1011176	.0344282	2.94	0.004	.0333335	.1689017
ROA	-.1036243	.0309884	-3.34	0.001	-.164636	-.0426126
FS	-.6484159	.1668018	-3.89	0.000	-.9768245	-.3200072
FA	.0371098	.0196564	1.89	0.060	-.0015908	.0758104
INOW	.092383	.0399063	2.31	0.021	.0138132	.1709527
PI	.0627187	.025483	2.46	0.014	.0125464	.112891
TQ	-.1312064	.0302845	-4.33	0.000	-.1908321	-.0715806
TC	.5634222	.1348443	4.18	0.000	.2979332	.8289112
TS	-.0605825	.0122389	-4.95	0.000	-.0846792	-.0364858
GOP	-.0814374	.0114209	-7.13	0.000	-.1039235	-.0589513
_cons	1.872997	.4780179	3.92	0.000	.9318486	2.814145
sigma_u	.06110594					
sigma_e	.05032519					
Rho	.59585092	(fraction of variance due to u_i)				

F test that all u_i=0: F(30, 268) = 10.80 Prob > F = 0.0000

	---- Coefficients ----			
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	Fe	re	Difference	S.E.
TAN	.0668645	.0734584	-.0065938	.0108336
LEV	.1011176	.0955139	.0056037	.0085879
ROA	-.1036243	-.0865838	-.0170405	.0099776
FS	-.6484159	-.5003549	-.1480609	.1290986
FA	.0371098	.0380498	-.00094	.0062233
INOW	.092383	.1003586	-.0079756	.0127217
PI	.0627187	.0704873	-.0077686	.0095286
TQ	-.1312064	-.1368776	.0056712	.0089479
TC	.5634222	.5370322	.02639	.0670946
TS	-.0605825	-.0640409	.0034583	.0028769
GOP	-.0814374	-.0759153	-.0055222	.004797

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg
Test: Ho: difference in coefficients not systematic
chi2(11) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 13.20
Prob>chi2 = 0.2803

Fixed-effects (within) regression	Number of obs	= 310
Group variable: FIRMID	Number of groups	= 31
R-sq: within = 0.6570	Obs per group: min	= 10
between = 0.7808	avg	= 10.0
overall = 0.7373	max	= 10
	F(12,267)	= 42.61
corr(u_i, Xb) = -0.3243	Prob > F	= 0.0000

PD	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
TAN	.0673921	.02527	2.67	0.008	.0176382	.1171459
LEV	.0963062	.0334718	2.88	0.004	.0304039	.1622084
ROA	-.0833005	.0305128	-2.73	0.007	-.1433768	-.0232243
FS	-.6449975	.1620711	-3.98	0.000	-.9640974	-.3258976
FA	.0283577	.0192171	1.48	0.141	-.0094786	.066194
INOW	.0810407	.0388722	2.08	0.038	.0045057	.1575756
PI	.0577818	.0247891	2.33	0.021	.008975	.1065887
TQ	-.1142172	.0297143	-3.84	0.000	-.1727213	-.0557131
TC	.5559984	.1310307	4.24	0.000	.2980136	.8139833
TS	-.057614	.0119136	-4.84	0.000	-.0810705	-.0341574
GOP	-.0817698	.0110971	-7.37	0.000	-.1036188	-.0599207
GOP*PI	-.1598532	.0389062	-4.11	0.000	-.2364551	-.0832513
_cons	1.88129	.4644589	4.05	0.000	.9668218	2.795757
sigma_u	.05874757					
sigma_e	.04889725					
Rho	.59074775	(fraction of variance due to u_i)				

F test that all u_i=0: F(30, 267) = 10.72 Prob > F = 0.0000

Random-effects GLS regression	Number of obs	= 310
Group variable: FIRMID	Number of groups	= 31
R-sq: within = 0.6554	Obs per group: min	= 10
between = 0.7915	avg	= 10.0
overall = 0.7465	max	= 10
	Wald chi2(12)	= 611.38
corr(u_i, X) = 0 (assumed)	Prob > chi2	= 0.0000

