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**The Effect of Internet Subscriptions on Capital Market Participation by Local
Individual Investors in Kenya**

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145248

**Submitted in partial fulfilment of the requirements for the Degree of
Bachelor of Business Science in Financial Economics at Strathmore University**

Strathmore Institute of Mathematical Sciences

Strathmore University

Nairobi, Kenya

February, 2025

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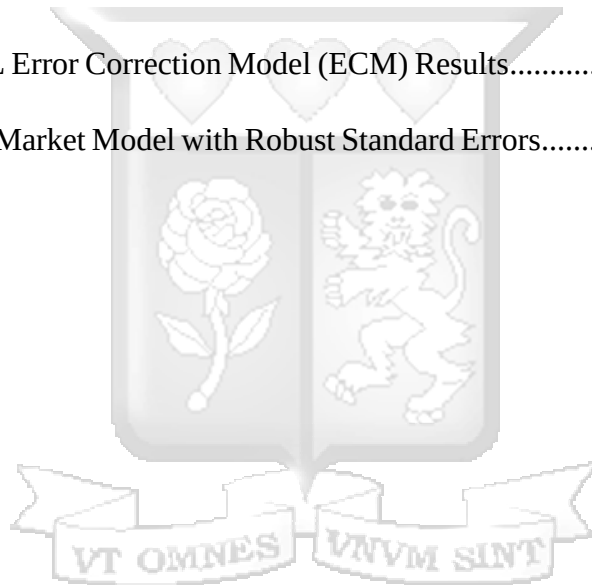
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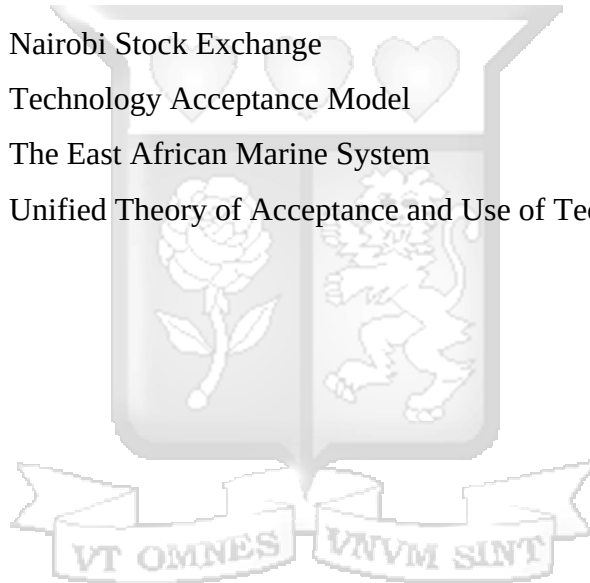
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LIST OF ACRONYMS

ARCC	African Regional Centre for Computing
ARPANET	Advanced Research Projects Agency Network
ATS	Automated Trading System
CA	Communications Authority of Kenya
CAPM	Capital Asset Pricing Model
CDSC	Central Depository and Settlement Corporation
CMA	Capital Markets Authority
ISP	Internet Service Provider
NSE	Nairobi Stock Exchange
TAM	Technology Acceptance Model
TEAMS	The East African Marine System
UTAUT	Unified Theory of Acceptance and Use of Technology



ABSTRACT

This study examines the effect of internet subscriptions on capital market participation by local individual investors in Kenya, focusing on stocks and corporate bonds. Using quarterly data from 2010 to 2023, the research employs an Autoregressive Distributed Lag (ARDL) model to analyze the relationship, accounting for macroeconomic factors such as inflation, interest rates, and market performance. Results show that internet subscriptions positively influence stock market participation though the effect is lagged, with an increase in subscriptions leading to a statistically significant higher number of stock investors. Bond participation also has a positive statistically significant effect from internet access in the short run and this effect is immediate then becomes negative when lagged unlike in the case of stock market participation.

Macroeconomic variables reveal mixed effects; inflation and interest rates negatively impact stock participation, while their influence on bonds remains statistically insignificant. The Bounds Test confirms a long-term relationship between internet subscriptions and stock market participation but yields inconclusive results for bonds. Diagnostic tests ensure the robustness of findings, with adjustments made for heteroskedasticity in the bond model.

The study highlights the transformative role of internet access in democratizing financial markets for stocks. However, low bond participation underscores the need for targeted interventions, such as improved product availability and financial literacy initiatives. The research suggests expanding internet infrastructure, particularly in underserved regions, and fostering financial and digital literacy to boost market participation. Future studies should explore government bonds and behavioral factors influencing investment decisions in the context of internet access. These findings provide critical insights for policymakers and stakeholders aiming to enhance financial inclusion and market development in Kenya.

CHAPTER 1: INTRODUCTION

1.1 Background Information

1.1.1 Overview of the internet and capital markets globally

1.1.1.1 The inception and growth of the internet globally

The internet's origin can be traced back to the late 1960s, during a period of technological innovation fuelled by military and academic collaboration. The Advanced Research Projects Agency Network (ARPANET), established by the United States Department of Defence in 1969, is widely recognised as the predecessor of the modern internet. The first successful message was sent between two computers at UCLA and Stanford University in October 1969, marking the beginning of the digital communication era (Leiner et al., 2009). Throughout the 1970s and 1980s, ARPANET evolved, with the development of key protocols such as Transmission Control Protocol (TCP), which became the foundation for data exchange on the internet. TCP allowed different types of networks to communicate with each other. The adoption of TCP on January 1, 1983, is often celebrated as the official birthday of the internet (Cerf & Kahn, 2004).

The late 1980s and early 1990s saw the internet transition from a government and academic tool to a global phenomenon. The development of the World Wide Web (WWW) by British computer scientist Tim Berners-Lee in 1989 was a pivotal moment. The launch of the first web browser, Mosaic, in 1993, further popularised the Web by making it easier for non-technical users to access and share information online (Gillies & Cailliau, 2000). Soon afterwards, the commercialisation of the internet began in the mid-1990s, driven by the expansion of internet service providers (ISPs) and the rise of e-commerce. The dot-com boom of the late 1990s was marked by rapid growth in internet users and the development of new technologies like broadband, which offered faster and more reliable connections compared to the earlier dial-up services (Greenstein, 2015).

The introduction of mobile broadband and the increased growth of smartphones in the 2000s transformed internet access, making it possible for people to stay connected on the go. As of 2023, over 5 billion people worldwide are estimated to use the internet, with mobile devices accounting for a significant portion of this usage (International Telecommunication Union, 2023). Internet subscriptions, which are agreements made

between a user and an ISP to access the internet via mobile networks or fixed connections, are easy to measure and hence used to analyse internet access. The number of subscriptions worldwide have been growing steadily and stood at approximately 7.5 billion according to the International Telecommunication Union (2023).

1.1.1.2 Capital markets and investor participation globally

Capital markets are financial markets where long-term debt and equity instruments are issued and traded. They are crucial for facilitating economic growth by allowing businesses and governments to raise funds for long-term investments (Fabozzi, 2015). The concept of capital markets as we know them today began to take shape during the 17th century in Europe, particularly in Amsterdam. The establishment of the Amsterdam Stock Exchange in 1602 by the Dutch East India Company is widely recognized as the world's first official stock exchange. This institution allowed for the trading of shares and bonds, laying the foundation for modern financial markets (Neal, 2005).

The advent of electronic trading in the late 20th century increased the speed and efficiency of transactions. The development of NASDAQ in 1971 marked the beginning of the first electronic stock exchange, which allowed for the trading of securities without a physical trading floor. This innovation paved the way for the global expansion of capital markets, enabling investors from around the world to participate in financial markets more easily (Mendelson, 2007). The rise of high-frequency trading (HFT) and algorithmic trading has transformed the landscape, enabling trades to be executed in fractions of a second. These technologies have increased market liquidity but have also raised concerns about market volatility and the potential for systemic risks (Jones, 2013). The growth of emerging markets has contributed to the expansion of global capital markets, offering new opportunities for investment and economic growth (Bekaert & Harvey, 2014).

The global financial crisis of 2008 was a significant event in the history of capital markets, exposing weaknesses in the financial system and leading to widespread reforms. In response to the crisis, governments and regulatory bodies around the world implemented measures to enhance transparency, improve risk management, and strengthen oversight of financial institutions. These reforms have had a lasting impact on the structure and functioning of capital markets (Acharya et al., 2009). In recent years, the increasing focus

on sustainable investing and environmental, social, and governance (ESG) factors has begun to reshape capital markets. Investors are increasingly considering the impact of their investments on society and the environment, leading to the growth of green bonds, impact investing, and other ESG-related financial products (Clark, Feiner, & Viehs, 2015).

1.1.1.3 The internet and global capital markets

Capital market participation refers to the engagement of investors, whether individual or institutional, in buying, selling, or holding financial instruments like stocks and bonds. The relationship between the internet and capital market participation has become increasingly interconnected due to the internet's role in enhancing access, efficiency, and participation in these markets. The internet facilitates the flow of financial information, enabling investors to access real-time data, research reports, and market trends, all of which are crucial for making informed investment decisions. For example, online platforms allow investors to monitor stock prices, trade securities, and analyse portfolios instantly, which has democratised access to financial markets, especially for individual retail investors (Mishkin, 2021).

Furthermore, the internet has transformed traditional trading mechanisms by introducing electronic and algorithmic trading systems. These technologies have not only increased the speed of transactions but also reduced costs, making it easier for investors to participate (Fabozzi, 2015). A 2019 report by the Bank for International Settlements (BIS) found that high-frequency trading, which relies on internet speed and data processing capabilities, accounted for approximately 50% of the total trading volume in the U.S. equity markets. The Asia-Pacific region has also seen a boom in stock market participation due to the rapid increase in internet penetration. Countries like China and India have witnessed exponential growth in online trading. According to a report by The Financial Express in 2021, India saw a 44% increase in new dematerialised in 2020, largely attributed to the availability of online and mobile-based trading platforms (Financial Express, 2021).

1.1.2 Overview of the internet and capital markets in Kenya

1.1.2.1 The inception and growth of the internet in Kenya

In 1993, the internet first became available in Kenya and soon afterwards, in 1995, the African Regional Centre for Computing (ARCC) established the first full internet service connection in October. Afterwards, many commercial Internet Service Providers (ISPs) entered the market. Another key milestone in Kenya's internet development was the landing of the SEACOM and TEAMS (The East African Marine System) undersea cables in 2009. All the above projects significantly increased bandwidth capacity, therefore reducing the cost of internet access and improving connectivity speeds. There has been a continuous upward trend for internet subscriptions in the country. There was a noticeable spike in late 2018 due to the rising popularity of messaging and social media apps as well as Safaricom and Telkom, two major telecommunications firms, winning contracts to set up transceiver stations in remote locations yet to be connected to mobile networks. According to the Communications Authority of Kenya (CA), the number of internet subscriptions by end of 2023 surpassed 47.7 million. The figure below shows the trend.

