



**ADDIS ABABA UNIVERSITY**

**COLLEGE OF BUSINESS AND ECONOMICS**

**DEPARTMENT OF ECONOMICS**

**Master of Science (M. Sc.) in Financial Economics**

**THE IMPACT OF INFLATION ON STOCK PRICE IN SELECTED  
AFRICAN COUNTRY**

By

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A Thesis submitted to the school of postgraduate studies in partial Fulfillment for  
the award of degree in master of Financial Economics

**Advisor**

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**JUNE, 2025**

**ADDIS ABABA, ETHIOPIA**

## **DECLARATION**

I, Tigist Kassie, hereby declare that the thesis entitled: The impact of inflation on stock price in selected African countries; is my own original work and has not been submitted for any degree either at this University or any other University and all sources of materials used for the study have been duly acknowledged. It is offered for the award of the degree of Master of Science in Financial Economics from Addis Ababa University.

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**MASTER OF SCIENCE (M. SC.) IN FINANCIAL ECONOMICS**

**CERTIFICATE**

This is to certify that this study entitled: The impact of inflation on stock price in selected African countries; was undertaken by Tigist Kassie for the partial fulfillment of Master of Science in Financial Economics at Addis Ababa University, is an original work and not submitted earlier for any degree either at this University or any other University.


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## LIST OF ACRONYMS

- ASEAS African Security Exchange Association
- ARDL Autoregressive Distributed Lag
- BSE Botswana Stock Exchange
- CSE Casablanca Stock Exchange
- CPI Consumer Price Index
- DSE Dar Es Salaam Stock Exchange
- DFE Dynamic Fixed Model
- EGX Egyptian Exchange
- ECM Error Correction Mechanisms
- GFE Generalized Fisher Effect
- GSE Ghana Stock Exchange
- GDP Gross Domestic Product
- JSE Johannesburg Stock Exchange
- MG Mean Group
- NSE Nairobi Security Exchange
- NGX Nigerian Stock Exchange
- OLS Ordinary Least Square
- PMG Pooled Mean Group
- PPI Producer Price Index
- OECD The Organization for Economic Co-operation and Development

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## ABSTRACT

*The study investigating the impact of inflation on stock price in selected eight African countries, Egypt, Morocco, Tanzania, Kenya, Ghana, South Africa, and Botswana span from 2008 to 2023. The study employed secondary data. The study used panel Auto-regressive Distributed Lag (ARDL) model estimated via pooled mean group (PMG) approach. The study examined the short-run and long-run effect of inflation on stock price as well as other macroeconomic variable as a control variable. Results from the study indicate that inflation has a positive and significance long-run impact on stock price. This also suggests that equity in these markets can serve as a hedge against inflation which supports the fisher effect hypothesis. In contrast short-run effect of inflation varies significantly across the country. Among those, South Africa, Egypt, Nigeria and Ghana, has positive and significant effect on stock price. This indicates the presence of country specific effect. Broad money supply shows a significant and positive impact on stock price in long-run, in contrast gross domestic product growth rate exhibits a significant and negative impact on stock price. However, there is no significant relationship between deposit interest rate and stock price. The findings also recommend to policy maker emphasizes the need of macroeconomic stability, country specific investment strategy, and for investor may use the information invest in safe investment environment.*

**Key words:** Inflation, Stock price, Panel ARDL, PMG estimation, Inflation hedge, Africa stock market

# CHAPTER ONE: INTRODUCTION

## 1.1. Background of The Study

The relationship between inflation and stock price has been a topic of interest in both developed and developing capital markets. This is because of the vital role that the capital market plays in the growth process over the world economies. This is hardly surprising, since the stock market is seen to be a barometer reflecting the state of the economy (Ikeobi, 2024), and risk reduction by offering opportunities for risk diversification (Ezeoha et al., 2009). Thus, the stock market index and stock market capitalization which come from the prices of the underlying holdings are considered to be the best indicators of the changes in the activities in the economy. The private sector's assessment of present and future business conditions is reflected in changes in share prices, as the stock market is thought to have a significant impact on business enterprises' investment choices and spending patterns (Mwai, 2013).

The capital market is the area of the financial system that is responsible for providing the means for the creation and trading of medium- to long-term financial instruments to funding demands, mobilizes and channels cash held by investors (savers) to users (firms). The country's financial resources are therefore gathered and distributed by the capital market to the businesses and sectors that would utilize them most effectively and support the expansion and advancement of the economy (Akani & Uzobor, 2015).

The efficiency of the capital market depends on the degree to which it can provide adequate information, which will guide investors on where to channel their resources. This in turn, is based on how much firm-specific information is reflected in stock prices. Although the efficiency of the capital market is linked to how well it reflects firm-specific information, stock prices are considered to be influenced by other factors which are not firm-specific, like Macro-economic variables factor such as inflation, interest rates, exchange rates, money supply and GDP (Gross Domestic Product) are believed to influence stock prices (Akani & Uzobor, 2015). Among Macro-economic factors, inflation receive particular attention due to its complex and sometimes contradictory effect on stock price in the empirical evidence. Theoretically though, stocks should be effective hedge inflation since they constitute a claim on actual assets, the value of which is

anticipated to fluctuate in line with inflation. This is the economic theory of the Fisher effect as explained by (Fisher, 1930), as cited in Ahmed and Igbinovia,2015).

According to the Fisher hypothesis, Nominal asset prices fluctuate in line with anticipated inflation, meaning that real factors that are not influenced by inflation rate affect real stock prices. This implies that assets which represent claims to physical or real assets, like stocks, should offer a hedge against inflation, since inflation should not affect real stock price and return. Throughout most of the 1930s and 1970s, this idea provided the most reasonable explanation for the relationship between stocks and inflation. This is supported by the belief that the underlying value of assets is maintained despite inflation. However, empirical evidence on this relationship remains mixed. Some studies report a positive correlation between inflation and stock prices, (Adam and Tweneboah, 2008; Akmal, 2007; Yaya, 2015 and Luintel and Paudyal,2006). While others suggest a negative or inconclusive relationship (Geysers and Lowies (2001), Shamsudin, Rosmi, and Mohamed's study (2021, Anari and kolari (2001)). Factors such as monetary policy, time period, statistical methodology which means the specific techniques and tools used to analyze the data and test the relationship between inflation and stock prices in different studies and level of market development often explain these inconsistencies.

The persistent increase in the overall price level is known as inflation, and it is typically caused by a growth in the amount of credit and money accessible in relation to the supply of products and services. As general prices rise, a unit of currency may buy fewer goods and services, decreasing money's buying power. Given that the objective of investment is to generate a respectable return on investment with the least amount of risk, it is not surprising that high rates of inflation brought on by an expansion of the money supply may discourage investment. To minimize risk and generate a respectable return, it implies that investment value will decrease over time if the present rate of inflation is not taken into consideration. (Akani & Uzobor, 2012). Keeping inflation at a minimum rate is the primary goal of most central banks in both developed and developing nations in order to overcome the economic obstacle of inflation and achieve and sustain high economic growth Oatthotse et al. (2018)). But it is difficult for monetary authorities to keep inflation under control in African nations. Despite the presence of political will, inadequate institutional frameworks, shallow financial markets, and imperfect bank

competition (Oatthotse et al. (2018)). Inflation discourages saving and crowds out investment with a resultant negative effect on stock prices (Akani & Uzobor, 2012).

In 2022, there were 30 exchanges in Africa, representing 39 countries capital markets. At that time, African Security Exchange Association (ASEA) had 26 Full Members and 6 Associate Members. In addition to the Casablanca Stock Exchange in Morocco, which was established in 1929, the JSE Limited in 1887, and the Nairobi Securities Exchange in Kenya in 1954, the Egyptian Exchange (EGX), which was established in 1883, is the oldest stock exchange in Africa. In Africa today, the Johannesburg Stock Exchange (JSE), Egyptian Exchange (EGX), Nigerian Stock Exchange (NGX), Casablanca Stock Exchange (Morocco), and Nairobi Security Exchange (NSE) are the top five stock markets.

Many empirical studies were conducted in relationship between inflation and stock price in Africa. However prior finding's show conflicting results on the connection between inflation and stock price, this study is not motivated merely by the existence of mixed findings. Rather, it addresses critical gaps in African finance literature. Most existing studies focus on single countries apply homogeneous estimation techniques, and failed to distinguish between short run and long run dynamics, as a result, there is limited evidence on whether African stock differ in their inflation-hedging properties these problem had addressed by employed panel ARDL model framework. for this reason, study on those subjects have attracted the attention of researcher due to considering the investors to invest in Africa by comparing which Africa stock exchange may use hedge against inflation and invest in safe investment environment, empirical studies will be conducted with comparison between those select countries.