PD	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
TAN	.0731004	.0229813	3.18	0.001	.0280579	.1181429
LEV	.0883408	.0324135	2.73	0.006	.0248116	.15187
ROA	-.0657661	.0289183	-2.27	0.023	-.122445	-.0090873
FS	-.5261193	.1035374	-5.08	0.000	-.7290488	-.3231898
FA	.0310011	.0181804	1.71	0.088	-.0046318	.066634
INOW	.0907177	.0368075	2.46	0.014	.0185762	.1628591
PI	.0677031	.0229779	2.95	0.003	.0226672	.1127389
TQ	-.1205225	.0283458	-4.25	0.000	-.1760793	-.0649657
TC	.5352139	.113883	4.70	0.000	.3120072	.7584206
TS	-.0603969	.0115764	-5.22	0.000	-.0830863	-.0377075
GOP	-.0766064	.0100813	-7.60	0.000	-.0963655	-.0568474
GOP*PI	-.164763	.0379944	-4.34	0.000	-.2392306	-.0902954
_cons	1.543075	.3000314	5.14	0.000	.9550241	2.131126
sigma_u	.05390563					
sigma_e	.04889725					
Rho	.54860299	(fraction of variance due to u_i)				

	(b) Fe	(B) re	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
TAN	.0673921	.0731004	-.0057083	.0105088
LEV	.0963062	.0883408	.0079654	.0083504
ROA	-.0833005	-.0657661	-.0175344	.0097345
FS	-.6449975	-.5261193	-.1188782	.1246878
FA	.0283577	.0310011	-.0026434	.0062266
INOW	.0810407	.0907177	-.009677	.0125
PI	.0577818	.0677031	-.0099212	.0093012
TQ	-.1142172	-.1205225	.0063053	.0089136
TC	.5559984	.5352139	.0207846	.064805
TS	-.057614	-.0603969	.0027829	.0028143
GOP	-.0817698	-.0766064	-.0051633	.0046383
GOP*PI	-.1598532	-.164763	.0049098	.0083737

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg
Test: Ho: difference in coefficients not systematic
chi2(12) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 12.12
Prob>chi2 = 0.4357

Fixed-effects (within) regression	Number of obs	=	310
Group variable: FIRMID	Number of groups	=	31
R-sq: within = 0.6627	Obs per group: min	=	10
between = 0.8028	avg	=	10.0
overall = 0.7554	max	=	10
	F(13,266)	=	40.21
corr(u_i, Xb) = -0.2971	Prob > F	=	0.0000

PD	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
TAN	.0639298	.0251552	2.54	0.012	.014401	.1134585
LEV	.0954364	.0332531	2.87	0.004	.0299637	.1609091
ROA	-.084735	.0303185	-2.79	0.006	-.1444298	-.0250402
FS	-.6238988	.1613023	-3.87	0.000	-.9414906	-.306307
FA	.0198911	.019497	1.02	0.309	-.0184969	.0582792
INOW	.0907902	.0388839	2.33	0.020	.0142309	.1673496
PI	.0637543	.0247833	2.57	0.011	.0149578	.1125507
TQ	-.0874201	.0320719	-2.73	0.007	-.1505672	-.0242731
TC	.5298144	.1307402	4.05	0.000	.2723971	.7872317
TS	-.0565009	.0118463	-4.77	0.000	-.0798254	-.0331764
GOP	-.0788096	.0111105	-7.09	0.000	-.1006853	-.0569338
GOP*PI	-.1580198	.0386585	-4.09	0.000	-.2341354	-.0819042
GOP*TQ	-.0217535	.0101814	-2.14	0.034	-.0417999	-.0017072
_cons	1.838685	.4618195	3.98	0.000	.929398	2.747971
sigma_u	.0550722					
sigma_e	.04857404					
Rho	.56245018	(fraction of variance due to u_i)				

F test that all u_i=0: F(30, 266) = 8.35 Prob > F = 0.0000

Random-effects GLS regression	Number of obs	=	310
Group variable: FIRMID	Number of groups	=	31
R-sq: within = 0.6579	Obs per group: min	=	10
between = 0.8300	avg	=	10.0
overall = 0.7753	max	=	10
	Wald chi2(13)	=	681.69
corr(u_i, X) = 0 (assumed)	Prob > chi2	=	0.0000