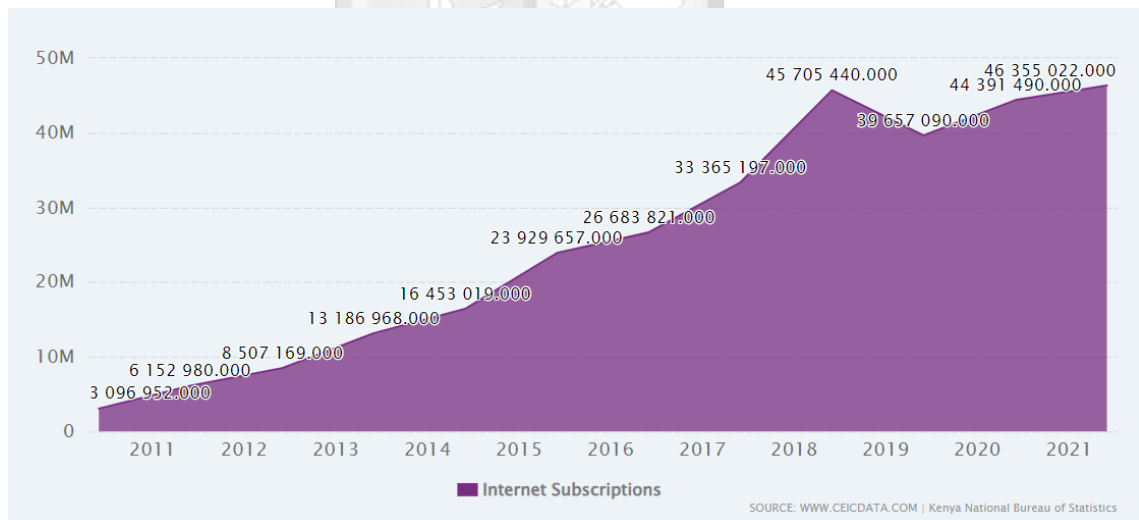


Figure 1.1: Internet subscriptions in Kenya. Source: Kenya National Bureau of Statistics

In addition to infrastructure, Kenya's regulatory environment has been key in the growth of internet penetration. The Kenyan government's Digital Economy Blueprint, launched in 2019, outlined key objectives for enhancing digital infrastructure, skills, and innovation. The plan aimed to position Kenya as a hub for technological innovation and entrepreneurship in Africa. As a result, Kenya has seen a boom in mobile internet usage

as well, fuelled by the widespread adoption of mobile money services such as M-Pesa. The rise of mobile internet and the expansion of broadband has changed the interaction of Kenyans with internet-based services and mostly in the banking sector as evidenced by research in the sector as shown by Mwange (2013) and Mabwai (2016).

1.1.2.2 Capital markets and investor participation in Kenya

The history of capital markets in Kenya can be traced back to the 1920s, during the colonial era, when the Nairobi Stock Exchange (NSE) was first conceptualised as a marketplace for trading shares. Initially informal and restricted to European investors, the NSE was officially registered in 1954 as a limited company under the Societies Act, marking the formal establishment of Kenya's stock market. This was a critical moment that laid the foundation for a structured capital market in Kenya.

Following Kenya's independence in 1963, the NSE started to open up to Kenyan investors. In the 1970s, the government began a process of Africanisation, encouraging local ownership of enterprises and participation in the stock market. However, despite these efforts, the stock market remained relatively underdeveloped and was largely dominated by institutional investors. The 1980s and 1990s marked a period of significant reform and modernisation for Kenya's capital markets. In 1990, the Capital Markets Authority (CMA) was established under the Capital Markets Act to regulate and oversee the development of the capital market in Kenya. The CMA's role was to promote a transparent and efficient capital market, enhance investor protection, and facilitate the development of new financial products.

In recent years, Kenya has witnessed major developments in both its capital markets and its telecommunications sector. These include: the automation of trading through the introduction of the Automated Trading System (ATS) in 2006, which replaced the manual trading system, the introduction of electronic settlement by the Central Depository and Settlement Corporation (CDSC) and the launch of a mobile trading application by the NSE in 2019 which allows investors to access real-time market data, track portfolios, and trade on the go. Despite these advancements, capital market participation remains relatively low among Kenyan individuals especially in corporate bonds where they only accounted for 5.37% compared to 90.79% for institutional investors according to the CMA

Statistical Bulletin (2023). While foreign investors once dominated the NSE, there is a growing trend of local investors stepping in in the stocks side, a move CMA supports as part of its long-term strategy but there remains a large opportunity for improvement.

From 2010 to 2023, local individual investors in stocks at the Nairobi Securities Exchange (NSE) experienced periods of growth, stagnation, and decline. Initially, the number of investors remained stable before rising sharply in 2014, however, this growth plateaued from 2015, followed by a decline. A notable increase occurred in 2019-2020, potentially fueled by the rise of digital trading platforms and the COVID-19 pandemic, which saw more individuals participating in stock markets globally. However, a sharp decline followed in 2021-2023, influenced by post-pandemic economic challenges, inflation, and disappointing stock performances. The figure below shows the trends.

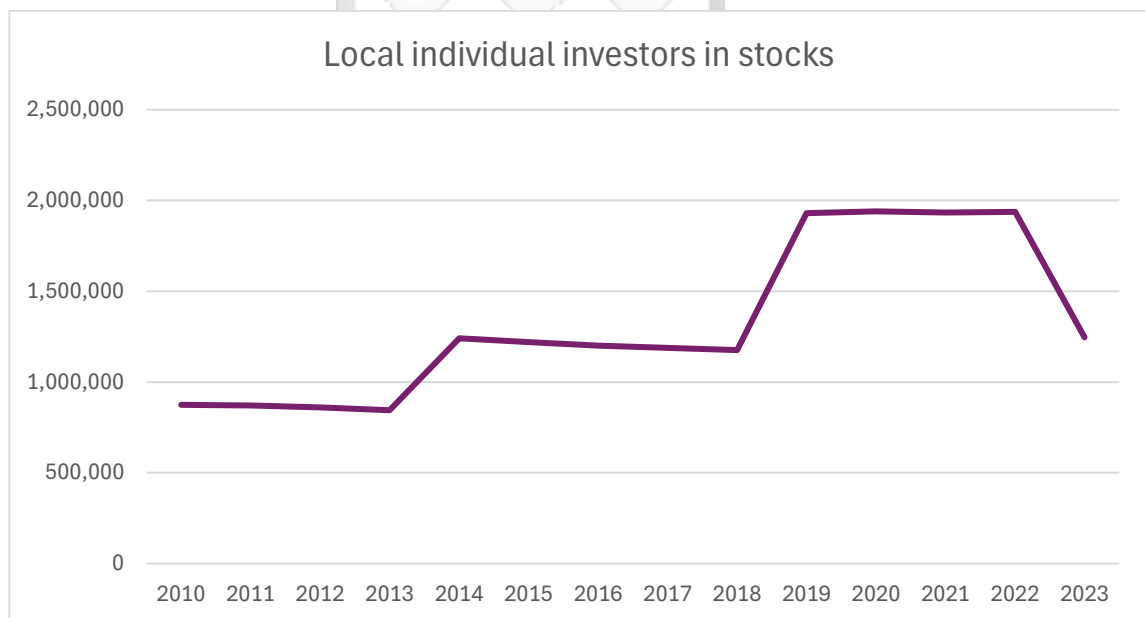


Figure 1.2: Number of Local Individual Investors in Stocks at NSE. Source: Capital Markets Authority Statistical Bulletins

For corporate bonds, local investor participation remained steady until 2014, after which it grew significantly, peaking in 2017. This growth was likely due to attractive bond yields and the perception of corporate bonds as lower-risk investments. However, from 2018 onwards, there was a drastic decline, largely due to corporate bond defaults in Kenya, including high-profile cases like Chase Bank and Imperial Bank, which eroded investor

confidence. The market has since stagnated, with participation remaining low due to continued investor caution and a lack of new bond issuances. The figure below shows the trend.

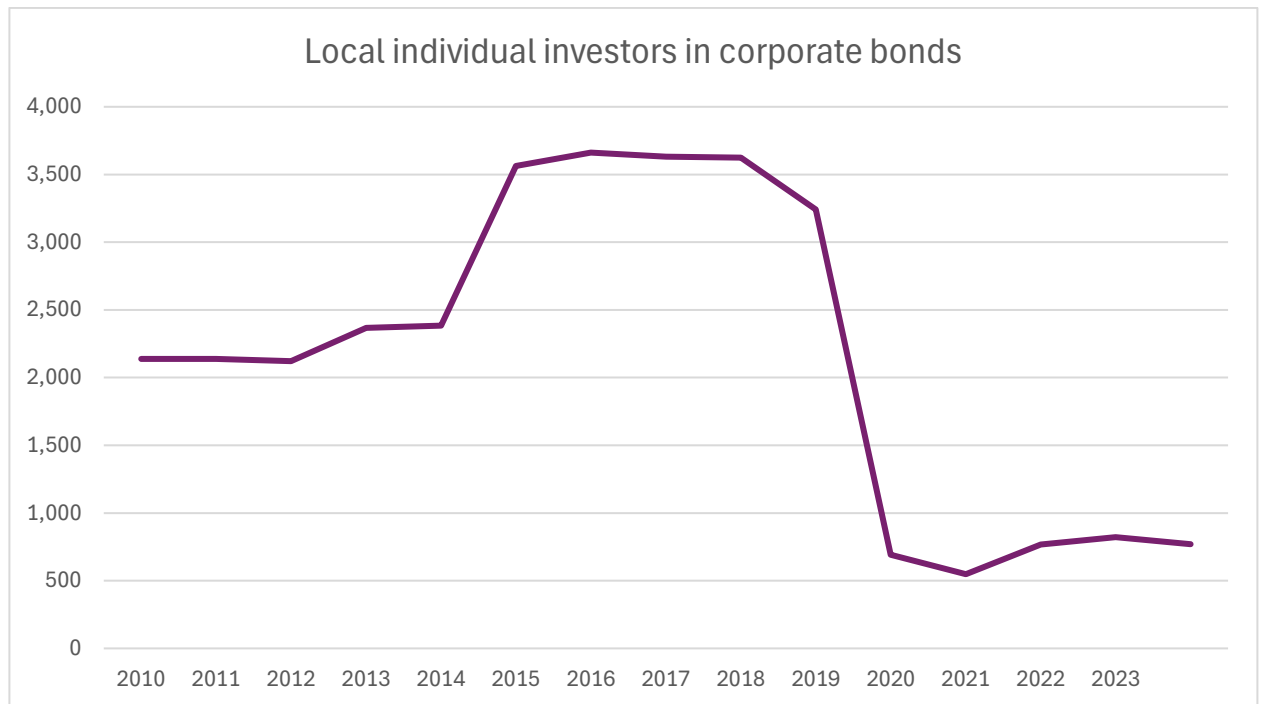


Figure 1.3: Number of Local Individual Investors in Corporate Bonds at NSE. Source: Capital Markets Authority Statistical Bulletins

1.2 Problem statement

The low capital market participation experienced across various countries including Kenya poses a significant problem. With about 1.2 million local individual investors in stocks and less than 1000 for corporate bonds, they account for less than 2.2% of the population based on data from the Central Depository and Settlement Corporation. It indicates that many potential investors in capital and equities are missing out on potential returns from their forgone investment. It also shows that companies are missing out on funding due to few investors putting up capital in form of equities and bond investments. This then leads to inefficient capital allocation in the financial markets. According to Bogan (2008), individual stock market participation was well below levels predicted by models like the Consumption Capital Asset Pricing Model (CCAPM) in the US considering the risk-adjusted expected returns from holding stock. Similar reports of low

individual participation have been reported in South Africa by Nyakurukwa & Seetharam (2022) and in Kenya according to Mwangi (2015). This introduces the stock market participation puzzle related to the unexpectedly low participation when contrasted to the potentially high returns researched at length across various markets in the world. The phenomenon was first studied by (Mankiw & Zeldes, 1991). Other papers have also investigated the puzzle like Mauricas et al. (2017) that focused on emerging markets and more specifically Lithuania.