## 1.2. Statement of the Problem

Given that inflation is a significant monetary variable and that it reduces purchasing power, damages financial assets, has a direct effect on stock market prices, and influences investors, many investors may become irrational, which means during a period of high inflation some investor may make decision-based on fear and uncertainty rather than on risk return calculation. The concerning rise in inflation is a challenge for policymakers in controlling this element. However, Fisher's hypothesis suggests that equity stocks, which are claims against a company's actual assets, could act as a hedge against inflation; this logic demonstrates that inflation and stock prices are positively correlated (Spyrou, S. I.,2004). The relationship between stock prices and inflation has intrigued researchers who have attempted to explain how a nominal variable such as inflation should determine a real variable (asset prices). Findings from recent studies have found the presence of a negative relationship between stock prices and inflation Khumalo (2013). These findings contradict the hypothesis by Fisher (1930) who made the claim that stock prices should be positively related with expected inflation, providing a hedge against rising prices.

Various studies for example Fisher (1930), Fama (1981), Anari and Kolari (2001), and Geysler and Lowies (2001), Luintel and Paudyal (2006), Akmal (2007), Adam and Tweneboah (2008), Khumalo (2013), Yaya (2015), Shamsudin, Rosmi, and Mohamed's study (2021), have investigated the relationship between inflation and stock prices across the countries ,and the results have been inconsistent Over the years. The connection between inflation and stock price has gotten significant attention in economic research. While developed economies have been the primary focus of such study, however, remains under explored in Africa context across the countries. Given Africa's diverse economic landscape and unique and volatile inflation pattern, understanding how inflation influences stock market performance is crucial for both policymakers and investors.

This paper aims to address these gaps and contribute basic concepts. Firstly, the study examined the long-run relationship between inflation and stock prices of selected African countries by

employing the most recent method of panel ARDL estimation model framework via pooled mean group (PMG), mean group (MG), and dynamic fixed effect (DFE) estimating approach.

Secondly, the studies were assessing the role of other macroeconomic variables on the relationship between inflation and stock price. Because stock prices are not influenced by inflation alone, this study aims to include major other macroeconomic indicators, except inflation, as a control variable in the model to prevent omitted variable bias and provide a more realistic comprehending of the unique impact of inflation on stock prices.

Thirdly, Africa is not a homogeneous continent; countries differ in terms of financial market development, economic diversification, monetary policy effectiveness, and inflation history, as a result. The study aims to provide a comparative analysis to the effect across different African countries, recognizing that the continent has experiencing different inflation, and understanding these differences will help to identify regional (country-specific) investment risks and tailored policy recommendations in the context of the African market.

Fourthly, the study investigates the concept of inflation hedging becoming relevant. An inflation hedge refers to an investment that is expected to maintain or increase its value over time. Offsetting the advance effect of inflation, Assets like gold, real estate and certain stocks have historically been considered effective hedges against inflation. So, this paper explore whether certain asset in African market act as effective hedges against inflation. This can prove valuable insight into investment strategies and economic policy during inflationary period.

### **1.3. Objective of the study**

#### **1.3.1. General objective**

The main objective of the study was to examine the effect of inflation on stock price in selected African countries.

#### **1.3.2. Specific objective**

The specific objective would be:

- I. To explore the relationship between inflation and stock price across selected countries.

- II. To assess the role of other key macroeconomic variables (Deposit interest rate, Gross domestic product growth rate, Broad money supply) as a control factor in determining stock price.
- III. To explore whether selected African stock market act as hedge against inflation

#### **1.4. Research Question**

To accomplish the objectives of the research, this thesis try to address the following four research questions which are.

- Is there inflation impact on stock price the same across selected African country?
- How macroeconomic variables (Deposit interest rate, Gross domestic product growth rate, Broad money supply) influence the stock price?
- Which African country's stock exchanges are more likely to serve as inflation hedges?

#### **1.5. Research hypotheses**

- Ho1: the impact inflation on stock price is the same across selected African country.
- Ho2: other key macroeconomic variables (Deposit interest rate, Gross domestic product growth rate, Broad money supply) have significance impact on stock price.
- Ho3: Fisher hypothesis hold in long run/ market provide hedge against inflation.

#### **1.6. Significance of the study**

The study contributes to the literature in several ways.

**For Academics and Researchers,** The study contributes to a critical gap in the literature, particularly regarding inflation and stock price in African economies. This paper show how inflation influence the stock price across selected African countries. The research provides opportunity to comparative studies across African economy Due to African countries experienced different inflation history and stock market structure as well as behaviors. So this thesis would serve as a baseline for future research into considering studies in across the country.

**For policymakers,** they often use inflation control mechanisms to stabilize the economy. The findings of this study can help policymakers design more effective monetary policies, particularly in managing the impact of inflation on the broader economy. Central banks can use

data from the study to determine inflation targets that stabilize both the macro-economy and the stock market. Policymakers can also use the findings to enhance economic stability by tailored policy recommendation.

**For investors,** businesses and investors can use this research to mitigate risks and adjust strategies in inflationary environments. This thesis provides information on inflation and stock prices across selected African countries, a key consideration in all investment decisions, as well as examines and uses for decision about which stock exchange will provide a hedge against inflation in order to invest in a safe environment and minimize loss during inflationary period. This also led to increase investor confidence.

**For portfolio managers:** The outcomes were providing insight for portfolio managers and policymakers to assess if stock in these markets can consistently protect investors' actual wealth during times of inflation in the African context. Even when stock prices may not be able to effectively hedge against inflation due to market inefficiencies and inflation volatility. They are better informed about reallocation of asset.

## **1.7. Scope of the study**

This study was specifically deal with the impact of inflation on stock prices in selected African countries. Geographically limited to eight African countries (East Africa: Kenya and Tanzania; West Africa: Nigeria and Ghana; South Africa: South Africa and Botswana; North Africa: Morocco and Egypt), the choice of those countries will focus on the four corners of the African region, aligning with the study area as well as the accessibility of data, geographical representation, and economy of the country. These sample countries were used for comparative analysis of the study across selected African countries. Covering the 16-year data span from 2008 to 2023 based on accessibility of data and incorporates updated data.

The study was sets stock price as a dependent variable and inflation as a major independent variable as well as other macroeconomic variables such as deposit interest rate, and GDP, and broad money supply as a control independent variable in order to see the unique and direct effect of inflation on stock price by avoiding omitted variable bias. Macroeconomic variables have been identified as a major determinant of stock price (Fama 1981; Chen et al., 1986; Smith &

Sims 1993; Flannery & Portopapadikis, 2020) (cited in Kaur 2016). The choice of variable that was included in this study was depend on different empirical evidence and theoretical knowledge

### **1.8. Limitation of the study**

In conducting research, the impact of inflation on stock price in selected African countries, several data related limitation can impact the comprehensive and accurate of the study. This limitation includes; access to detail historical data especially in annual data from African stock exchange often requires paid subscriptions which is more expensive for researchers, in order to handling this the researcher collect those data from annual report of each stock exchange home page, this also exert more effort and time consuming issue. The second issue is inconsistency in index measurement and reporting standard, lack of standardizes stock measurement index makes difficult to do research across the country.

### **1.9. Organization of the Study**

This thesis had been organized in to five chapters, chapter one provides an introduction and background of the study, briefly states the research problem, objective of the study, research question and scope of the study. Chapter Two were offer a review of the theoretical and conceptual framework, with relevant empirical literature. Chapter Three were emphasize the research methodology employed these studies. Chapter four will present and interprets the results, alongside a critical discussion of the key findings. Finally, Chapter five were conclude the study and offers recommendations based on the findings.

## **CHAPTER TWO: LITRATURE REVIEW**

### **2.1. Theoretical Literature**

#### **2.1.1. Definition of Inflation**

A persistent and substantial increase in the average level of prices for goods and services is referred to as inflation. (Morris and Morris, (1999),Cited in Geysler et al. (2001)). Repeated price increases caused significant distortions and uncertainty by eroding the purchasing power of money and other fixed-value financial assets. When actual economic pressure plus projections of future developments result in a demand for products and services that is greater than the supply at present prices, inflation takes place or when declining productivity and market forces limit the amount of output that can be produced.

#### **2.1.2. How is inflation measured?**

Geysler et al. (2001) state that the government and media mostly rely on two types of information when identifying inflation. The first source is consumer price index (CPI) - A measure of the change in prices for consumer goods and services like cars, food, clothing, and gasoline. It is among the most useful data for determining when inflation or deflation is occurring. It typically has a significant effect on how the stock price moves on the day of release. Geysler et al. (2001)

The consumer price index (CPI) is most frequently used to: Determine the rate of inflation; inflate or deflate another time series or index; and, if index copulation is employed, adjust price, salary, wage, and other variables for changes in the rate of inflation. Geysler et al. (2001). One advantage of the consumer price index (CPI) is that it is an easily accessible and explicit pricing index. Long-term series can be used. And also measure the price of products and services. This is used as a measure of inflation in each of those selected countries Diewet, W.E (2001). The second source is producer price index (PPI)-a family or smaller index measures the average change over time in selling price by domestic producer of goods and services. PPI is a measure of price change from a manufacturing and smaller company perspective. It looks three area of production industry- based, commodity –based and stage of process-based companies (Gautier, E. 2008).