PD	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
TAN	.0681752	.022396	3.04	0.002	.0242798	.1120705
LEV	.0818816	.0322523	2.54	0.011	.0186682	.145095
ROA	-.0624141	.0285175	-2.19	0.029	-.1183073	-.0065208
FS	-.4836277	.0880084	-5.50	0.000	-.656121	-.3111344
FA	.0186053	.0184485	1.01	0.313	-.0175531	.0547637
INOW	.1059997	.0362762	2.92	0.003	.0348996	.1770998
PI	.0786361	.0223649	3.52	0.000	.0348018	.1224704
TQ	-.0847484	.0304093	-2.79	0.005	-.1443494	-.0251473
TC	.4824779	.1070943	4.51	0.000	.2725769	.6923788
TS	-.0603018	.0115893	-5.20	0.000	-.0830164	-.0375872
GOP	-.0706835	.0096757	-7.31	0.000	-.0896475	-.0517195
GOP*PI	-.1631784	.0381028	-4.28	0.000	-.2378585	-.0884984
GOP*TQ	-.0345119	.0100255	-3.44	0.001	-.0541615	-.0148624
_cons	1.451076	.2563318	5.66	0.000	.9486751	1.953477
sigma_u	.03824397					
sigma_e	.04857404					
Rho	.38267568	(fraction of variance due to u_i)				

	---- Coefficients ----			
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	Fe	re	Difference	S.E.
TAN	.0639298	.0681752	-.0042454	.0114545
LEV	.0954364	.0818816	.0135548	.0080966
ROA	-.084735	-.0624141	-.0223209	.010294
FS	-.6238988	-.4836277	-.1402711	.1351775
FA	.0198911	.0186053	.0012858	.0063076
INOW	.0907902	.1059997	-.0152095	.0139997
PI	.0637543	.0786361	-.0148818	.0106783
TQ	-.0874201	-.0847484	-.0026718	.0101923
TC	.5298144	.4824779	.0473365	.0749921
TS	-.0565009	-.0603018	.0038009	.0024543
GOP	-.0788096	-.0706835	-.0081261	.0054612
GOP*PI	-.1580198	-.1631784	.0051586	.0065316
GOP*TQ	-.0217535	-.0345119	.0127584	.001775

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg
Test: Ho: difference in coefficients not systematic
chi2(13) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 5.86
Prob>chi2 = 0.9513
(V_b-V_B is not positive definite)

xed-effects (within) regression	Number of obs	=	310
Group variable: FIRMID	Number of groups	=	31
R-sq: within = 0.6706	Obs per group: min	=	10
between = 0.8049	Avg	=	10.0
overall = 0.7594	Max	=	10
	F(14,265)	=	38.53
corr(u_i, Xb) = -0.2912	Prob > F	=	0.0000

PD	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
TAN	.0631765	.0249111	2.54	0.012	.0141275	.1122254
LEV	.0922696	.0329522	2.80	0.005	.0273881	.1571511
ROA	-.0821875	.0300393	-2.74	0.007	-.1413337	-.0230414
FS	-.614743	.1597673	-3.85	0.000	-.9293179	-.3001681
FA	.0180966	.0193197	0.94	0.350	-.0199431	.0561362
INOW	.0921338	.0385075	2.39	0.017	.0163142	.1679534
PI	.0617439	.0245542	2.51	0.013	.0133978	.1100901
TQ	-.0832384	.0318022	-2.62	0.009	-.1458555	-.0206212
TC	.4521482	.1331214	3.40	0.001	.190038	.7142584
TS	-.0539338	.0117752	-4.58	0.000	-.0771186	-.030749
GOP	-.0794271	.0110047	-7.22	0.000	-.1010948	-.0577594
GOP*PI	-.1192572	.0412886	-2.89	0.004	-.2005526	-.0379618
GOP*TQ	-.0250825	.010169	-2.47	0.014	-.0451049	-.0050601
GOP*TC	.0755577	.0301561	2.51	0.013	.0161817	.1349337
_cons	1.812196	.4574272	3.96	0.000	.9115421	2.71285
sigma_u	.05465716					
sigma_e	.0480992					
Rho	.56356152	(fraction of variance due to u_i)				