Various factors that are suspected to cause this puzzle including risk aversion, availability of information, financial literacy, transaction costs and household wealth have been investigated. In the past two decades, the internet as a factor affecting stock market participation has also been studied by the likes of Bogan (2008) in the US, Glaser & Klos (2013) in Germany and Lu et al. (2023) in China. All the above studies found increased stock market participation associated with internet use. It is posited that internet use helps substantially reduce transaction costs as well as increase access to information. However, all the above studies were based on developed countries and thus not giving much perspective on the effect in developing countries like Kenya.

This study seeks to address this gap by investigating how internet subscriptions have impacted the participation of local individual investors in both the stock and corporate bond markets at the NSE. The main purpose of this research is to investigate the relationship between internet subscriptions and capital market participation in Kenya. Further, the study will seek to examine whether a causal relationship exists between the two variables.

This study therefore seeks to fill this gap in literature in terms of geography as well as contribute to the body of literature by. By carrying out the study, policy makers and investors will acquire an understanding of the effect of internet subscriptions on capital market participation. This is important in helping to potentially increase capital market participation through investment in internet access.

1.3 Research objectives

The primary aim of this study is to assess the effect of internet subscriptions on the participation of local individual investors in Kenya's capital markets. Specifically, the study has two key objectives:

1. To investigate the effect of internet subscriptions on the number of local individual investors in stocks at the NSE.
2. To investigate the effect of internet subscriptions on the number of local individual investors in corporate bonds at the NSE.

1.4 Research Questions

1. What is the effect of internet subscriptions on the number of local individual investors in stocks at the NSE?
2. What is the effect of internet subscriptions on the number of local individual investors in corporate bonds at the NSE?

1.5 Scope of the Study

The study will focus on the relationship between internet subscriptions and the participation of local individual investors in both the stock and corporate bond markets at the Nairobi Securities Exchange (NSE). It will use quarterly data covering the period from 2010 to 2023, which represents a significant phase of internet subscription growth in Kenya. The growth started as early as 1993 but unavailability of data from years before 2010 limits the study period. The study will control for key macroeconomic variables, including GDP per capita, inflation rates, interest rates, and NSE index performance.

1.6 Significance of the Study

Potential beneficiaries of the research paper include policy makers and regulators, particularly the Communications Authority of Kenya and Capital Markets Authority. By analysing the relationship between internet subscriptions and capital market participation, policymakers can craft well-informed policies that encourage internet expansion. They might leverage this data to introduce tax incentives, promote public-private partnerships with internet service providers, or justify direct government investment to enhance

broadband infrastructure. In doing so, they would help bridge the digital divide, enabling wider access to financial markets and fostering greater economic inclusion.

For Internet Service Providers (ISPs), the study highlights the role of fixed broadband subscriptions in influencing local individual investor participation in capital markets. ISPs like Safaricom, Zuku, and Faiba could benefit from the findings by identifying an untapped market potential. With concrete evidence supporting the link between internet access and stock market participation, ISPs might be incentivized to expand their networks in rural and underserved areas. These findings could also justify potential collaborations with the government and financial institutions to promote digital literacy and financial inclusion initiatives, which in turn would increase demand for their services.

The findings of this study will provide valuable data for the Ministry of ICT, which is responsible for spearheading digital infrastructure development in Kenya. The ministry can utilize the results to prioritize investments in expansion of internet transmitters to improve capital market participation. This would align with the goals set out in Kenya's Digital Economy Blueprint and Vision 2030. By recognizing the impact of internet penetration on capital market participation, the ministry could push for more equitable internet distribution, fostering economic growth and broadening financial opportunities.

Owing to the low existence of other studies done in Africa that investigate the effect of internet use on capital market participation, this study makes an addition to related works and goes further to invigorate additional research in the area. This library of works will be beneficial to the academic society by extending the literature on the topic for future researchers and students looking to study and make a contribution in the area.

CHAPTER 2: LITERATURE REVIEW

2.1. Introduction

This chapter covers the theoretical foundations and empirical studies relevant to this topic. It explores the existing literature on the impact of the internet on capital market participation before identifying gaps in the literature and presenting the conceptual framework for the study.

2.2 Theoretical Review

This section provides a detailed review of the theories and models that inform capital market participation and use of technology empowered by the internet. Specifically, the review covers the Efficient Market Hypothesis, Information Asymmetry Theory, Technology Acceptance Model (TAM), and the Unified Theory of Acceptance and Use of Technology (UTAUT).

2.2.1 Efficient Market Hypothesis (EMH)

The Efficient Market Hypothesis, proposed by Eugene Fama (1970), posits that financial markets are informationally efficient. This theory suggests that asset prices fully reflect all available information at any given time. As a result, it is impossible for investors to consistently achieve returns that exceed the average market returns on a risk-adjusted basis, because any new information is quickly incorporated into stock prices. EMH is typically categorized into three forms: weak, semi-strong, and strong efficiency. The weak form asserts that current stock prices reflect all historical price information. The semi-strong form extends this by asserting that prices also reflect all publicly available information. The strong form of EMH goes even further, claiming that prices reflect all information, both public and private.

Within the context of this study, the EMH provides a lens through which the impact of improved internet access on market efficiency can be examined. When local individual investors have better access to high-speed internet, they can more easily access, process, and react to new information in real-time. This increased flow of information helps markets to adjust quickly to new data, thereby enhancing market efficiency. If more investors are informed and actively participating, the semi-strong form of market efficiency could become more pronounced, where stock prices rapidly reflect all publicly

available information. Consequently, improved internet access could lead to a more efficient market environment on the Nairobi Securities Exchange (NSE), supporting the validity of the EMH.

2.2.2 Information Asymmetry Theory

Information Asymmetry Theory describes a situation in which one party in a transaction possesses more or better information than the other. Akerlof (1970) laid the groundwork for understanding how information asymmetry can lead to market inefficiencies, such as adverse selection and moral hazard. In financial markets, this theory implies that when some investors have more access to relevant financial information than others, it can lead to suboptimal investment decisions and pricing anomalies.

In the context of this research, information asymmetry is a key concept in understanding the potential advantages of improved broadband access. As fixed broadband services become more widely available, local individual investors gain better access to real-time financial news, market analysis, and other essential data. This reduces the information gap between retail investors and more informed institutional players. With reduced asymmetry, all investors are better equipped to evaluate risks and returns, thus making more rational investment decisions. Therefore, the inclusion of internet subscriptions as an explanatory variable in this study is justified by the theory of information asymmetry. By enhancing access to information, the internet can help level the playing field, leading to more efficient and equitable market outcomes on the NSE.

2.2.3 Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM), introduced by Fred Davis (1989), is a widely recognized framework for understanding how users come to accept and utilize new technologies. TAM suggests that two primary factors determine technology adoption: perceived usefulness and perceived ease of use. Perceived usefulness refers to an individual's belief that using a particular technology will improve their performance or effectively meet their needs. On the other hand, perceived ease of use relates to the extent to which an individual believes that using the technology will require minimal effort. According to Davis (1989), these perceptions significantly shape a user's attitude toward

the technology, influencing their behavioural intention to use it, which subsequently leads to actual usage.

In this study, TAM offers a valuable lens for analysing how local individual investors in the capital markets adopt online trading platforms supported by fixed broadband subscriptions. The availability of the internet enhances both the perceived ease of use and usefulness of these platforms by providing seamless access to trading tools, real-time financial data, and various online resources. This increased accessibility and efficiency encourage more investors to participate in the market, as they can more easily manage their investments, monitor market trends, and execute trades, thereby fostering a greater level of engagement in capital market activities.

2.2.4 Unified Theory of Acceptance and Use of Technology (UTAUT)

The Unified Theory of Acceptance and Use of Technology was introduced by Venkatesh et al. in 2003. This model consolidates eight earlier models, including TAM, to provide a more comprehensive framework for understanding technology adoption and usage. UTAUT identifies four key constructs that influence user acceptance of technology: Performance Expectancy which is the degree to which using the technology will provide benefits to the user in performing certain activities, Effort Expectancy which is the degree of ease associated with the use of the technology, Social Influence which is the extent to which individuals perceive others believe that they should use technology and Facilitating Conditions which refers to the degree to which an individual believes that the technical infrastructure exists to support the use of the technology. The model also considers the impact of gender, age, experience, and voluntariness of use as moderating variables that influence the four key constructs. UTAUT has been widely applied across various domains, particularly in understanding the adoption of new technologies in both organizational and consumer contexts.

In this study, UTAUT helps explain the factors that influence local individual investors' adoption and use of online trading platforms facilitated by internet access. The theory suggests that factors like performance expectancy, faster access to market data, ease of use of trading platforms, recommendations from peers, and availability of high-speed broadband all play a role in driving capital market participation. The likelihood of

acceptance in society fundamentally increases the potential impact internet access has on the health of financial markets.

2.3. Empirical Review

2.3.1 Review of empirical studies on internet use and capital market participation globally

Recent empirical studies have investigated the effects of internet use on stock market participation, showing that internet access facilitates financial engagement by lowering transaction and information costs. These studies employ various methodologies, using both observational and experimental data to examine the extent and nature of this relationship.

Bogan (2008) was among the first to investigate this relationship. The approach involves examining U.S. data from the Health and Retirement Study (HRS) and the Survey of Consumer Finances (SCF) to investigate how internet use has influenced stock market participation over a decade. Using panel data and probit models, Bogan (2008) finds that households with computer and internet access were significantly more likely to participate in the stock market compared to those without access. The results are robust even after controlling for factors such as income, education, and age. Bogan (2008) further explores how the effects of internet access vary across different demographics, revealing that younger and more educated individuals exhibited the largest increases in participation. The study dismisses the possibility that the rise in participation is solely attributable to the bull market of the 1990s or the growth of retirement savings vehicles, concluding instead that the reduction in information and transaction costs due to internet access plays a crucial role in increasing market engagement.

Glaser and Klos (2013) focus on establishing a causal relationship between internet use and stock market participation in their analysis. To address potential endogeneity, they use household panel survey data and employ two instrumental variables (IV) to isolate exogenous variation in internet usage. Their study concludes that internet access positively impacts stock market participation, with a significant effect among households with higher levels of financial literacy. The authors attribute the slower growth in stock market participation among less financially literate households to a lack of requisite knowledge

to capitalize on internet-based information effectively. Their findings show the importance of financial education in enabling the internet to act as a conduit for greater market participation.

The work of Hvide et al (2022) provides further empirical evidence from Norway. This study takes advantage of a government program that introduced broadband internet access across the country in the 2000s, creating quasi-experimental conditions to assess the effect of internet access on individual investment behaviour. Using instrumental variables that account for the share of households covered by broadband infrastructure, the authors find that access to broadband led to a significant increase in stock market participation, particularly in mutual funds, with improved portfolio diversification among existing investors. The authors utilize data from the Norwegian Central Securities Depository (NCSD), allowing them to analyse individual transactions and link them to household socio-demographic data. The study concludes that high-speed internet facilitates better access to financial information, reducing the fixed costs of entering financial markets and encouraging more diversified investment decisions.

Further research analysed the influence of Internet Wealth Management Products (WMPs) on stock market participation in China from 2013 to 2019 (Lu et al., 2021). The study utilized data from the China Household Finance Survey (CHFS) and applied econometric models to show that WMP ownership positively impacts stock market participation. The finding was that the convenience of digital finance products and their ability to lower entry barriers were crucial in increasing market engagement, especially among financially literate households. This reflects a shift in investment behaviour facilitated by digital finance tools, which provide easier access to financial products and reduce traditional barriers to market entry.