### **2.1.3. Share Price Index**

The prices of common shares of companies that are traded on domestic or international stock exchanges are used to compute share price indexes. They are often expressed as straightforward arithmetic averages of the daily data and are usually calculated by the stock market using the closing daily values for the month's data (Das, N., et al ,2009). A share return index informs the investor of their return, or how much money they would make from investing in that basket of shares, whereas a share price index tracks how the value of the stocks in the index is fluctuating (Mueller & Roviello, 2021).

### **2.1.4. Theoretical Relation Between Inflation and Stock Price**

The literature has put up a number of theories to explain the connection between stock market performance and inflation. As a result, this section will examine the links between inflation and stock market performance using accepted theories and academic reasons.

#### **2.1.4.1 The Fisher Hypothesis**

Fisher's (1930) economic theory postulated that stock returns and inflation would positively correlate, based on the idea that assets should be able to hold their value in the face of inflation. According to the Fisher (1930) hypothesis—also referred to as the Fisher effect from here on—real stock returns are influenced by actual factors that are not influenced by the rate of inflation, but nominal asset returns move in line with predicted inflation. Assets that represent claims to actual assets, like equities, should have a positive correlation with anticipated inflation, according to Fisher (1930), acting as a hedge against price increases. Inflation will pose a threat to stock investors if the suggested positive correlation between inflation and stock prices is not maintained. Accordingly, in an efficient market where prices represent both present and future levels of inflation, an increase in predicted inflation *ceteris paribus* would lead to an increase in nominal returns; hence, the idea that inflation and stock returns move in parallel.

#### **2.1.4.2. The Proxy Hypothesis**

In order to explain the negative correlation between inflation and stock market values, Fama (1981) developed the proxy hypothesis, which posited that there is an indirect relationship between both variables and economic activity. Fama (1981) recognized the Proxy effect, which

states that the negative correlation between inflation and stock returns is confusing since it is widely believed that common stock, which represents ownership of the income generated by real assets, ought to act as a hedge against inflation. According to his argument, the correlation between inflation and returns is merely a proxy association between the growth rate of the actual gross national product and stock return. Since inflation and stock returns are inversely correlated, a high rate of inflation may reduce demand for money, which would slow the expansion of real activity. The opposite side is that rising inflation lowers projected future profits, which in turn causes stock prices to fall Fama (1981).

The Proxy effect states that the positive correlation between stock returns with real variables which Fama (1981) considered to be more fundamental determinants of equity values is being proxy by the negative correlation between inflation and stock returns. According to both the quantity theory of money and the money demand theory, the real economy and inflation have a negative link, which causes the negative relations (Fama, 1981).

Fama concluded that there was evidence of a positive relationship between real stock returns and measures of real activity, such as capital expenditure, average real return on capital, and output, based on monthly, quarterly, and annual data from the USA between 1953 and 1977. This relationship reflected variations in the amount of capital investment with expected return exceeding costs of capital. Additionally, he pointed out that the abnormal correlation between inflation and stock returns and indicators of future real activity is in line with the rational expectations theory, which holds that markets for securities and goods determine current prices based on projections of pertinent real variables. A demonstration of the inference in the relationship between projected inflation and stock returns is the end result. The Proxy hypothesis, a new school of thinking about the interaction of various variables, has resulted from this.

#### **2.1.4.3. Inflation Illusion Hypothesis**

The Inflation Illusion hypothesis, which was developed by Modigliani and Cohn (1979) after the negative relationships between inflation and stock returns were discovered in the 1970s, claimed that the correlation between inflation rate and stock returns was caused by inflation illusion.

They explained the inverse relationship by claiming that the inflation illusion caused irrational investors to discount real cash flows using nominal interest rates.

According to the inflation illusion hypothesis, even during times of fluctuating inflation, investors extrapolate historical nominal growth rates because they are unable to comprehend how inflation affects nominal dividend growth rates. According to Modigliani and Cohn (1979), investors as a whole experience money illusion and make two mistakes when valuing stocks: they discount real cash flows using a nominal rate (and neglect to modify the nominal growth rate of dividends) and they overlook the capital gain that corporations with fixed dollar liabilities accrue to their equity holders when inflation is present.

### **2.1.5. Overview of major sample selected of stock exchange**

Over time, the African stock markets have shown consistent expansion. The eight African stock exchanges that make up the study's unit of analysis the Botswana Stock Exchange (BSE), Dar es Salaam Stock Exchange (DSE), Nairobi Securities Exchange (NSE), Nigerian Stock Exchange (NSE), Johannesburg Stock Exchange (JSE), Ghana Stock Exchange (GSE), Casablanca Stock Exchange (CSE), and Egyptian Exchange (EGX) are shown in this section.

#### **2.1.5.1. Nigerian Stock Exchange**

The Nigerian Stock Exchange All Share Index is a common index used to measure the performance of the Nigerian stock market. It monitors the effectiveness of each company that is listed on the Nigerian Stock Exchange (NSE). An all-encompassing perspective of the market is offered by the NSE All Share Index, which gives to investors an accurate representation of market trends and potential investment possibilities. Invest in the future of Nigeria's economy by tracking the performance of the NSE All Share Index (Igwilo, et al. (2021).

#### **2.1.5.2. Dar es Salaam stock exchange**

The performance of every company that is traded on Tanzania's Dar es Salaam Stock Exchange (DAR) is monitored by the Dar es Salaam All Share Index (DAR-ASI), a comprehensive index. The index is a measure of the overall performance of the Tanzanian stock market and is computed using the market capitalization weighted approach. The DSEI is updated frequently to

take into account changes in the value of the member companies as well as the most recent trends in the market.

Investors consider the DAR-ASI as a tool for evaluating the returns on their investments in Tanzanian stocks and as a standard for the performance of the stock market. The DAR-ASI is an important indicator of Tanzania's economic health, including information on the development and stability of the nation's most vital sectors and industries. Investors may continue to be informed about ongoing market trends and make well-informed investment decision-making processes by observing the DAR-ASI's movement (Annual report 2022).

### **2.1.5.3. Nairobi Stock Exchange**

The performance of every company listed on the Nairobi Stock Exchange (NSE) is represented by the Nairobi Stock Exchange All Share Index (NSE-ASI), a market capitalization weighted index. Market experts, analysts, and investors use the NSE-ASI to monitor the NSE's overall performance due to it is commonly regarded as the standard of performance that measures the Kenyan stock market. The market price of each listed company is used to construct the index, which is updated in real time. Because it shows the overall health of the stock market and the companies listed on the NSE, the NSE-ASI is a crucial instrument for assessing the success of the Kenyan economy. It is a useful instrument for investors who want to monitor the growth of the Kenyan stock market and can additionally be used as an indicator for investment performance (Igwiilo, et al. (2021).

Following extensive engagements with various stakeholders, including potential issuers of structured products like the Exchange Traded Funds (ETF), the NSE launched two new market indices on September 4, 2023: the NSE Bond Index (NSE-BI) and the NSE 10 Share Index (N10). The N10 Index is based on a list of ten companies: Safaricom Plc, Equity Group Holdings Plc, KCB Group Plc, East African Breweries Plc, ABSA Bank Kenya Plc, NCBA Group Plc, Kenya Electricity Generating Company Plc, Kenya Re Insurance Corporation Limited, and Centum Investment Co Plc. The constituent companies list will be reviewed semi-annually (Annual report 2023).

#### **2.1.5.4. The Ghana Stock Exchange**

The Ghana Stock Exchange, or GSE, was founded in 1989. A true stock market was first established in 1989, despite Ghana having passed a stock exchange laws in 1971. As a private company limited by guarantee, the GSE was established and registered. The stock exchange was recognized as an authorized stock exchange under the 1971 Stock Exchange Act, and it began trading in November 1990. The stock exchange thereafter became a public company by guarantee in 1994 (Ghana Stock Exchange 2023).

Every stock listed on listed on the Ghana Stock Exchange (GHS) are measured by the Ghana Stock Exchange Composite Index. It indicates the value of all listed stocks on the exchange, adjusted for the quantity of outstanding shares, and provides an in-depth evaluation of the overall condition of the Ghanaian stock market. The market price of all listed stocks is used to generate the index, which is then updated often to account for shifts in the underlying stocks' values. Financial institutions, analysts, and investors use it frequently to evaluate stock market performance and make decisions about investments (Igwilo, et al. ,2021).

#### **2.1.5.5. Johannesburg stock exchange**

The Johannesburg stock exchange (JSE) of South Africa has a long history that began in 1887. The JSE was established to give financiers the ability to obtain capital for the growth of Johannesburg's nascent mining sector. Murray (1987) contends that the JSE accurately represents the wealth of the gold mining sector, just as it did in the late 19th century. For instance, the majority of the top 10 businesses in the market capitalization rankings today are mining companies. From its founding in 1887 to the present, the JSE has been and still is an essential part of the Republic of South Africa's commercial and economic growth. The JSE is widely recognized as the backbone of the South African economy (Kotze, P. N, 2023).

#### **2.1.5.6. Egypt stock exchange**

For an NSE 10 index futures contract that would enable investors to protect themselves against market volatility, the Exchange obtained regulatory permission. In order to properly reflect the stock portfolios of market participants, the NSE 10 index was designed (Ayyad, et al.,2023).