F test that all u_i=0: F(30, 265) = 8.38 Prob > F = 0.0000

Random-effects GLS regression	Number of obs	=	310
Group variable: FIRMID	Number of groups	=	31
R-sq: within = 0.6663	Obs per group: min	=	10
between = 0.8325	Avg	=	10.0
overall = 0.7799	Max	=	10
	Wald chi2(14)	=	695.60
corr(u_i, X) = 0 (assumed)	Prob > chi2	=	0.0000

PD	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
TAN	.0686086	.0222102	3.09	0.002	.0250774	.1121398
LEV	.0787333	.0319169	2.47	0.014	.0161772	.1412893
ROA	-.0648517	.0282345	-2.30	0.022	-.1201902	-.0095132
FS	-.4490538	.0899912	-4.99	0.000	-.6254333	-.2726744
FA	.0160746	.018273	0.88	0.379	-.0197398	.051889
INOW	.1002708	.0359805	2.79	0.005	.0297503	.1707913
PI	.0744206	.0222257	3.35	0.001	.0308591	.1179821
TQ	-.0821186	.0301084	-2.73	0.006	-.1411299	-.0231073
TC	.4508106	.1076059	4.19	0.000	.2399068	.6617144
TS	-.0578083	.0114755	-5.04	0.000	-.0802999	-.0353167
GOP	-.0716056	.0096271	-7.44	0.000	-.0904743	-.0527369
GOP*PI	-.1255686	.0400964	-3.13	0.002	-.2041562	-.046981
GOP*TQ	-.0360707	.009937	-3.63	0.000	-.0555468	-.0165946
GOP*TC	.0720266	.0267708	2.69	0.007	.0195568	.1244964
_cons	1.35618	.2614728	5.19	0.000	.843703	1.868657
sigma_u	.03964709					
sigma_e	.0480992					
Rho	.40456104 (fraction of variance due to u_i)					

	---- Coefficients ----			
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	Fe	Re	Difference	S.E.
TAN	.0631765	.0686086	-.0054321	.0112815
LEV	.0922696	.0787333	.0135363	.0081951
ROA	-.0821875	-.0648517	-.0173358	.0102556
FS	-.614743	-.4490538	-.1656892	.1320121
FA	.0180966	.0160746	.002022	.0062728
INOW	.0921338	.1002708	-.0081371	.0137197
PI	.0617439	.0744206	-.0126767	.0104368
TQ	-.0832384	-.0821186	-.0011198	.0102404
TC	.4521482	.4508106	.0013376	.0783726
TS	-.0539338	-.0578083	.0038744	.0026396
GOP	-.0794271	-.0716056	-.0078215	.0053312
GOP*PI	-.1192572	-.1255686	.0063113	.00985
GOP*TQ	-.0250825	-.0360707	.0109882	.0021601
GOP*TC	.0755577	.0720266	.0035311	.0138821

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(14) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 8.74
Prob>chi2 = 0.513

Fixed-effects (within) regression	Number of obs	=	310
Group variable: FIRMID	Number of groups	=	31
R-sq: within = 0.6838	Obs per group: min	=	10
between = 0.8273	avg	=	10.0
overall = 0.7795	max	=	10
	F(15,264)	=	38.06
corr(u_i, Xb) = -0.2832	Prob > F	=	0.0000