The reviewed studies collectively illustrate a significant and consistent link between internet access and increased stock market participation. Initial findings by Bogan (2008) established that internet access enhances financial engagement by lowering transaction costs. This was corroborated and expanded by Jappelli, Padula, and Pistaferri (2012), who identified a causal relationship between internet use and improved financial literacy, thus boosting market participation. Hvide et al. (2017) provided further evidence from Norway,

showing that broadband internet enhances stock market participation and portfolio diversification, while Lu et al. (2021) and Wu et al. (2023) highlighted the specific impact of digital finance products in China, emphasizing their role in reducing entry barriers and altering investment behaviours.

These studies collectively support the notion that while internet tools reduce barriers and improve financial literacy, their impact on trading behaviour may vary. Broadband and digital finance products enhance market participation and portfolio diversification but do not necessarily lead to increased trading frequency. This suggests that while digital tools democratize financial access, their benefits are most pronounced among individuals with existing financial knowledge and literacy. Therefore, the studies additionally highlight the importance of financial literacy and education in maximizing the benefits of internet access

2.3.2 Review of empirical studies on ICT and capital market participation in Kenya

The integration of Information Communication Technology (ICT) has significantly influenced stock market dynamics, as evidenced by several studies focusing on the Nairobi Stock Exchange (NSE). This review synthesizes key findings from research conducted in Kenya, highlighting the role of ICT in shaping market performance, investor behaviour, and overall market efficiency.

Mwalya (2010) examined the impact of ICT on stock returns and trading volumes for companies listed on the Nairobi Stock Exchange (NSE) from 2006 to 2010. Using secondary data from the NSE and regression analysis, Mwalya (2010) found that ICT adoption positively impacted stock returns and trading volumes. Companies that integrated ICT into their operations experienced higher stock returns and increased trading volumes due to improved market accessibility and reduced transaction costs. The study also highlighted that ICT contributes to market efficiency by providing timely and accurate information, enhancing investor decision-making and overall market activity.

Gathathai (2015) focused on the effects of online and mobile trading practices on active momentum trading at the NSE between 2010 and 2015. Utilizing both secondary data from the NSE and primary data from surveys, Gathathai (2015) discovered that the adoption of online and mobile trading platforms led to increased trading activity and the

prevalence of momentum trading strategies. The study noted that these platforms facilitated near real-time market access, enhancing market efficiency and enabling traders to respond swiftly to market trends.

Mwangi (2015) analysed the effect of mobile banking on the financial performance of commercial banks in Kenya from 2011 to 2015. The study found that mobile banking positively impacted financial performance indicators such as return on assets (ROA) and return on equity (ROE). Mobile banking also enabled banks to expand their customer base, particularly in rural areas, and improve operational efficiency by reducing transaction costs. The industry sets precedent for a positive impact of internet use in promoting financial inclusion in Kenya and hence investigation on whether this is the case for stock market participation is important.

Njihia (2017) investigated the impact of the automated trading system (ATS) on the performance of the NSE. Comparing data before and after the introduction of ATS for equities and bonds, Njihia found that technology improved market efficiency, increased liquidity, and enhanced trading activity. The study reported higher returns and reduced volatility in the bond market and a substantial increase in the NSE 20 share index following the introduction of ATS, indicating significant improvements in market performance (Njihia, 2017). Since the focus of this study was on the adoption of technology and internet use by the trading platform, the engagement of this platform by investors becomes important to explore especially in light of the ability to access data on trades faster and more efficiently with the help of the internet.

Nyamweya (2023) explored factors influencing product uptake in the Kenyan capital markets, emphasizing customer awareness, government bond interest rates, and the impact of unregulated financial products. The study found that increased customer awareness and favourable government bond interest rates significantly influenced product uptake. Nyamweya (2023) also highlighted the need for better regulatory frameworks to address the impact of unregulated financial products on investor decisions and market participation.

Igwilo & Sibindi (2022) conducted a study on the impact of ICT adoption on stock market development across African countries, including Kenya, from 2000 to 2020. Using panel

data and econometric models, the research found that ICT adoption significantly enhances stock market development by improving market efficiency, transparency, and accessibility. The availability of online trading platforms and real-time information was associated with increased trading volumes and market liquidity. The study recommended promoting ICT infrastructure development to support stock market growth in Africa.

The reviewed studies collectively illustrate a robust positive impact of ICT and digital tools on stock market performance in Kenya. Mwalya (2010) and Gathathai (2015) provide evidence that ICT adoption and digital trading platforms enhance trading volumes, market efficiency, and investor activity. Njihia (2017) confirms these findings by demonstrating that technological advancements like ATS significantly improve market performance. Additionally, Nyamweya (2023) and Mwangi (2015) highlight the broader effects of ICT and mobile banking on market participation and financial performance. Igwilo and Sibindi (2022) offer a broader perspective, showing that ICT adoption positively impacts stock market development across Africa, including Kenya. The studies emphasize the importance of continued investment in ICT infrastructure to enhance market efficiency, transparency, and accessibility, ultimately fostering greater investor engagement and market growth.

2.4 Research Gap

While existing studies, such as those by Glaser and Klos (2013), Bogan (2008), and Hvide et al. (2017), have explored the impact of internet access on capital market participation, their focus has primarily been on developed markets like the United States, Norway, China, and Germany. These studies demonstrate that increased internet accessibility correlates with higher participation in stock markets, as it reduces information asymmetry, lowers transaction costs, and enhances investors' financial literacy. However, this relationship remains underexplored in developing countries, particularly in the African context.

In Kenya, much of the existing research, including studies by Nyamweya (2023) and Mwangi (2015), has primarily concentrated on the role of mobile internet in expanding access to basic financial services, such as mobile banking and microfinance. These studies have overlooked the potential of internet subscriptions, especially fixed broadband, in

facilitating more advanced financial activities like stock and bond investments. Furthermore, they have not adequately considered how internet infrastructure might drive the participation of local individual investors in more sophisticated, long-term investments within the Nairobi Securities Exchange (NSE).

This study seeks to bridge this knowledge gap by specifically investigating the effect of both fixed and mobile internet subscriptions on capital market participation by local individual investors in Kenya. By incorporating a comprehensive set of macroeconomic control variables—including GDP, inflation, interest rates, and stock market performance—this research will offer a more nuanced understanding of how internet access influences investment behaviour in an emerging market context. This analysis will provide valuable insights into the role of digital infrastructure in democratizing financial markets in developing economies, ultimately contributing to more inclusive economic growth in Kenya.

2.5 Conceptual Framework

The conceptual framework illustrates the relationship between the independent variable, which is internet subscriptions and the dependent variables, which are the number of local individual investors in stocks and those investing in corporate bonds at the NSE. Several control variables, such as GDP, inflation rate, interest rate, and NSE index performance, are also considered in the analysis.

Increased access to stable internet infrastructure is hypothesized to facilitate greater participation in capital markets by local individual investors through reduction of barriers to access like high transaction costs and low information access (Bogan 2008). In this research, internet subscriptions which refers to the total number of fixed and mobile connections in Kenya are used to measure internet access. Fixed connections include subscriptions such as DSL, fiber optic, and satellite connections, while mobile encompasses 2G, 3G, 4G, and 5G subscriptions on mobile devices like cell phones, laptops and portable modems. This metric indicates the level of internet penetration and accessibility in the country, influencing individuals' ability to access online financial platforms and information.

Local individual investors represent the number of retail investors who are Kenyan residents actively participating in the Nairobi Securities Exchange (NSE) by owning stocks and corporate bonds. This measure focuses on individuals (rather than institutional investors) who have active Central Depository System accounts holding listed equities or corporate bonds, highlighting the participation of the average citizen in Kenya's capital markets. It provides insight into market inclusivity and the reach of investment opportunities within the local population.

The listed macroeconomic factors will be controlled to ensure that the observed effects on capital market participation are attributable to internet access rather than economic variables. Real Gross Domestic Product (GDP) measures the total economic output of Kenya, representing the value of all goods and services produced within the country over a specific period at prices from a base year. Real GDP reflects the overall health of the economy and is an indicator of economic performance. An increase in Real GDP typically signals economic growth, which can lead to greater opportunities for investment, increased employment, and improved financial market participation. Higher Real GDP growth is often associated with higher levels of disposable income and investment potential, as a more robust economy tends to boost confidence in capital markets. Conversely, the inflation rate refers to the annual percentage change in the cost of goods and services in Kenya, indicating the rate at which the purchasing power of money is declining. High inflation rates may discourage investment in fixed-income securities like bonds due to the erosion of real returns, while also affecting stock market valuations and individual investor behaviour.

Interest rates represent the cost of borrowing money and the return on savings in Kenya. Interest rates directly impact the attractiveness of saving versus investing, influencing individual decisions to allocate funds in the capital markets. Lower interest rates typically encourage stock market investments as they reduce the opportunity cost of investing in equities over fixed-income assets. In this research, the Central Bank rate is used to represent interest rate levels. On the other hand, the NSE index measures the overall performance of the Nairobi Securities Exchange by tracking the price movements of a selected group of stocks listed on the exchange. This index acts as a benchmark for the

stock market's health and investor sentiment in Kenya. Changes in the NSE index provide an indicator of market trends, investor confidence, and economic conditions that can affect individual investment decisions. The specific index chosen is the NSE all share index (NASI) which provides an overview of the entire market performance.

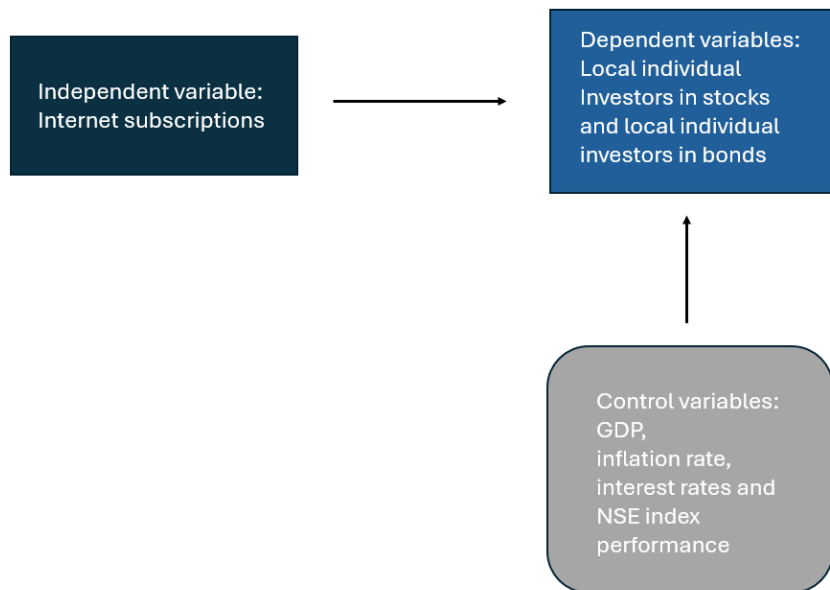
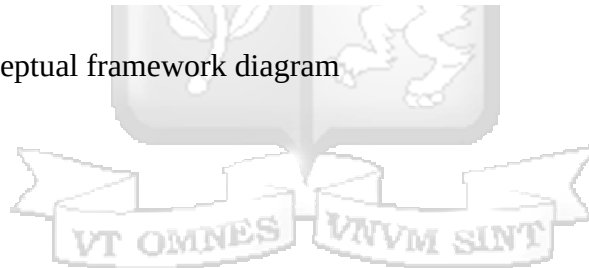


Figure 2.1: Conceptual framework diagram



CHAPTER 3: METHODOLOGY

3.1 Introduction

This chapter presents the research design, population and sampling methods, data collection procedures, and data analysis techniques employed in this study. The purpose of this chapter is to outline the methodology used to examine the effect of internet subscriptions on the number of local individual investors participating in the Nairobi Securities Exchange (NSE).