### **2.1.5.7. The Botswana Stock Exchange**

The Botswana Stock Exchange (BSE) has gone through several stages of development, much like all other stock markets in Africa. But most relevant was the original concept of Botswana's stock exchange, which was considered and implemented in 1989. According to the Botswana Stock Exchange (2019), the BSE is the third-biggest stock exchange in SADC and has had some of the finest performance over the past ten years (Igwilo, et al., 2021).

### **2.1.5.8. Morocco Stock Exchange**

It was founded in in 1929 as the Casablanca Stock Exchange (Casa SE) in morocco. Casa SE has undergone several reform phases, just like the majority of African stock exchanges. The stock exchange underwent reorganization in 1967 to adopt a more structured framework of legal and technical. Throughout the years, the stock exchange has persisted in implementing reforms to fortify and update the exchange (Igwilo, et al. ,2021).

### **2.1.6. Regional Variations in Stock Market Performance**

The way that many developed countries consider the impact of regional differences on stock market performance is comparable to Brooks and Del Negro's (2005) assessment of the regional differences that significantly affect equity return in America, Asia, and Europe. Portfolio investment strategies and regional economic development policies can benefit from this segmentation of investments in various assets in various nations. However, this fails to take into account Africa. African economies' stock markets operate quite differently because of differences in economic structures, financial advancement, and institutional frameworks. Barasa, J. W. (2014). Expounded upon the idea of close financial integration. These regional differences highlight the role that monetary infrastructure, governance, and economic policies play in influencing the overall performance of inventory markets throughout the continent.

## **2.2. Empirical review**

There are numerous empirical reviews that examine the relationships between stock price and inflation, but many yield mixed results. The study groups the empirical literature into two categories: those in Global and African contexts.

### 2.2.1. Global Context

According to **Anari and kolari (2001)**, the study use Johansen cointegration test VAR mode investigate the relationship between inflation and stock price for six countries; United States, Canada, United Kingdom, France, Germany and Japan period span from 1955 to 1998 of monthly data, and the result shows in short-run there was negative relation between inflation and stock price, but there was positive relation in long term.

According to **Luintel and Paudyal (2006)** use UK aggregate and disaggregate monthly time series spanning 48 years data (1955-2002). They investigate whether stock investments hedge against inflation in UK. They found after adjusting for structural shifts, the long-run elasticity of stock prices with respect to goods prices exceeds unity in almost all cases; with disaggregate results exhibiting considerable heterogeneity. This implies a positive long-run relation between them.

According to **Akmal (2007)** examine the relationship between inflation and stock price in Pakistan by using ARDL and ECM model from period 1971-2006 of Monthly data and the result shows Positive and non-significant short-term relationship between share prices and inflationary pressure (CPI), subterranean economy and Positive and significant long-term relationship between stock prices and inflation (CPI) .

**Geetha et al (2011)** by applying tests for cointegration the study, which looks into the relationship between macroeconomic variables like inflation and stock returns, concludes that there is, in fact, a long-term relationship between China, the US, and Malaysia. According to their research, inflation may have a negative impact on market returns because inflationary pressures may harm future corporate profits. Additionally, inflationary pressures can lead nominal discount rates to rise, which lowers the present value of future profits and, consequently, the stock market. Nevertheless, there isn't a meaningful correlation between the variables in the short term. In order to establish a long-term equilibrium between stock prices, CPI, and actual economic activity, Al-Khazali (2003) also used the cointegration test. The results demonstrate a negative correlation between stock returns and CPI.

**Shamsudin, Rosmi, and Mohamed's study (2021)** the study examines how certain macroeconomic factors relate to the Bursa Malaysia Finance Services Index and the Malaysian stock return index for the financial sector using multiple regression analysis. The macroeconomic variables that were analyzed in the annual data analysis, which covered the years 1979 to 2019, were the real effective exchange rate (REER), money supply (M.S.), and inflation (INF). The results showed that Malaysian inflation (INF) had a substantial positive association with the money supply and a negative correlation with developments in the stock market. However, the exchange rate has no statistically meaningful link.

### **2.2.2. Africa Context**

**Geyser and Lowies (2001)**, attempted to investigate how inflation affected stock prices in Namibia and South Africa, two SADC nations. Simple regression analysis was employed in the investigation. As a result, neither of the two countries that were chosen provided an ideal inflation hedge. In South Africa, the mining industry's listed businesses have a negative correlation with inflation, whereas in Namibia, the opposite is true.

**Omran and Pointon (2001)** examined how the inflation rate affected the performance of the Egyptian stock market in terms of market activity and liquidity while examining the Fisher hypothesis. The time frame for the data analysis was 1980–1998. To determine the variables' short- and long-term associations; co-integration analysis using error correcting mechanisms (ECM) was employed. To check for co-integration correlations between the variables, ordinary least squares (OLS) were also used in long-run regressions. They came to the conclusion that there is no doubt that the inflation rate has affected the performance of the stock market in terms of market activity and liquidity. For all market activity and market liquidity factors, the association was negative both in the short and long term, in contrast to the Fisher effect.

**Adam and Tweneboah (2008)** examine Macroeconomic Factors and Stock Market Movement: Evidence from Ghana Period: 1991-2006 of Quarterly data, by employed Johansen's integration and VECM model to and they come up with the result there was a positive relationship between stock market indices and the inflation rate as well as Exchange rate.

**Alagidede and Panagiotidis (2010)** Use an imbalanced dataset from 1990 to 2007 to analyze the long-term relationship between stock and goods prices for six emerging market countries in Africa: Egypt, Kenya, Morocco, Nigeria, South Africa, and Tunisia. In both high-inflation and inflation-targeting African countries, including South Africa, these scholars examine whether equity markets protect investors from inflation. Using both parametric and non-parametric cointegration techniques, along with the impulse response function, they find evidence of a positive long-term relationship between stock and goods prices, with a point estimate of the elasticity of stock prices with respect to goods prices ranging from 0.015 (Tunisia) to 2.264 (South Africa).

**Aliyu (2011)** investigated the effects of inflation on stock returns and volatility in Ghana and Nigeria, two West African nations, using time series data. The study used the generalized autoregressive conditional heteroskedasticity (GARCH) model to evaluate the effects. The two countries' stock market volatility was found to be significantly impacted negatively by the inflation rate and its three-month average.

**Khumalo (2013)**, investigated inflation and stock price interactions in south Africa using data covering the period span from 1980 to 2010. He employed Auto-regressive Distributed Lag (ARDL) model and causality test in his analysis. He found that inflation exerted significant negative impact on stock prices in South Africa and unidirectional causation from inflation to stock prices.

According to **Yaya (2015)**, examine the validity of Fisher effect in ten African countries used an Autoregressive distributed lag (ARDL) approach and it use the deposit rate as a measure of nominal interest rate. The long-run results revealed that the full Fisher effect holds in Kenya and partially holds (less than one-for-one) in Cote d'Ivoire and Gabon. Conversely, the results suggest no evidence of the Fisher effect in other seven countries, namely; Benin, Cameroon, Gambia, Ghana, Nigeria, Senegal and South Africa.

**Adamu and Gbande (2016)** investigated how inflation affected stock returns for companies listed between 1996 and 2015 on the Nigerian Stock Exchange (NSE). By using ordinary least squares (OLS) regression analysis, they discovered that the inflation rate significantly increased NSE returns, indicating that stock market returns could be a useful strategy for protecting

Nigerians from inflation. These findings conflict with those of Ahmed and Igbinoia (2015) and Akani and Uzobor (2015). Monthly data spanning from 1995 to 2010 was used. The contrasting results may result from the various time periods that the investigations were conducted.

**Epaphra, Manamba. (2018)**, investigates how Tanzanian stock prices relate to macroeconomic factors such as the country's money supply, currency rate, inflation, and Treasury bill rate. Monthly time series data from January 2012 to December 2016 for ten businesses listed on the Dar es Salaam Stock Exchange is used in this article. Money supply and exchange rates have a beneficial impact on stock prices; according to the overall model regression results obtained using error correction models (ECM). The Treasury bill rate, on the other hand, typically has a negative impact on stock values.

**Oladosu et al. (2022)** examined the effects of macroeconomic factors on the performance of the Nigerian capital market. Covering Monthly time series data from 2000 to 2019 were used in the study. They employed utilization of Quintile regression mode and use money supply, exchange rate, consumer price index and prime lending rate as proxies for macroeconomic factors, while market capitalization for equities was used as proxy for Nigerian capital market performance. Inflation, measured by consumer price index had negative but insignificant effect on capital market performance in Nigeria. According to the study's findings, market capitalization equities measure the performance of the Nigerian capital market, and macroeconomic factors had a major impact on that performance.

**Ikeobi, (2024)**. By employed autoregressive distributed lag (ARDL), the study investigate the impact of inflation on stock market in Nigeria the period span from 2006 to 2020, the study also include other variables like treasury bill, broad money supply and exchange rate, and two US stock market indices, namely the S&P 500 Index and Dow Jones Industrial Average Index to see the impact on stock price. The finding yields, there is negative and insignificant relationship between inflation and stock price in both short run and long run. The treasure bill also shows a positive and insignificant relation with stock price. Whereas money supply shows a significant and negative relation with stock price in both short run and long run. The exchange rate also shows a positive and insignificant relation with stock price. The S&P 500 Index and Dow Jones

Industrial Average Index also show insignificantly positive and negative relation with stock price in Nigeria respectively.