PD	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
TAN	.0597334	.0244736	2.44	0.015	.0115451	.1079216
LEV	.0949934	.0323548	2.94	0.004	.0312871	.1586997
ROA	-.075836	.0295471	-2.57	0.011	-.1340139	-.017658
FS	-.5703425	.157388	-3.62	0.000	-.880238	-.260447
FA	.0187504	.0189644	0.99	0.324	-.0185902	.0560911
INOW	.0803172	.037964	2.12	0.035	.0055665	.1550679
PI	.0651136	.0241226	2.70	0.007	.0176165	.1126108
TQ	-.0648491	.0317018	-2.05	0.042	-.1272697	-.0024285
TC	.504257	.1316026	3.83	0.000	.2451327	.7633813
TS	-.0547326	.0115605	-4.73	0.000	-.077495	-.0319701
GOP	-.0740415	.0109225	-6.78	0.000	-.0955478	-.0525353
GOP*PI	-.1243516	.040556	-3.07	0.002	-.2042059	-.0444973
GOP*TQ	-.0299674	.010089	-2.97	0.003	-.0498326	-.0101022
GOP*TC	.0813157	.0296505	2.74	0.007	.0229342	.1396972
GOP*TS	-.0263662	.0079305	-3.32	0.001	-.0419814	-.0107511
_cons	1.704349	.4501601	3.79	0.000	.8179883	2.59071
sigma_u	.05126519					
sigma_e	.047212					
Rho	.54108909 (fraction of variance due to u_i)					

F test that all u_i=0: F(30, 264) = 7.63 Prob > F = 0.0000

Random-effects GLS regression	Number of obs	=310
Group variable: FIRMID	Number of groups	=31
R-sq: within = 0.6797	Obs per group: min	=10
between = 0.8525	avg	=10.0
overall = 0.7979	max	=10
	Wald chi2(15)	=752.18
corr(u_i, X) = 0 (assumed)	Prob > chi2	=0.0000

PD	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
TAN	.0637308	.0216742	2.94	0.003	.02125	.1062115
LEV	.0807833	.0311839	2.59	0.010	.0196639	.1419027
ROA	-.0616521	.0275551	-2.24	0.025	-.1156591	-.0076451
FS	-.4151332	.0868919	-4.78	0.000	-.5854382	-.2448282
FA	.0165225	.0178391	0.93	0.354	-.0184415	.0514864
INOW	.0835952	.0353523	2.36	0.018	.014306	.1528843
PI	.0747045	.0216491	3.45	0.001	.032273	.117136
TQ	-.0635014	.0297561	-2.13	0.033	-.1218223	-.0051806
TC	.4767689	.1045298	4.56	0.000	.2718942	.6816436
TS	-.0591375	.0112193	-5.27	0.000	-.0811269	-.0371482
GOP	-.0670106	.0094206	-7.11	0.000	-.0854746	-.0485465
GOP*PI	-.1311267	.0392043	-3.34	0.001	-.2079658	-.0542876
GOP*TQ	-.0409115	.0097726	-4.19	0.000	-.0600655	-.0217576
GOP*TC	.0797117	.0261246	3.05	0.002	.0285085	.1309149
GOP*TS	-.0310873	.0078317	-3.97	0.000	-.0464372	-.0157375
_cons	1.28112	.2521703	5.08	0.000	.7868758	1.775365
sigma_u	.03760345					
sigma_e	.047212					
Rho	.38814778	(fraction of variance due to u_i)				

	---- Coefficients ----			
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	fe	Re	Difference	S.E.
TAN	.0597334	.0637308	-.0039974	.0113659
LEV	.0949934	.0807833	.0142101	.0086253
ROA	-.075836	-.0616521	-.0141839	.0106652
FS	-.5703425	-.4151332	-.1552093	.131228
FA	.0187504	.0165225	.002228	.0064354
INOW	.0803172	.0835952	-.003278	.0138377
PI	.0651136	.0747045	-.0095908	.0106402
TQ	-.0648491	-.0635014	-.0013476	.0109354
TC	.504257	.4767689	.0274881	.0799547
TS	-.0547326	-.0591375	.004405	.0027879
GOP	-.0740415	-.0670106	-.007031	.0055274
GOP*PI	-.1243516	-.1311267	.0067751	.010383
GOP*TQ	-.0299674	-.0409115	.0109441	.0025069
GOP*TC	.0813157	.0797117	.001604	.0140234
GOP*TS	-.0263662	-.0310873	.0047211	.001248

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg
Test: Ho: difference in coefficients not systematic
chi2(15) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 109.60
Prob>chi2 = 0.0000
(V_b-V_B is not positive definite)

Appendix IV: NACOSTI Research Permit

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Ref No: 938684

Date of Issue: 20/September/2022

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Awarded by

Prof. Anne Syomwene Kisilu
CERM-ESA Project Leader Date: 8/11/2023