3.2 Research Design

The research adopted a longitudinal design at identifying relationships between fixed broadband subscriptions and capital market participation by local individual investors in Kenya by taking the same sample over time periodically to examine the effects over a given period. The choice of quantitative design allowed for the measurement and analysis of the variables using statistical tools, offering the ability to generalize findings.

The design was chosen due to its suitability in analysing relationships between economic and technological variables over time. Additionally, it enabled the incorporation of control variables that could impact the relationship between internet subscriptions and investor participation.

3.3 Population and Sampling

The population of interest in this study included the number of local individual investors in stocks and corporate bonds at the Nairobi Securities Exchange (NSE). The sample for the study was derived from historical data collected every 3 months (quarterly) over a period of 14 years from 2010-2023. This time frame was selected to ensure the availability of quarterly data on both the number of internet subscriptions and the number of local individual investors participating in the capital markets. Even though quarterly sector statistics reports from the Communications Authority of Kenya with data for internet subscriptions were available starting from 2008-2023, CMA quarterly statistical bulletins that contain the data on local individual investors in stocks and corporate bonds were only available from 2010-2023 thus the restriction of the study to the later period.

To ensure representativeness, key macroeconomic indicators were selected as control variables. These include GDP, inflation rates, interest rates and NSE index performance. Data on these indicators was sourced from Kenya National Bureau of Statistics (KNBS), Central Bank of Kenya (CBK) and Nairobi Securities Exchange (NSE) reports.

3.4 Data Collection

Time series data was collected from secondary data sources. The data on the number of local individual investors participating in stocks and corporate bonds at the NSE was obtained from quarterly statistical bulletins of the Capital Markets Authority (CMA) sourced from the Central Depository and Settlement Corporation (CDSC). The data on internet subscriptions was sourced from Communications Authority of Kenya (CAK), which provides quarterly reports on the status of internet service in the country. Macroeconomic data on Real GDP was obtained from Kenya National Bureau of Statistics (KNBS) while NSE index performance was obtained from NSE reports and interest rates and inflation rates were obtained from the Central Bank of Kenya (CBK) Reports. The frequency of the data is quarterly, with 4 equally interspaced observations for each variable each year. The data collection period covers 2010 to 2023. The choice of this period was based on the availability of complete data sets for both internet subscriptions and local individual capital market participants.



Table 3.1: Data sources for the various variables

Variables	Description	Source
Internet subscriptions	Measures the total number of mobile and non-mobile internet connections in Kenya every quarter	Communications Authority of Kenya Quarterly Sector Statistics Reports
Local individual investors	Number of retail investors who are within the country who own stocks and corporate bonds every quarter	Capital Markets Authority Quarterly Statistical Bulletins
Real GDP	Representative measure of the general income level in Kenya with prices from 2016 as the base year	Kenya National Bureau of Statistics Economic Survey
Inflation rate	Measure of general increase in prices	Central Bank of Kenya
Interest rates	Measure of price to borrow money and return on investing and saving	Central Bank of Kenya
NSE all share index	Stock market performance measured using the prices of all listed shares	NSE Reports

3.5 Data Analysis

The collected data was analysed using time series regression analysis. The choice of this analytical technique was driven by the time-series nature of the data, which consists of observations over multiple years. Time series regression is useful in detecting temporal effects and analysing the dynamic relationships between variables over time.

3.5.1 The Econometric Model

The models estimated in the study are as follows:

$$\text{Ln_Number of local individual investors in stocks}_t = k + \delta_1 \text{ln_internet subscriptions}_{t-n} + \delta_2 \text{ln_GDP}_t + \delta_3 \text{Inflation rate}_t + \delta_4 \text{Interest rates}_t + \delta_5 \text{NSE index performance}_t + \varepsilon_t$$

$$\text{Ln_Number of local individual investors in corporate bonds}_t = k + \delta_1 \text{ln_internet subscriptions}_{t-n} + \delta_2 \text{GDP}_t + \delta_3 \text{Inflation rate}_t + \delta_4 \text{Interest rates}_t + \delta_5 \text{NSE index performance}_t + \varepsilon_t$$

Where:

k is the constant term

δ_1 is the coefficient of the independent variable which shows by how much the respective number of local individual investors change for a unit change in internet subscriptions, ceteris paribus.

δ_2 – δ_5 represent the coefficients of the control variables, which show by how much the respective number of local individual investors change when each of the variables change, ceteris paribus.

ε_t is the error term

3.5.2 Descriptive Statistics

This section provides a summary of the key variables used in the study: internet subscriptions (independent variable), capital market participation by local individual investors in stock and corporate bonds (dependent variables), and control variables including GDP, inflation, interest rates and NSE index performance. Descriptive statistics such as the mean, median, standard deviation, minimum, and maximum values were calculated for each variable to provide an overview of their distributions.

Visualizations, such as line graphs, are employed to illustrate the trends of these variables over the years. This aids in understanding the dynamics and patterns of the data, which is essential for the subsequent analysis.

3.5.3 Correlation Analysis

A correlation analysis was conducted to examine the strength and direction of the linear relationship between internet subscriptions and the number of local individual investors. The Pearson correlation coefficient was calculated for all pairs of variables, and the results are presented in a correlation matrix. This step helps in identifying potential multicollinearity issues among the control variables, which is crucial to ensure reliable regression results.

Variance Inflation Factor (VIF) was also computed to quantify how much the variance of each regression coefficient is inflated due to multicollinearity. A VIF value above 10 would indicate severe multicollinearity, and such variables are considered for removal or transformation.

3.5.4 Stationarity Tests

To check for stationarity, a unit root test, the Augmented Dickey-Fuller (ADF) test was conducted to check if statistical properties like mean and variance remain constant over time.

The variables were found to be mixed. This is because internet subscriptions, number of local individual investors, GDP per capita, interest rates and the NSE index performance are non-stationary while the inflation rate is stationary.

3.5.5 Model Selection

The Autoregressive Distributed Lag (ARDL) model was selected for this study due to the mixed order of integration among the variables. The mix of stationary and non-stationary variables, make the model appropriate for the dataset. Additionally, the ARDL approach is suitable for small sample sizes and provides both short-term dynamics and long-term relationships between variables through its error correction representation.

3.5.6 Cointegration Test and Error Correction Model

To determine whether there is a long-run equilibrium relationship among the variables, the study applies the Bounds Test for cointegration, which is compatible with the ARDL framework. The Bounds Test is preferable when dealing with variables of mixed integration orders $I(0)$ and $I(1)$. The null hypothesis in the Bounds Test posits that there

is no long-run relationship among the variables. If the calculated F-statistic exceeds the critical upper bound, we reject the null hypothesis, indicating a cointegrated relationship. Conversely, if the F-statistic is below the lower bound, we fail to reject the null, implying no cointegration. If there is cointegration, the error correction model is used to estimate the long-run relationship in the presence of cointegration.

3.5.7 Diagnostics tests

3.5.7.1 Test for Serial Correlation

Breusch-Godfrey test for serial correlation

Null Hypothesis (H_0): There is no serial correlation in the residuals (errors are independent).

Alternative Hypothesis (H_1): There is serial correlation in the residuals (errors are correlated over time).

If the p-value is less than 0.05 ($p < 0.05$), we reject the null hypothesis and conclude that serial correlation is present in the model. This suggests that the model may need adjustments, such as adding lagged variables or using a different estimation technique.

If the p-value is greater than 0.05 ($p > 0.05$), we fail to reject the null hypothesis and conclude that there is no evidence of serial correlation in the residuals. This means that the model does not suffer from autocorrelation issues.

3.5.7.2 Heteroscedasticity Test

Breusch-Pagan Test

Null Hypothesis (H_0): Homoscedasticity is present

Alternative Hypothesis (H_1): Heteroscedasticity is present

If the p-value of the test is less than some significance level (for e.g. $\alpha = 0.05$) then we reject the null hypothesis and conclude that heteroscedasticity is present in the regression model.

3.6 Ethical Considerations

This study relies entirely on secondary data sources that are publicly available and does not involve direct interaction with human subjects. Therefore, there is no significant ethical risks. However, care is taken to ensure that all data is sourced from reputable institutions, and the findings were presented objectively without any bias or manipulation of data. Proper citations are used to acknowledge all data sources.



CHAPTER 4: RESULTS AND ANALYSIS

4.1 Introduction

This chapter presents the results of the study and their analysis, focusing on the relationship between internet subscriptions and capital market participation among local individual investors in Kenya. The findings are structured to align with the research objectives and questions, emphasizing the statistical evidence from the study. Descriptive statistics, correlation analysis, regression outputs, and diagnostic test results are interpreted, with both stock and bond participation analyzed separately. Key methodological decisions, such as dropping GDP due to high correlation and applying natural logarithms to reduce variance, are discussed. The results build on the foundation set in earlier chapters, including the theoretical and empirical framework.

4.2 Descriptive Statistics

The summary statistics for the variables used in this study are presented in Table 4.1. These statistics provide an overview of the data, including measures of central tendency and dispersion. This section lays the foundation for understanding the variables before delving into their relationships in subsequent sections.

Table 4.1: Summary of Descriptive Statistics

Variables	Mean	Std. Dev.	Min	Max	Obs.
Ln(Internet Subscriptions)	14.03	0.29	13.65	14.48	57
Ln(Number of Stock Investors)	7.52	0.70	6.21	8.28	57
Ln(Number of Bond Investors)	16.88	0.89	14.80	17.78	57
Inflation (%)	6.98	3.17	3.33	19.19	57
Interest Rate (%)	9.32	2.70	6.00	18.00	57
NSE All-Share Index	163.33	119.24	68.03	804.41	57

The natural logarithm transformation was applied to variables with high variances, such as the number of internet subscriptions, stock investors, and bond investors, to ensure

consistent scaling and reduce heteroskedasticity. These transformations allow for more meaningful comparisons and ensure the robustness of the regression analysis.

The average natural log value of stock investors is 14.03, which translates to approximately 1,246,000 investors. This indicates relatively low but growing individual participation in Kenya's stock market over the study period. The standard deviation of 0.29 suggests that variations in stock market participation were moderate, which could be influenced by shifts in investor confidence, economic conditions, and accessibility to financial markets. The minimum and maximum values of 13.65 (equivalent to around 850,000 investors) and 14.48 (approximately 1,900,000 investors) demonstrate a wide range, reflecting periods of initially subdued then gradually leading to heightened market activity.

For bond investors, the mean natural log value of 7.52 translates to approximately 1,840 individuals. This confirms the extremely low participation of individual investors in Kenya's bond market, which remains dominated by institutional investors. The standard deviation of 0.70 indicates some level of variation, with the minimum value of 6.21 (equivalent to 500 investors) highlighting periods of near-zero retail participation. Several corporate bonds listed on the Nairobi Securities Exchange (NSE) have been adversely affected by issuer failures, eroding investor confidence in the market. Notable cases include Chase Bank, which issued a bond in 2015 but was placed under receivership in 2016, Imperial Bank, which issued a bond in August 2015 before collapsing two months later, ARM Cement, which defaulted on its bond obligations, and Nakumatt Holdings, whose commercial paper investors suffered losses after the retailer went into administration. These failures, coupled with corporate governance issues—where nearly half of NSE-listed firms lack transparency and adequate risk controls—have contributed to low investor participation. Additionally, the absence of clear investor protection mechanisms has left bondholders exposed to losses when issuers default. Many companies also prefer bank loans over bond issuance to avoid the stringent disclosure requirements associated with public offerings. The maximum value of 8.28 (approximately 4,000 investors) suggests occasional spikes in participation, likely influenced by favorable bond yields or regulatory efforts to attract retail investors.