### **2.2.3. Research gap**

The literature observes that a number of studies have examined at the connection between inflation and stock price in both developed and African markets. Nevertheless, their empirical findings have not been consistent. This study will contribute to the ongoing debate especially at this period when inflation has been on an upward trend using the most recent available data in selected African countries by fill the four major gaps from previous study. The findings can inform policymakers about the varying impacts of inflation on stock markets across different African countries, aiding in the formulation of tailored economic policies.

- \* Lack of interaction with other macroeconomic variables

Numerous African studies focus only on the connection between inflation and stock price. Ignoring other critical macroeconomic variables like deposit interest rate, GDP, and money supply, those variables also impact the relationship between inflation and stock price, so this study will fill the gap and incorporate those variables as control variables. To find out the unique effect of inflation on stock price and provide better reflects real world economic interaction, this is also in turn used for policymakers for implementing tailored inflation target policy.

- \* Lack of across country comparative analysis

The majority of empirical studies on the inflation-stock connection have focused on developed countries. In contrast, research on African stock exchanges remains limited and often fragmented. Most studies targeted individual countries or country by country approach (like South Africa, Nigeria, Kenya, and Ghana) and lacked a comparative approach. There is a scarcity of cross-country studies that take into account Africa's regional economic diversity, variation in inflation drivers, different monetary policies, and stock market development. So this research fills the gap analysis the effect of inflation on stock prices may vary across the countries.

- \* Empirical Gap

The fisher hypothesis assumes that stocks hedge against inflation by reflect in changes in nominal variables, however. Empirically inconsistent many African studies fail to critically engage with theoretical tension or fail to test alternative framework. This thesis analysis weather these selected countries provide to investor hedge against inflation across the selected countries.

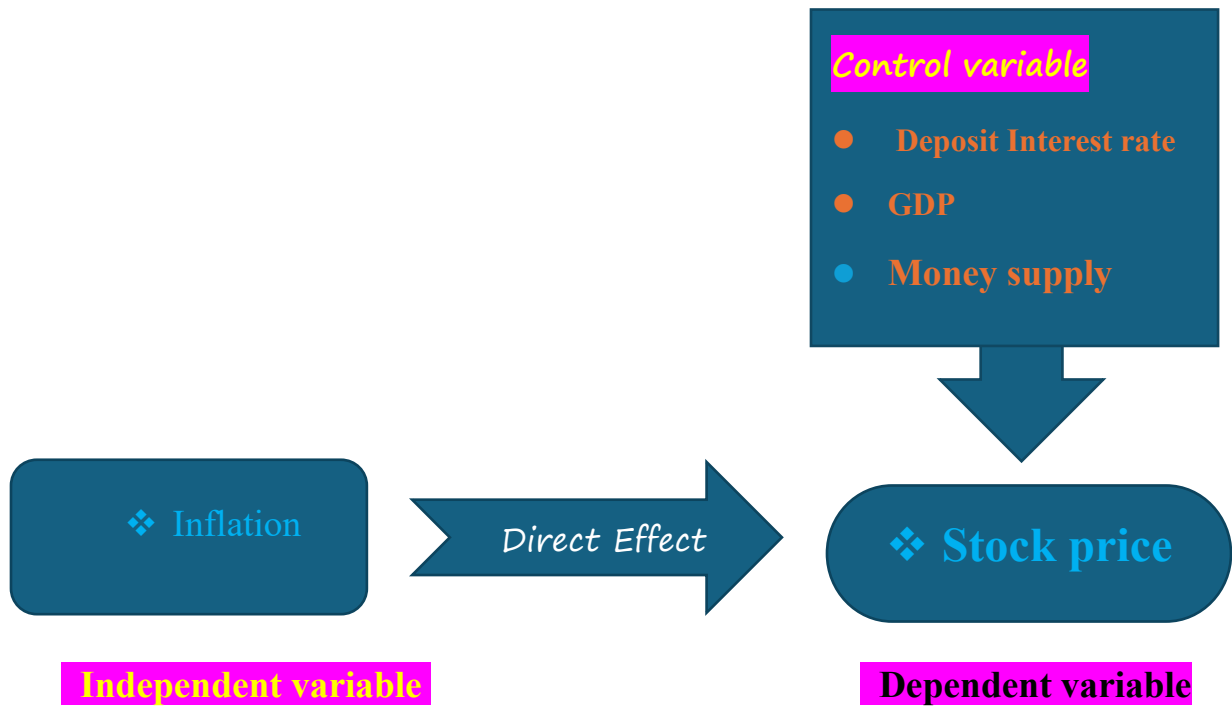
\* Methodological Gap

Numerous earlier research have relied on Johansson cointegrated models, which may requires all the variables must be integrated in first level or must be in  $I(0)$  at level ), and they do not test the relation at time framework of short-term and long-term. And other method like panel VAR and panel VECM, they also need for non-cointegrated  $I(1)$  time series variable, examine short-run dynamics and for cointegrated  $I(1)$  variable respectively. This study were fill these gaps by allowing a mixed integrated variables in  $I(0)$  OR  $I(1)$ , but note in  $I(2)$  , by doing so it examining how inflation affects stock prices in a selected African country using panel ARDL model framework via mean group (MG), pooled mean group (PMG), and dynamic fixed effect (DFE) as well as the model estimate simultaneously short-run and long run relationship and examine the significance to test whether the selected African country may provide hedge against inflation.

### **2.3. Conceptual Framework**

Understanding how these independent variables (inflation), and control variables (other major macroeconomic variable) affect the stock market prices across selected African countries, is demonstrated by the study. Inflation is the primary explanatory factor that influences stock prices. To capture the direct effect of inflation on stock price, while other macroeconomic factors such as GDP, money supply, and deposit interest rate act as control variables.

The conceptual framework diagram is presented below;



**Figure 1 Conceptual Framework**

Source; Authors own construct

## **CHAPTER THREE: METHODOLOGY**

This chapter outlines the systematic approach and procedures employed to conduct the study. It also serves as a blueprint, details about how data was collected, analyzed, and interpreted to address the specific objectives of the study. This section is important for ensuring the validity and reliability of the research finding.

### **3.1. Research Design**

The overall method for relating the conceptual research challenges to the relevant and feasible empirical research is known as research design. It is an investigation that offers precise guidance for study processes (Asenahabi, 2019). The relationship between variables, or more precisely, the impact of one variable on another, is examined by causal research. For this study, quantitative and causal research designs were used. The causal research design was taken into consideration for the study in order to determine the effect of inflation on stock prices in selected African countries and that it has the advantage of being reasonably priced. It examines the connections between variables in terms of cause and effect (Griffiths and Tenenbaum, 2009).

### **3.2. Target Population**

The target population includes African country with functional stock exchange and available data for macroeconomic as well as stock market data during the study period. According to African Security Exchange Association in 2022, there were 30 African exchanges represented the capital markets of 39 countries.

### **3.3. Research Sample and Technique**

According to Kothari (2004), the quantity that needs to be chosen from the entire population in order to form a sample is known as the sample size. This thesis employs a purposive sampling technique. Based on criteria like; the availability of data, geographical representation, and consideration of the diverse economy and inflation profile. The selected sample countries were made across the four regions of Africa (East Africa: Kenya and Tanzania; West Africa: Nigeria and Ghana; South Africa: South Africa and Botswana; and North Africa: Morocco and Egypt) and specifically select eight country from all region for comparative analysis and better understanding of inflation's heterogeneous effect on stock price. Adam & Tweneboah, (2008),

used a similar approach, in addition the cutoff date used 16 years of data from 2008 to 2023 in order to take into account updated information and capture multiple economic cycles.

### **3.4. Data Type and Sources**

The research used 16 yearly secondary data covers from 2008 to 2023, macroeconomic data which was mostly come from World Bank development indicator data files and central bank of each country. Variables like GDP, inflation, deposit interest rates, broad money supply. And the stock price (All-Share Index) are taken from individual countries stock exchange annual report of their homepage, central bank of each county as well as the capital and security market authority of each country. The selection of those variables was based on empirical reviews and prior research experience For instance, Nairobi all share index from Kenya, GSE- Composite index (All share Index) from Ghana, all share index from Dar es Salaam stock exchange of Tanzania, Johannesburg stock exchange (JSE) All Share Index from south Africa, Botswana Stock Exchange (BSE), Casablanca Stock Exchange (CSE), Egyptian Exchange (EGX), Nigerian Stock Exchange (NSE).

### **3.5. Research Method**

The term quantitative research refers to the collection and analysis of numerical data. Finding trends and averages, predicting outcomes, assessing causal relationships, and extrapolating results to broader populations are all possible uses for it. The quantitative research methods were used in this investigation.