The mean natural log value of internet subscriptions is 16.88, which translates to approximately 21 million subscriptions. This figure indicates a substantial penetration of internet services in Kenya, which could have a positive influence on capital market participation. The standard deviation of 0.89 reflects moderate variation in internet subscriptions over time. The minimum value of 14.80 (equivalent to 2.7 million subscriptions) suggests earlier stages of lower internet penetration, while the maximum value of 17.78 (around 53 million subscriptions) indicates the highest level of connectivity reached during the study period in 2023.

Inflation averaged 6.98% over the study period, with a standard deviation of 3.17%, indicating moderate variation in price levels. The range extends from 3.33% (indicating periods of relative price stability) to 19.19% (signifying significant inflationary pressures). Such fluctuations could have influenced investor behavior, particularly in the bond market, where real returns are highly sensitive to inflationary trends.

The mean central bank rate of 9.32%, with a standard deviation of 2.70%, reflects a relatively stable monetary policy environment throughout the study period. The range of 6.00% to 18.00% indicates periods of both accommodative and tightening monetary policies. Higher rates generally encourage savings in fixed deposits, which could reduce the attractiveness of stock and bond investments.

The average NSE All-Share Index value of 163.33, with a standard deviation of 119.24, suggests a high degree of fluctuation in market performance. The minimum value of 68.03 corresponds to periods of weak market performance, potentially reflecting economic downturns or investor pessimism. Conversely, the maximum value of 804.41 represents periods of significant market growth, likely linked to increased investor confidence and economic expansion.

4.3 Correlation Analysis

Correlation analysis assessed the strength and direction of relationships between variables. This analysis provides insights into the preliminary relationships among variables before moving to detailed regression models.

Table 4.2: Pearson Correlation Coefficients

Variables	Ln stocks	Ln LII bonds	Ln internet subscriptions	Ln real GDP	Inflation rate	Central bank rate	NSE All-share index
Ln stocks	1.00	-0.67	0.76	0.80	-0.19	-0.32	-0.16
Ln LII bonds	-0.67	1.00	-0.37	-0.56	0.00	0.24	0.08
Ln internet subscriptions	0.76	-0.37	1.00	0.94	-0.25	-0.04	-0.40
Ln real GDP	0.80	-0.56	0.94	1.00	-0.19	-0.08	-0.33
Inflation rate	-0.19	0.00	-0.25	-0.19	1.00	0.52	-0.38
Central bank rate	-0.32	0.24	-0.04	-0.08	0.52	1.00	-0.38
NSE All-share index	-0.16	0.08	-0.40	-0.33	-0.38	-0.38	1.00

Internet subscriptions exhibited a strong positive correlation with stock market participation ($\rho = 0.76$) and a weak negative correlation with bond participation ($\rho = -0.37$). This suggests that greater internet accessibility significantly enhances stock market engagement but has a limited or even slightly negative effect on bond participation, possibly due to the structural barriers in the bond market. The NSE All-Share Index had a weak negative correlation with stock participation ($\rho = -0.16$) and a very weak positive correlation with bond participation ($\rho = 0.08$), suggesting that overall market performance is not a primary driver of individual investment decisions in Kenya.

Real GDP initially showed a strong positive correlation with stock participation ($\rho = 0.80$) and a moderate negative correlation with bond participation ($\rho = -0.56$). However, GDP was dropped from the regression model due to its extremely high correlation with internet subscriptions ($\rho = 0.94$), which raised concerns of multicollinearity. Multicollinearity occurs when two independent variables are highly correlated, leading to unreliable coefficient estimates in regression analysis. Since GDP and internet subscriptions moved closely together, including both would distort the results. To ensure robustness, the model retained internet subscriptions as the primary independent variable while excluding GDP.

Inflation and interest rates exhibited weak negative correlations with stock participation ($\rho = -0.19$ and $\rho = -0.32$, respectively), aligning with economic theory that suggests rising inflation and interest rates discourage stock investments by increasing costs and reducing real returns. Meanwhile, inflation had an almost negligible correlation with bond participation ($\rho = 0.00$), while interest rates showed a weak positive correlation with bond participation ($\rho = 0.24$), indicating that bond investors may be more influenced by monetary policy decisions. The strong relationship between internet subscriptions and stock market participation reinforces the importance of digital access in expanding financial market inclusion, whereas the weaker and more mixed correlations for bonds highlight the need for additional interventions, such as investor education and bond market reforms.

4.4 Stationarity and Model Selection

Stationarity tests were conducted to determine the order of integration for each variable. The Augmented Dickey-Fuller (ADF) test assesses whether a time series variable is stationary or follows a unit root process. The test's null hypothesis (H_0) states that the variable has a unit root, meaning it is non-stationary. The alternative hypothesis (H_1) suggests that the variable is stationary. The decision rule is based on the MacKinnon p-value: if the p-value is less than 0.05, we reject the null hypothesis and conclude that the variable is stationary. If the p-value is greater than 0.05, we fail to reject the null hypothesis, meaning the variable is non-stationary and must be differenced to achieve stationarity.

From the results, ln (internet subscriptions) and NSE_index were found to be stationary at level ($p < 0.05$), meaning they did not require differencing. However, ln_LII_stocks, ln_LII_bonds, Inflation_rate, and Central_bank_rate were non-stationary at level ($p > 0.05$) and needed to be differenced to achieve stationarity. After first differencing, all non-stationary variables became stationary ($p < 0.05$). This confirms that the dataset contains a mix of I(0) (stationary at level) and I(1) (stationary after first difference) variables, justifying the use of an Autoregressive Distributed Lag (ARDL) model, which is suitable for analyzing relationships involving variables of different orders of integration.

Table 4.3: Augmented Dickey-Fuller (ADF) test results

Variable	MacKinnon p-value (Level)	Stationary at Level?	MacKinnon p-value (First Difference, if non-stationary)	Stationary at First Difference?
Ln LII stocks	0.5038	Non-Stationary	0.0000	Stationary
Ln LII bonds	0.8347	Non-Stationary	0.0000	Stationary
ln (internet subscriptions)	0.0061	Stationary	Not needed (Stationary at Level)	Not needed
Inflation rate	0.1511	Non-Stationary	0.0000	Stationary
Central bank rate	0.1341	Non-Stationary	0.0205	Stationary
NSE_index	0.0000	Stationary	Not needed (Stationary at Level)	Not needed

4.5 Regression Analysis Results

4.5.1 Autoregressive Distributed Lag (ARDL) Model and Optimal Lag Selection

The ARDL model was initially run using the default lag structure, allowing the model to determine relationships without pre-imposed restrictions on the lag length of each variable. However, in time-series econometrics, determining the optimal number of lags is critical for ensuring robust and reliable results. Lag selection is important because including too few lags may lead to omitted variable bias, while too many lags can introduce unnecessary complexity and reduce degrees of freedom, leading to inefficient estimates. To balance these concerns, the Akaike Information Criterion (AIC) was employed to select the optimal lag length for each variable.

AIC is a commonly used criterion in time-series analysis because it trades off model fit and complexity, penalizing models that include too many lags while ensuring that essential lag structures are retained. It does so by calculating an AIC value for each possible lag structure and selecting the model with the lowest AIC value. This approach ensures that the ARDL model captures the most relevant information from past observations while avoiding overfitting. Given that financial and economic variables often have time-dependent effects, using AIC allows us to identify the lags that best represent the persistence of internet subscriptions and other macroeconomic factors in influencing capital market participation.

Table 4.4: Akaike Information Criterion (AIC) Optimal Lags

Variable	Initial AIC Considered (0-4 Lags)	Optimal Lag (AIC Selection)	AIC Value with Selected Lag
Ln(Stock Investors)	-1.5303*	1	-1.6047*
Ln(Bond Investors)	-1.4803*	1	-2.2238*
Ln(Internet Subscriptions)	-2.1446*	2	-2.2562*
Inflation Rate	3.706*	2	3.5971*
Central Bank Rate	3.9749*	3	3.8261*
NSE All-Share Index	8.1812*	4	7.9952*

(* denotes the lowest AIC value indicating the optimal lag selection per variable.)

The selection of optimal lags based on AIC provides insights into how past values of each variable influence market participation. For stock and bond market participation, there was inclusion of one lag since investor decisions are strongly influenced by recent market behavior, meaning that past market conditions within the previous quarter play a key role in determining present participation trends. This aligns with behavioral finance theories, which suggest that investors react relatively quickly to recent market movements, but older market data become less relevant over time.

For internet subscriptions, AIC selected two lags, indicating that the effects of internet penetration take about two quarters to manifest in investor behavior. This could be due to the gradual adoption of online trading platforms and financial technology services, which require some time for investors to adjust to digital trading environments. It also suggests that investors do not immediately react to increased internet access, but over a couple of quarters, digital infrastructure improvements facilitate higher market participation.

Regarding inflation and the central bank rate, the selection of two and three lags, respectively, implies that investors do not react immediately to macroeconomic fluctuations but instead adjust their participation in response to economic conditions over time. This lag structure is expected, as macroeconomic changes often take time to be absorbed into market prices and investor expectations. For example, a central bank rate change might not immediately impact stock or bond investments, but within a few quarters, adjustments in lending rates, credit availability, and inflation expectations could influence investor participation.

Finally, the NSE All-Share Index required four lags, highlighting that market performance has a more extended impact on investment behavior. This suggests that investors track longer-term market trends before making participation decisions, possibly due to the need for sustained bullish or bearish trends to build investor confidence. Unlike macroeconomic factors, which may influence short-term liquidity decisions, stock market movements may require a more extended observation period before investors adjust their market positions.

The ARDL regression produces coefficients for all lags less than or equal to the optimal lag. Having identified these optimal lags using AIC, the ARDL model was re-estimated to incorporate these adjustments, producing more refined and robust short-run regression

coefficients that accurately reflect the time-dependent relationships in capital market participation.

4.5.2 Short Run Regression Results

The ARDL (1,2,2,3,4) regression models for Ln(LII Stocks) and Ln(LII Bonds) were estimated using quarterly data from 2011Q1 to 2024Q1, with 53 observations. The stock market model demonstrated strong explanatory power, with an R-squared of 0.9317 and an adjusted R-squared of 0.9014, indicating that the independent variables explained the majority of stock price variations. The bond market model performed even better, with an R-squared of 0.9607 and an adjusted R-squared of 0.9433, suggesting that the model accounted for almost all variations in bond market movements. Both models were statistically significant, with $\text{Prob} > F = 0.0000$, and the log likelihood values of 62.1341 for stocks and 28.1196 for bonds further confirmed their robustness.

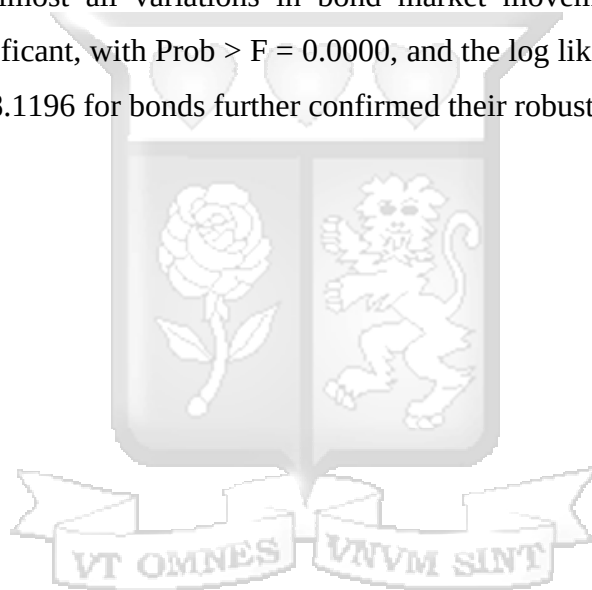


Table 4.5: Short Run Regression Coefficients

Variables	Stock Market Coefficient	Lag	Bond Market Coefficient	Lag
Ln(LII Stocks)	0.6935 (0.1029) ***	1	-	-
Ln(LII Bonds)	-	-	0.8462 (0.0669) ***	1
Ln(Internet Subscriptions)	-0.9278 (0.2316) ***	0	2.1423 (0.4348) ***	0
	0.6191 (0.2871) **	1	-1.1879 (0.5418) **	1
	0.2921 (0.2335)	2	-0.9157 (0.4434) **	2
Inflation Rate (%)	-0.0119 (0.0154)	0	-0.0475 (0.0290)	0
	0.0366 (0.0168)	1	-0.0015 (0.0320)	1
	0.0061 (0.0127)	2	-0.0579 (0.0240)	2
Central Bank Rate (%)	-0.0099 (0.0141)	0	-0.0051 (0.0282)	0
	0.0016 (0.0137)	1	0.0115 (0.0257)	1
	-0.0050 (0.0131)	2	-0.0013 (0.0254)	2
	-0.0190 (0.0112) *	3	-0.0135 (0.0222)	3
NSE All-Share Index	0.0013 (0.0011)	0	-0.0021 (0.0023)	0
	-0.0004 (0.0011)	1	-0.0011 (0.0024)	1
	0.0008 (0.0005)	2	-0.0004 (0.0006)	2
	-0.0003 (0.0005)	3	-0.0019 (0.0008) **	3
	0.0003 (0.0003)	4	-0.0015 (0.0007) **	4
Constant	4.8729 (1.2190) ***	N/A	-0.5955 (1.3715)	N/A

(Standard errors in brackets). *** Statistical significance at 1% level (p value < 0.01); ** Statistical significance at 5% level (p value < 0.05); * Statistical significance at 10% level (p value < 0.1).

One of the most notable findings was the impact of internet subscriptions on both markets. In the stock market, the immediate effect was negative (-0.9278, $p < 0.01$), suggesting that a 1% increase in internet subscriptions leads to a 0.93% decline in stock market participation. This may indicate that increased internet access initially disrupts stock prices, potentially due to shifts in investment behavior, speculative activity, or alternative

digital investment options such as forex trading or cryptocurrencies. However, at lag 1, the effect turns positive (0.6191, $p < 0.05$), meaning that a 1% increase in internet subscriptions after one quarter results in a 0.62% increase in stock market participation. This suggests that the benefits of increased internet penetration—such as improved access to financial information, online trading platforms, and market data—materialize over time. By lag 2, the effect becomes statistically insignificant (0.2921, $p = 0.219$), indicating that the impact of internet access on stock participation is short-lived and does not persist beyond two quarters.

In contrast, the bond market exhibited an immediate and highly positive response (2.1423, $p < 0.01$) to increased internet subscriptions, meaning that a 1% increase in internet subscriptions leads to a 2.14% rise in bond market participation. This could indicate that improved digital financial access encourages greater retail participation in fixed-income securities, possibly due to the perception of bonds as a safer investment option or the ease of accessing government and corporate bonds through digital platforms. However, at lag 1, the effect turns negative (-1.1879, $p < 0.05$), meaning that bond market participation decreases by 1.19% after one quarter. This decline continues at lag 2 (-0.9157, $p < 0.05$), suggesting that while internet access initially drives bond investments, short-term volatility or portfolio rebalancing leads to a subsequent reduction in participation before stabilizing.

Inflation had a negligible effect on both markets, with all coefficients statistically insignificant. This suggests that a 1% increase in inflation does not significantly influence stock or bond market participation in the short run. One possible explanation is that investors already incorporate inflation expectations into their decision-making processes, mitigating its direct effect on participation. Alternatively, the impact of inflation may be offset by other macroeconomic factors, such as central bank interventions, economic growth, or liquidity conditions in financial markets.

Similarly, the central bank rate exhibited weak effects on stock prices, with the third lag (-0.0190, $p < 0.10$) showing a minor negative impact, suggesting that a 1 percentage point increase in the central bank rate reduces stock market participation by 1.9% after three quarters. This implies that monetary policy changes take time to influence stock markets,

as investors gradually adjust their expectations and portfolio allocations in response to interest rate shifts. However, for bond markets, the central bank rate was consistently insignificant across all lags, indicating that a 1% increase in the central bank rate has no significant effect on bond market participation. This suggests that fixed-income securities remain largely unaffected by short-term interest rate adjustments, likely due to the ability of bond yields to adjust dynamically to changes in interest rates.

The NSE All-Share Index had minimal influence on stock prices, with all coefficients statistically insignificant, the highest being at lag 0 (0.0013, $p > 0.10$). This suggests that a 1-point increase in the NSE All-Share Index does not significantly impact stock market participation in the short run, implying that investors may rely on broader macroeconomic conditions rather than short-term market fluctuations when making investment decisions. However, for the bond market, a delayed negative effect emerged at lags 3 (-0.0019, $p < 0.05$) and 4 (-0.0015, $p < 0.05$), meaning that a 1-point increase in the NSE All-Share Index leads to a 0.19% decline in bond participation after three quarters and a 0.15% decline after four quarters. This indicates that bond markets react adversely to stock market movements after a significant time lag, possibly due to liquidity shifts between asset classes as investors move funds from bonds to equities in response to prolonged stock market gains.

Both stock and bond markets exhibited strong autoregressive behavior, meaning that past participation strongly influences current trends. The first lag of stock prices (0.6935, $p < 0.01$) was highly significant, indicating that a 1% increase in stock market participation in the previous quarter results in a 0.69% increase in the current quarter. This suggests that stock market movements exhibit strong momentum, with past participation playing a crucial role in shaping future investment decisions. For the bond market, this effect was even more pronounced, with the first lag (0.8462, $p < 0.01$) showing a strong persistence, meaning that a 1% increase in bond participation in the previous quarter leads to an 0.85% increase in the current quarter. This finding reinforces the importance of historical trends in forecasting market participation, as past investment behavior strongly dictates future engagement in both asset classes.

Overall, the findings highlight the dynamic and lagged effects of macroeconomic variables on financial markets. Internet subscriptions emerge as a key driver of bond markets, initially boosting activity but later inducing volatility as investors adjust their portfolios. Inflation has minimal impact on participation, while central bank rate adjustments influence stocks with a delay but leave bonds unaffected. The stock-bond relationship is evident in the long run, with bond prices reacting negatively to stock market movements after a significant lag. Additionally, the strong autoregressive effects in both markets emphasize the importance of past trends in shaping future market behavior. These insights provide valuable implications for investors, policymakers, and financial analysts, offering a deeper understanding of the evolving relationship between internet access, macroeconomic factors, and capital market participation.

4.5.3 Cointegration Test and Long-Term Dynamics

4.5.3.1 Bounds Test Results

Table 4.6: Bounds Test results

Model	F-Statistic	t-Statistic	Lower Bound I(0)	Upper Bound I(1)	Conclusion
Stock Market Model	4.140	-2.979	2.45 - 3.03	3.74 - 5.06	Long-run relationship exists
Bond Market Model	2.356	-2.299	2.45 - 3.03	3.74 - 5.06	Inconclusive; Long-run relationship exists

The Null Hypothesis (H_0) states that there is No long-run relationship exists among the variables with the alternative Hypothesis (H_1): A long-run relationship exists among the variables. For the stock market model, the F-statistic (4.140) is above the upper bound of the critical values at the 5% level (3.74 - 5.06), which means we reject the null hypothesis (H_0) and conclude that a long-run relationship exists among the variables.

Additionally, the t-statistic (-2.979) supports this conclusion. For the bond market model, the F-statistic (2.356) falls between the lower and upper bounds, making it inconclusive. However, the t-statistic (-2.299) is outside the two-tail range for the critical value of -1.96 to 1.96, which leads us to reject the null hypothesis (H_{0H_0}), concluding that a long-run relationship exists among the variables for the bond market.

4.5.3.2 Long-Run Coefficients for the Error Correction Model (Stock Market)

Table 4.7: ARDL Error Correction Model (ECM) Results

Variable	Coefficient
Ln(Internet Subscriptions)	-0.6541 (0.17790)***
Inflation Rate (%)	-0.0842 (0.1108)
Central Bank Rate (%)	-0.1203 (0.0821)
NSE All-Share Index	-0.0703 (0.0278)**

(Standard errors in brackets). *** Statistical significance at 1% level (p value < 0.01); ** Statistical significance at 5% level (p value < 0.05); * Statistical significance at 10% level (p value < 0.1).

The results indicate that in the long run, Ln(Internet Subscriptions) has a negative and statistically significant effect (-0.6541, $p < 0.01$) on the stock market index, suggesting that increased internet penetration is associated with a long-term decline in stock market participation. This could imply shifts in investor behaviour, such as increased speculative trading or preference for alternative digital financial assets such as cryptocurrencies and forex trading, more sophisticated assets such as derivatives and private equity, or diversifying into financial products such as unit trusts and exchange-traded funds (ETFs). Inflation Rate (%) has a negative but insignificant effect (-0.0842, $p = 0.733$), meaning inflation does not significantly influence the stock market in the long run. Central Bank Rate (%) also has a negative but insignificant effect (-0.1203, $p = 0.155$), suggesting that while monetary policy changes might affect the stock market in the short term, they do not play a significant long-run role. NSE All-Share Index has a negative and significant effect (-0.0703, $p < 0.05$), indicating that fluctuations in the broader market index negatively influence the dependent variable in the long run.

4.6 Diagnostic Tests

4.6.1 Serial Correlation Test Results

The Breusch-Godfrey test for serial correlation was conducted for both stock and bond market participation models. The null hypothesis (H_0) of this test states that no serial correlation exists in the residuals, while the alternative hypothesis (H_1) suggests that serial correlation is present. The test results for stocks show a p-value of 0.2888, and for bonds, a p-value of 0.3346, both of which are greater than the conventional significance level of 0.05. Since the p-values are high, we fail to reject the null hypothesis, meaning that there is no evidence of serial correlation in either model. This suggests that the residuals are independent over time, confirming the appropriateness of the ARDL specification in capturing time-dependent relationships without autocorrelation concerns.

4.6.2 Heteroskedasticity Test Results

The Breusch-Pagan/Cook-Weisberg test for heteroskedasticity was also performed to assess whether the variance of residuals remains constant across observations. The null hypothesis (H_0) assumes homoskedasticity, meaning that residuals have a constant variance, whereas the alternative hypothesis (H_1) suggests heteroskedasticity, where residual variance changes systematically. The test results indicate a p-value of 0.4702 for stocks, which is greater than 0.05, leading us to fail to reject the null hypothesis, suggesting that heteroskedasticity is absent in the stock market model. However, for bonds, the test yields a p-value of 0.0000, which is below 0.05, leading us to reject the null hypothesis and conclude that heteroskedasticity is present in the bond market model. To correct for this issue, robust standard errors were computed for the bond market model to provide reliable statistical inference despite the presence of heteroskedasticity.