### **3.6. Data Analysis**

Panel data analysis is a sophisticated statistical method for analyzing time-series and cross-sectional data, according to their definition. They should ideally provide long-term, repeated measurements of a certain number of variables on observable units, such as individuals, firms, and countries, Xu, Lee, and Eom (2007). Panel data analysis incorporates both descriptive and inferential approach; each has a unique role in understanding and interpreting data that span across time and entities. Descriptive analysis often provides a foundational understanding of the dataset by summarizing its main feature without making causal inferences. Whereas econometric analysis aiming to build causal relationships and make inference.

Using both descriptive and inferential statistics, the data were examined. Descriptive statistics measure and explain the mean, standard deviation, minimum and maximum value, whereas and econometric procedures to ascertain the direction of interaction between the variables under examination. The model was then estimated by using panel ARDL estimation method, and interpretations of major findings were made. Robustness of the model were performed on the data and confirmed to be sufficiently valid to draw relevant conclusions.

### 3.6.1. Descriptive statistics

Descriptive statistics is quantitatively show the summery of minimum value, maximum value, mean and standard deviation. To understand the deviation of one countries from another countries and within country itself. This study show the panel descriptive analysis as compared the summery of listed earlier within and between countries.

### 3.6.2. The Econometrics Analysis

#### 3.6.2.1. Variable Description and Expected Sign

**Table 1 Variable of the study**

<b>All share index</b>	<b>ASI</b>	Dependent variable		It is the stock market index that shows the worth of the stock market and is calculated by taking the closing price of stocks, typically at the end of the day.
<b>Inflation</b>	<b>CPI</b>	Independent variable	Positive	CPI, which is used to measured inflation, reflects the price change occur in group of goods and services over a certain period.
<b>Deposit Interest rate</b>	<b>DIR</b>	Control variable	Negative	It represent average interest rate paid in financial institution on deposit account
<b>Gross domestic product growth rate</b>	<b>GDP</b>	Control variable	Positive	GDP, which is measured by the added value of products and services over a given time period, is a crucial indication of economic growth.
<b>Broad Money Supply</b>	<b>BMS</b>	Control variable	Positive	It represents the overall amount of money circulated in the economy, including

				currency and deposit.
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Source: Authors construct

### 3.6.2.2 Build the empirical model

In order to build the empirical model this thesis set the seven steps. The following steps will be conducted for the purpose of clear analysis each and every step of empirical model building

#### Step One: Perform Panel Unit Root Test

In econometric analysis involving panel data and time series data, before any kind of econometric estimation takes place, the collected data should be tested for their stationarity. Especially when using panel ARDL estimation model the stationary case is the pre request that the variable must be a mixed integration order (the dependent variable must be stationary at first difference (1), and all the independent variable must be stationary at level or at first difference, but none of variable is second order or higher level difference)  $I(0)$  or  $I(1)$ , but none of  $I(2)$  is the necessary pre assumption of the model.

The study uses two panel unit root test of Levin-Lin-Chu (LLC) and Im-Pesaran-Shin (IPS) in order to test stationarity of each variable. The former assumes common unit root process where as the later assume and allow individual unit root process respectively. For robust result this study uses both tests. This test is very important to do because if the variables in the regression model are higher order  $I(2)$ , use of Panel ARDL model will not be valid and lead to miss specification of the model as well as spurious result.

#### Step Two: Correlation Analysis

The correlation Analysis is carried out to find out the connection between dependent and independent variable, in this case between the inflation, deposit interest rate, GDP, and Broad money supply and stock price. To understand the relationship between these variables, as indicated earlier, it will be better to check before performing the estimation techniques

#### Step Three: Optimal Lag Selection

Optimal lag length in a panel ARDL (Autoregressive Distributive Lag) model is the process of identifying the appropriate lags which included in the dependent and independent variable for the purpose of specify the correct model specification.

#### **Step Four: Model Specification**

Model specification in a Panel ARDL (Autoregressive Distributed Lag) model includes selecting appropriate variable, identify lag length and select the appropriate estimator (PMG, MG, and DFE) in order to capture the short term and long-term effect of the variables over time and across the countries. This study used the panel Autoregressive distributed lagged (ARDL) model. The estimated model is specified according to Pesaran et al. (1999).

$$Y_{it} = \vartheta_i (Y_{i,t-1} - \gamma_i X_i) + \sum_{j=1}^p \alpha_i Y_{i,t-j} + \sum_{j=1}^q \beta_{ij} X_{i,t-j} + \theta_i + \epsilon_{it}$$

**Where:**  $Y_{it}$  is the dependent variable,  $X_{i,t}$  is a  $K \times 1$  independent variable that are  $I(0)$  or  $I(1)$ ,  $\alpha_i$  is the coefficient of the lagged dependent variable,  $\beta_{ij}$  are the coefficient of independent variables,  $\theta_i$  is the unit specific fixed effect and  $\epsilon_{it}$  is the error term.

The estimation Error correction model (ECM) and short run dynamic is specified based on Pesaran et al. (1999).

$$\Delta Y_{it} = \sum_{j=1}^{p-1} s_i \Delta Y_{i,t-j} + \sum_{j=1}^q k_{ij} \Delta X_{i,t-j} + \vartheta_i (Y_{i,t-1} - \gamma_i X_i) + \theta_i + \epsilon_{it}$$

ECM is Error correction model =  $Y_{i,t-1} - \gamma_i X_i$ ,  $\vartheta_i$  is the group specific speed of adjustment coefficient ( $\vartheta_i < 0$ ), which implies variation from the equilibrium, and  $k_{ij}$  are the short run dynamic coefficient of the model's adjustment long run equilibrium,  $\gamma_i$  is a vector of long run coefficients. ECM is associated with the long-term estimates.

#### **Step Five: Estimate the Model**

Estimating a Panel Autoregressive Distributed Lag (Panel ARDL) model allows researchers to analyze both short-run and long-run dynamics among variables across multiple cross-sectional units over time. Estimate the model by using mean group (MG), pooled mean Group (PMG), and Dynamic fixed effect (DFE). This approach is particularly useful when dealing with variables integrated of order  $I(0)$  and  $I(1)$ , but not  $I(2)$

### **Step Six: Perform Hausman Test**

The Hausman tests compare which estimation method will best to estimate the model there are there method which is mean group (MG), pooled mean Group (PMG), and Dynamic fixed effect (DFE). This thesis were employed the pooled mean Group (PMG) estimates and the Dynamic fixed effect (DFE). Estimator to determine whether the assumption of long run parameter homogeneity alien with my objective of the study. The former method deal with it is an intermediate approach, as compared with DFE and MG. unlike MG, it constraints long run coefficient to be the same. Unlike DFE, it allows short –run coefficient and error variances to differ across the group. PMG is based on a lower degree of heterogeneity because it imposes homogeneity only in the long run coefficient but allow heterogeneity in the short-run coefficient.

### **Step Seven: Robustness Test**

This regression examines if the long-term associations found in Panel ARDL estimation remain true when using robust (Driscoll-Kraay) standard errors in a more generic pooled OLS framework. To put it simply, do the signs and significance levels of the important variables hold true when using a different estimating technique?

Regression with Driscoll-Kraay provides a cross-sectional (special) correlation, hetroskedastic, and autocorrelation consistent standard error. Driscoll-Kraay standard errors are robust to very general forms of cross-sectional (spatial) and temporal dependence when the time dimension becomes large. There are no limitations on the limiting behavior of the number of panels when using this nonparametric method of standard error estimation. As a result, even when the number of panels is significantly greater than T, the cross-sectional dimension size in finite samples does not limit practicality. Driscoll and Kraay (1998) cired in Hawitibo et al (2022).

## CHAPTER FOUR: DATA ANALYSES AND DISCUSSION

### 4.1. Descriptive Statistics

The dataset is balanced and compiled from reliable secondary sources, ensuring consistency and comparability across countries and time. The variables include the stock market index (ASI), consumer price index (CPI), deposit interest rate (DIR), gross domestic product growth rate (GDPGR), and broad money supply (BMS). As shown in Table 2, the results report the mean, between-country and within-country standard deviations, as well as the minimum and maximum values for each variable. These descriptive measures give a preliminary indication of the variation and distribution patterns in the data, which help assess its suitability for panel data analysis and provide initial insights into the economic diversity across the sampled countries.

**Table 2 summary of descriptive statistics**

<b>Variable</b>	<b>Mean</b>	<b>standard deviation Between</b>	<b>standard deviation within</b>	<b>Minimum value</b>	<b>Maximum value</b>
<b>ASI</b>	15,63576	17,227.9	10,163.91	1173.53	79,476.6
<b>CPI (%)</b>	8.85	4.69	5.03	0.30	38.11
<b>DIR (%)</b>	7.26	2.93	1.82	1.43	17.06
<b>GDPGR (%)</b>	3.9	1.49	3.37	-14.14	14.06
<b>BMS (%)</b>	52	31.99	4.62	19.74	128.86

Source: Authors research data output

Table 2 presents the summary of descriptive statistics of the key variables used in the study. With a considerable degree of variation across nations, the average stock market index (ASI) stands at 15,636, variation between country and within country is 17,227.9 and 10,163.91 respectively. The maximums and minimum value of stock market index (ASI) is 79,476.6 and 1173.53, it also indicates variations in market size and performance. Variability in stock market development may have an impact on how inflation and other macroeconomic factors impact stock performance in different countries.

The average consumer price index (CPI) was 8.85%; variation between country and within country is 4.69% and 5.03% respectively. In implies there is a moderate variation across the country over time. The maximums and minimum value of consumer price index (CPI) is 38.11 % and 0.30 %, this indicates some countries had very low inflation, while others reached high inflation levels. This may cause differing impacts on stock prices depending on each country's monetary policy effectiveness and market structure.

The average Deposit interest rates (DIR) were 7.26%; variation between country and within country is 2.93% and 1.82% respectively. In implies there is a moderate variation across the country over time. The maximums and minimum value of Deposit interest rates (DIR) is 17.06 %, and 1.42 %. Such variations could influence investors' portfolio choices between bank deposits and equities. The average the broad money supply (BMS), were 52 %; variation between country and within country is 31.99 % and 4.62% respectively. In implies there is a moderate variation across the country over time. The maximums and minimum value of broad money supply (BMS), is 128.86 %, and 19.74 %. Overall, the observed cross-country and temporal variations justify the use of panel data techniques, as they allow the study to capture both individual country characteristics and common regional dynamics in explaining the relationship between inflation and stock market performance in Africa.

#### 4.2. Panel unit root test result

Assessing the stationary properties of the variable is the pre requesting test before estimating the panel ARDL model to avoid spurious regression result. The panel data set include eight sample countries cover the time period of 2008 to 2023. Both Liven-Lin-Chu (LLC) and Im-pesaran-Shin (IPS) panel unit root test were employed, these tests check whether the variables have a unit root problem or stationary for the purpose of proceed with panel ARDL model check none of variable are in I (2), but it will be in I (0) or I (1). The result shows a summary of table as the following.

**Table 3 panel unit root test result**

Name of variable	Liven-Lin-Chu (LLC) P-Value	Im-pesaran-Shin (IPS) P-Value	Stationary at level	Stationary at first difference with P-Value	Order of integrated
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<b>ASI</b>	0.4300	0.2899	No	Yes LLC(p=0.0014) IPS(P=0.0000)	1(1)
<b>CPI</b>	0.2368	0.1144	No	Yes LLC(P=0.0000) IPS(P=0.0000)	1(1)
<b>GDP GR</b>	0.0000	0.0000	Yes	-	1(0)
<b>DIR</b>	0.0000	0.0102	Yes	-	1(0)
<b>BMS</b>	0.0044	0.10451	Yes	-	1(0)

Source: Authors research data output

Based on the unit root output, the result shows a mixture of integrated order of variable, and none of the variable in  $I(2)$  this is first confirmation to proceed to next panel ARDL framework step.

### 4.3. Correlation Matrix result

To understand the potential relationship and direction of the associated variables is essential before the main econometric analysis. The following below table shows the correlation between variables.

**Table 4 correlation matrix result**

	<b>ASI</b>	<b>CPI</b>	<b>GDP GR</b>	<b>DIR</b>	<b>BMS</b>
<b>ASI</b>	1.0000				
<b>CPI</b>	0.0869	1.0000			
<b>GDP GR</b>	-0.2749	0.0693	1.0000		
<b>DIR</b>	-0.1084	0.5337	0.2025	1.0000	

<b>BMS</b>	0.1343	-0.3014	-0.2312	-0.4623	1.0000
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Source: Authors research data output

### **Interpretation of the result**

Stock price Index, shows a weak positive correlation with Broad money supply (0.1343) and inflation (0.0869), and it indicate inflation and Broad money supply may have positive relationship with stock performance. It also shows a weak negative correlation with Gross domestic product growth rate (-0.2749) and deposit interest rate (-0.1084) it indicates higher economic growth and higher deposit interest rate may have stock market performance, especially higher deposit interest rate may lead to lower investment, this in turn decrease the stock price.

Inflation rate (consumer price index), shows a weak positive correlation with Gross domestic product growth rate (0.0693) and moderate correlation with deposit interest rate (0.5337) this indicate inflation pressure may increase by higher interest rate. It also shows a weak negative correlation with broad money supply (-0.3014) monetary expansion may reduce inflation.

GDP Growth rate, a weak positive correlation with deposit interest rate (0.2025), this implies a higher interest rate leads to economic growth. It also shows a negative correlation with broad money supply (-0.2312).

Deposit interest rate, Shows a negative correlation with Broad money supply (-0.4623), it indicate increase interest rate associated with contradictory monetary policy to reduce money supply. The correlations are generally low to moderate, none of the variable show above 0 .80, so there is no Multicollinearity appears in the independent variables.

### **4.4. Optimal Lag Selection**

The sample size of the data is small; mostly use one lag length, because in small sample uses more lags leads to eliminating the long run relationship. The panel ARDL estimation lag was panel ARDL (1, 1, 1, 1, 1). This indicates the first is the lag of the dependent variable, which is the stock price index(ASI), the remaining is the lag of the independent variable, which is the lag of the inflation rate (CPI), deposit interest rate (DIR), Gross Domestic product growth rate (GDP GR) , and Broad money Supply (BMS) respectively.

#### 4.5. Estimate the Model

Panel ARDL model framework is estimated the parameter via pooled mean group (PMG) and dynamics fixed effect (DFE) approach in order to test the researcher's hypothesis. The estimated parameter is interpreted after confirming the appropriate estimation approach by performing Hausman test. The PMG and DFE result were showing in Appendix (4 and 5) respectively.

#### 4.6. Perform Hausman test

**Table 5 Hausman test compare DFE with PMG**

Variable	PMG coefficient	DFE coefficient	Difference
CPI	0.116363	0.228393	-0.011203
DIR	0.0001418	0.0460071	-0.045865
GDP GR	-0.03854	-0.0207752	-0.017678
lnBMS	1.02068	-0.182497	1.20318

Source: Authors research stata output

H0: DFE and PMG estimates are significantly different. PMG more efficient

H1: Null is not true

Decision rule: if P-value < 0.05 rejects H0 and goes with DFE estimator.

The above Hausman result see from Appendix (6) the  $\chi^2(4) = 0.42$ , and  $p > \chi^2 = 0.9808$  which is the P-value  $> 0.05 = 0.9808$ . This impels we cannot reject the Null hypothesis that PMG is more efficient estimator than DFE. The PMG is the preferred model, as it always for short-run heterogeneity while maintain long-run homogeneity, which is appropriate for estimating the panel ARDL model in across the country in this study.

#### 4.7. PMG estimation result across the country

The PMG result across the country was interpreted in three sections that include the long-run coefficient, the error correction term, and short run dynamics as the following below table.

#### 4.7.1 Long-run coefficient (Homogeneous across the country)

**Table 6 Long-run coefficient of PMG estimation result**

Variables	Coefficient	Zt stat	P-value	Level of significance
<b>Inflation</b>	0.0116363	0.00499	0.020	**
<b>Deposit interest rate</b>	0.001418	0.0170	0.993	insignificance
<b>Gross domestic product growth rate</b>	-0.03845	0.0087	0.000	***
<b>Broad money supply</b>	1.020	0.2590	0.000	***

Source: Authors research data output

Note \*\*\* implies  $p < 0.001$  at 1 % level of significant, \*\*  $p < 0.05$  at 5 % level of significant, \*  $p < 0.10$  at 10 % level of significant

Interpretation

$$\ln(ASI)_t = 0.0116CPI_{t-1} + 0.0001DIR_{t-1} + 0.03845GDPGR_{t-1} + 1.027\ln(BSM)_{t-1} + E_{ti}$$

Based on the result from table 6 the following interpretations were given below.

**Inflation (CPI):** 0.0116363 (P-value =0.020), result from table 6 shows on average inflation (CPI) was positive and significantly impact on stock price in the long run, indicates asset value may rise with inflation over time. A one unit increase in consumer price index (CPI) leads to approximately 1.16 % increase in stock price in the long run across the country. This suggests that increase in Consumer Price Index (CPI) are associated with increase in stock price, this is theoretically explained in fisher effect. And empirically support by different studies like Akmal (2007), Anari and kolari (2001) and contrary result with Omran and Pointon (2001), Geysers and

Lowies (2001), Geetha et al (2011). Deposit interest rate (DIR): 0.00014(P-value =0.993), result from table 6 shows on average Deposit interest rate (DIR) was insignificantly impact on stock price in the long run across the country.

Gross domestic product growth rate (GDPGR): -0.03845 (P-value = 0.000), result from table 6 shows Gross domestic product growth rate (GDPGR) was on average negative and statistically significant ; A one unit increase in Gross domestic product growth rate leads to 3.85 % decrease in stock price in the long run across the country. This suggested that the benefit of economic growth may not be accruing to shareholder, possibly due to factors like inefficient capital allocation or profits being reinvested rather than distributed. This in turn may reduce stock price. Broad money supply (BMS): 1.020683(P-value =0.000), result from table 6 shows there was on average positive and statistically significant; A one percent increase in broad money supply rises stock price by 1.02%. This suggest that increase in broad money supply are associated with increase in stock price, this also enhance liquidity in the financial system, providing investors with more capital to allocate, this in turn leads to higher demand for financial asset which also lead to increase stock price.