Table 4.8: Bond Market Model with Robust Standard Errors

Variables	Bond Market Coefficient (Std. Error, Robust)	Lag
Ln(LII Bonds)	0.8632 (0.1012)*	1
Ln(Internet Subscriptions)	2.2401 (0.4532)*	0
	-1.6454 (0.5902)	1
	-1.3623 (0.5868)	2
Inflation Rate (%)	0.0323 (0.0283)	0
	-0.0006 (0.0323)	1
	-0.0263 (0.0341)	2
Central Bank Rate (%)	0.0549 (0.0320)	0
	-0.0359 (0.0295)	1
	0.0018 (0.0251)	2
NSE All-Share Index	-0.0031 (0.0023)	0
	0.0077 (0.0033)	1
	-0.0012 (0.0014)	2
	0.0018 (0.0008)	3
	-0.0019 (0.0005) **	4
Constant	2.1076 (1.5838)	N/A

(Standard errors in brackets). *** Statistical significance at 1% level (p value < 0.01); ** Statistical significance at 5% level (p value < 0.05); * Statistical significance at 10% level (p value < 0.1).

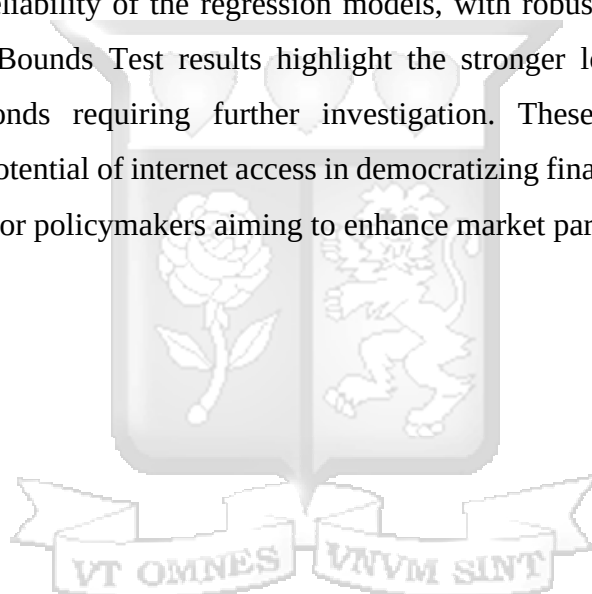
With robust standard errors applied, the bond market model results remain consistent, confirming that internet subscriptions significantly increase bond market participation in the short run, though their effect diminishes over time. The first and second lags of internet subscriptions are negative and statistically significant, suggesting that while initial internet access promotes bond investment, participation declines in later quarters, possibly due to portfolio rebalancing.

The NSE All-Share Index shows a delayed but significant negative effect in the fourth lag, reinforcing the idea that a prolonged increase in stock market performance leads to a shift away from bonds as investors reallocate funds to equities. Other control variables,

including inflation and interest rates, remain statistically insignificant, indicating that bond market participation is not strongly influenced by short-term macroeconomic conditions. The application of robust standard errors corrects for heteroskedasticity, ensuring that the statistical inferences drawn from the model are valid and reliable.

4.7 Conclusion

This chapter has provided a detailed analysis of the relationship between internet subscriptions and capital market participation in Kenya. The findings show that internet access significantly influences stock market participation in both the short and long term, while its impact on bond participation is significant in the short run only. Diagnostic tests confirmed the reliability of the regression models, with robust corrections made where necessary. The Bounds Test results highlight the stronger long-term relationship for stocks, with bonds requiring further investigation. These results underscore the transformative potential of internet access in democratizing financial markets and provide critical insights for policymakers aiming to enhance market participation.



CHAPTER 5: DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter discusses the study's key findings in relation to its research objectives and existing literature, highlighting the influence of internet subscriptions on capital market participation in Kenya. It also outlines the implications of these findings for policymakers, financial institutions, and investors. Additionally, the study's limitations and areas for future research are discussed, providing direction for subsequent investigations into the role of digital infrastructure in financial market development.

5.2 Discussion of Key Findings

The study established that internet subscriptions significantly impact capital market participation in Kenya, particularly in stock investments. A positive and statistically significant relationship was found between internet subscriptions and stock market participation, reinforcing findings from previous studies such as Bogan (2008) and Lu et al. (2023), which indicated that internet access reduces information asymmetry and transaction costs, thereby encouraging investment. These findings align with the Technology Acceptance Model (TAM) and Information Asymmetry Theory, both of which emphasize the role of technology in enabling financial decision-making and reducing barriers to participation.

The results are also consistent with Hvide et al. (2022), who found that broadband internet significantly increased stock market participation in Norway by enabling better access to financial information and reducing the fixed costs associated with investing. Similarly, studies by Glaser and Klos (2013) in Germany demonstrated that internet adoption had a significant positive effect on stock market engagement, particularly for financially literate individuals. This suggests that internet accessibility alone may not be sufficient to drive participation, and complementary factors such as investor education play a crucial role.

For corporate bonds, a positive short-term effect from internet subscription increase was observed but the long-term influence was inconclusive, as confirmed by the Bounds Test results. These findings contrast with the stock market participation trends, where improved internet access had a more delayed but sustained impact. One possible explanation, as suggested by Nyamweya (2023), is that corporate bond markets in Kenya

remain underdeveloped, with low liquidity and limited retail investor participation. Furthermore, studies such as Igwilo & Sibindi (2022) have emphasized that while ICT adoption enhances financial market participation, the effects are often more pronounced in equity markets than in fixed-income securities.

Macroeconomic controls, including inflation and interest rates, showed expected effects on stock participation. High inflation and interest rates negatively influenced stock market participation, supporting economic theories that suggest these variables increase opportunity costs and discourage risk-taking. The results are in line with Mishkin (2021), who argues that rising inflation erodes real investment returns, reducing incentives for stock market participation. Similarly, the negative effect of interest rates aligns with findings by Bekaert and Harvey (2014), who note that higher interest rates divert capital away from equities into safer fixed-income assets.

However, these macroeconomic variables had a negligible effect on bond participation, indicating that factors other than internet access and economic conditions may be more influential in this segment of the capital market. This aligns with the findings of Mauricas et al. (2017), who suggest that bond participation in emerging markets is more influenced by structural barriers such as lack of investor awareness and limited product offerings rather than macroeconomic conditions alone.

5.3 Conclusion of the Study

The study aimed to investigate the effect of internet subscriptions on capital market participation among local individual investors in Kenya. The findings confirm that increased internet subscriptions positively and significantly influence stock market participation, reinforcing the role of digital access in enhancing financial inclusion. The relationship with bond market participation is also positive and statistically significant but more immediate than the stocks case, though participation in the corporate bonds market itself remains very low indicating that behavioral barriers in the bond market may limit its accessibility to individual investors.

These findings align with the Technology Acceptance Model (TAM) and Information Asymmetry Theory, which suggest that greater access to financial information and reduced transaction costs contribute to higher stock and bond market engagement. The

results further highlight the importance of macroeconomic stability, as inflation and interest rates negatively impact investor participation. Given these insights, improving internet penetration, financial literacy, and market accessibility remains crucial for fostering a more inclusive capital market ecosystem in Kenya.

5.4 Recommendations and Policy Implications

Increased internet access has been found to significantly enhance stock market participation by reducing transaction costs and improving access to financial information. To maximize this impact, the government and private sector should collaborate to expand internet infrastructure, particularly in underserved regions. By investing in broadband expansion and lowering internet costs, more individuals will have the opportunity to access and engage with financial markets, ensuring a more inclusive capital market.

Financial literacy is a crucial factor in maximizing the benefits of internet access for capital market participation. Many potential investors may not fully understand stock and bond market opportunities despite increased internet connectivity. To address this, policymakers and financial institutions should implement targeted financial education programs to improve investor confidence and participation. These programs should focus on digital trading platforms, risk assessment, and investment strategies, equipping individuals with the knowledge necessary to navigate financial markets effectively.

The weaker correlation between internet subscriptions and bond market participation suggests that structural barriers hinder retail investors from engaging in the bond market which has significantly lower participation. To overcome these obstacles, regulatory bodies should work towards increasing the availability of retail-friendly bond products, improving market liquidity, and simplifying the corporate bond issuance process. Enhancing investor protections and reducing complexities in bond transactions could make this asset class more attractive to individual investors. To address these challenges, the Capital Markets Authority (CMA) is working on initiatives such as establishing a fund to support corporate bond issuances and mitigate investor losses and more of such initiatives should be implemented.

Inflation and interest rate fluctuations were found to negatively affect investor confidence, emphasizing the importance of macroeconomic stability. To mitigate these effects,

policymakers should maintain sound monetary policies that promote economic stability. Implementing predictable inflation and interest rate policies will encourage long-term investment, reduce capital market volatility, and create a more favorable environment for investor participation.

Digital trading platforms play a vital role in facilitating stock and bond market participation. Enhancing cybersecurity measures and promoting investor trust in digital trading platforms will be crucial for sustaining capital market growth. Regulatory bodies should incentivize the development of user-friendly online trading systems that facilitate seamless transactions, provide real-time market information, and ensure secure trading environments. By leveraging digital trading platforms, investors will have greater access to transparent and efficient trading mechanisms, further supporting capital market participation.

5.5 Limitations of the Study

This study faced several limitations that may have affected its scope and findings. One key limitation was the unavailability of consistently reported data points for local individual investor participation in stocks and corporate bonds outside of the period of study (2010-2023), which resulted in fewer observations than initially intended. There was also a constrained ability to include a broader range of control variables, such as investor risk preferences, financial literacy and access to financial advisory services, that could have provided a more nuanced analysis. Due to use of data reported by the selected institutions rather than surveys to the target households as done in studies like Bogan (2008) that used data from the Survey of Consumer Finances (SCF) in the United States and Glaser and Klos (2013) that used Household panel survey data in Germany no household specific controls were applied. Since there were no similar data repositories in Kenya, reliance on non-targeted secondary data limited the ability to explore qualitative aspects of investor behavior, such as motivations and risk perceptions. Primary data collection was not feasible due to time constraints and the difficulty of obtaining a representative sample of investors willing to participate in detailed surveys or interviews. Despite these limitations, the findings offer valuable insights and a strong foundation for future research.

5.6 Areas for Further Research

While this study provides valuable insights, several areas warrant further exploration. Future research should investigate the relationship between internet subscriptions and participation in government bond markets, an area not covered in this study. Given the growing popularity of mobile-based government bond platforms like the Dhow-CSD application, this presents a promising avenue for analysis. Additionally, examining the role of digital financial literacy in enhancing market participation could provide actionable insights for policymakers and educators. Analyzing how regional differences in internet penetration affect market participation could help tailor interventions to specific needs. Finally, exploring the behavioral motivations behind stock and bond investments in the context of internet access would enrich understanding of investor decision-making.

5.7 Conclusion

This study has demonstrated the significant impact of internet subscriptions on capital market participation in Kenya, particularly for stocks. The findings underscore the importance of digital infrastructure in democratizing financial markets and highlight the need for supportive policies to maximize its potential. While bonds exhibit a weaker relationship with internet access, targeted interventions could enhance their appeal and accessibility. By addressing these challenges and leveraging the opportunities identified, Kenya can foster a more inclusive and dynamic financial market ecosystem, ultimately contributing to broader economic growth and development.

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