#### 4.7.2. Error correction term

Table 7 Error correction term of PMG estimation result

Country name	Error correction coefficient	term	P-value	Significance level
<b>Egypt</b>	-0.3868		0.070	*
<b>Morocco</b>	-0.5010		0.000	***
<b>Tanzania</b>	-0.8377		0.000	***
<b>Kenya</b>	-0.0670		0.642	insignificant
<b>Nigeria</b>	0.6460		0.012	**
<b>Ghana</b>	-1.20		0.000	***
<b>South Africa</b>	-0.2142		0.094	*

<b>Botswana</b>	-0.0125	0.889	Insignificant
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Source: Authors research stata output

Note \*\*\* implies  $p < 0.001$  at 1 % level of significant, \*\*  $p < 0.05$  at 5 % level of significant, \*  $p < 0.10$  at 10 % level of significant

#### 4.7.3. Short-run Dynamics (Heterogeneous across countries)

Table 8 Short-run Dynamics result summery

Country name	Inflation effect (CPI)	P-value	Deposit interest rate (DIR)	P-value	Road money supply (BMS)	P-value	GDP growth rate (GDPGR)	P-value
Egypt	0.078	0.003	-0.096	0.399	-2.48	0.096	0.0235	0.712
Morocco	-0.032	0.005	-0.441	0.001	-1.674	0.027	-0.018	0.014
Tanzania	0.008	0.858	-0.311	0.007	-3.425	0.207	0.10	0.225
Kenya	0.005	0.649	0.034	0.182	1.762	0.026	0.032	0.070
Nigeria	0.022	0.262	0.019	0.505	-0.397	0.603	-0.006	0.818
Ghana	0.035	0.000	0.005	0.787	0.268	0.342	-0.0008	0.94
South Africa	0.069	0.004	-0.015	0.712	0.276	0.836	-0.011	0.264
Botswana	-0.011	0.264	0.042	0.223	-0.197	0.523	-0.001	0.55

Source: Authors research stata output

Note \*\*\* implies  $p < 0.001$  at 1 % level of significant, \*\*  $p < 0.05$  at 5 % level of significant, \*  $p < 0.10$  at 10 % level of significant

#### Interpretation

The whole interpretation is based on table 7 and table 8. Each country has its own short-run coefficients and adjustment speed (ECT). Below are the full PMG equations for all eight

countries and interpreted it across the country in order to understand the impact of inflation on stock price across the eight countries.

### **PMG result for Egypt**

$$\ln(\text{ASI})_t = -0.387\text{ECT}_{t-1} + 0.078\text{CPI}_{t-1} - 0.096\text{DIR}_{t-1} + 0.024\text{GDPGR}_{t-1} - 2.408\ln(\text{BSM})_{t-1} + \text{Et}$$

This equation models indicates the short-run dynamics of Egypt's All Share Index (ASI), and capturing how deviations from the previous period to long-run equilibrium and changes in key macroeconomic variables affect the stock market. The Pooled Mean Group (PMG) estimation result for Egypt's All Share Index (ASI) Error correction term indicates that approximately 38.7% of any deviation from the previous period to long-run equilibrium is corrected in the next period, indicating a moderate speed of adjustment towards equilibrium.

In the short-run, a one unit increase in Egypt's Consumer Price Index (CPI) leads to a 7.8 % immediate rise in stock price. This implies that, in the short run higher inflation may boost stock prices, possibly due to increased asset reallocation, which implies that during periods of inflation, real returns on fixed-income investments like bonds may decline. Investors seeking to preserve their purchasing power might shift funds into equities, perceived as offering better inflation hedging, thereby driving up stock prices. As well as inflation expectations which imply if investors expect inflation will continue to rise, they must invest in hedges against expected currency depreciation and rising price.

Whereas a one percent increase in Egypt's broad money supply led to a 2.408 % immediate decline in stock price. It may seem counterintuitive, as traditional economic theory often suggests that increased money supply boosts liquidity and leads to an increase in stock prices, but this did not happen in Egypt. It may be due to potential monetary tightening via contradictory monetary policy, which raises interest rates and leads to the cost of company borrowing. This in turn leads to decreased corporate profit and stock price and diminished investor confidence. This is because of investor's expectation and perception of this monetary expansion is due to the government facing a budget deficit. This also leads to decline investors' confidence as well as a flight of capital. However, other macroeconomic variables like gross domestic product growth

rate and deposit interest rate does not have significance effect in the short run Egypt's stock price market.

### **PMG result for Morocco**

$$\ln(\text{ASI})_t = -0.501\text{ECT}_{t-1} - 0.032\text{CPI}_{t-1} - 0.441\text{DIR}_{t-1} - 0.019\text{GDPGR}_{t-1} - 1.674\ln(\text{BSM})_{t-1} + E_t$$

This equation models indicates the short-run dynamics of Morocco's All Share Index (ASI), and capturing how deviations from the long-run equilibrium and changes in key macroeconomic variables affect the stock market. The Pooled Mean Group (PMG) estimation for Morocco's All Share Index (ASI) Error correction term indicates that approximately 50.1% of any deviation from the long-run equilibrium is corrected in the next period, indicating a strong speed of adjustment towards equilibrium. In the short-run, a one unit increase in Consumer Price Index (CPI) leads to 3.2 % immediate decrease in stock price, implying that higher inflation may erode investor confidence and reduce stock valuations. Similarly, a one percent rise broad money supply leads to 1.67 % decrease in stock price. As well as a one unit rise in the deposit interest rate lead to , gross domestic product growth rate, results in 44.1 %, 1.8 %, and 1.67 % decrease in stock price in morocco stock market respectively. These findings underscore the nuanced and sometimes counterintuitive relationships between macroeconomic variables and stock market performance in Morocco.

### **PMG result for Tanzania**

$$\ln(\text{ASI})_t = -0.838\text{ECT}_{t-1} + 0.008\text{CPI}_{t-1} - 0.3111\text{DIR}_{t-1} - 0.102\text{GDPGR}_{t-1} - 3.425\ln(\text{BSM})_{t-1} + E_t$$

This equation models indicates the short-run dynamics of Tanzania's All Share Index (ASI), and capturing how deviations from the long-run equilibrium and changes in key macroeconomic variables affect the stock market. The Pooled Mean Group (PMG) estimation for Tanzania's All Share Index (ASI) Error correction term indicates that approximately 83.8% of any deviation from the long-run equilibrium is corrected in the next period, indicating a fast speed of adjustment towards equilibrium. In the short-run, a one unit increase in deposit interest rate leads to 31.1 % immediate decrease in stock price, implying that higher deposit interest rates make

saving in banks more attractive relative to investing in stocks. Investors shift from equities to deposits. Whereas other macroeconomic variable like inflation rate, gross domestic product growth rate, and broad money supply may not have significant effect on stock price in the short run.

### **PMG result for Kenya**

$$\ln(\text{ASI})_t = -0.067\text{ECT}_{t-1} + 0.005\text{CPI}_{t-1} + 0.034\text{DIR}_{t-1} + 0.032\text{GDPGR}_{t-1} + 1.762\ln(\text{BSM})_{t-1} + \text{Et}$$

This equation models indicates the short-run dynamics of Kenya's All Share Index (ASI), and capturing how deviations from the long-run equilibrium and changes in key macroeconomic variables affect the stock market. The Pooled Mean Group (PMG) estimation for Kenya's All Share Index (ASI) Error correction term indicates that approximately 6 % and insignificant adjustment towards equilibrium. In the short-run, a one unit increase in gross domestic product growth rate leads to 3.2 % immediate increase in stock price in Kenya. Similarly, a one percent increase in broad money supply leads to 2.6 % immediate increase in stock price in Kenya. Whereas other macroeconomic variables like inflation rate which is measured in consumer price index (CPI) and deposit interest rate have not significant short run effect on stock price in Kenya.

### **PMG result for Nigeria**

$$\ln(\text{ASI})_t = -0.6460\text{ECT}_{t-1} + 0.022\text{CPI}_{t-1} + 0.019\text{DIR}_{t-1} - 0.006\text{GDPGR}_{t-1} - 0.397\ln(\text{BSM})_{t-1} + \text{Et}$$

This equation models indicates the short-run dynamics of Nigeria's All Share Index (ASI), and capturing how deviations from the long-run equilibrium and changes in key macroeconomic variables affect the stock market. The Pooled Mean Group (PMG) estimation for Nigeria's All Share Index (ASI) Error correction term indicates that approximately 64.60% of any deviation from the long-run equilibrium is corrected in the next period, indicating a fast speed of adjustment towards equilibrium. In the short-run, unfortunately all macroeconomic variables included in this model have no significant impact on Nigeria stock price during the study period. This indicates there is only long run effect. This result is consistent with Ikeobi (2024) inflation has no significant relation with stock price in Nigeria, but inconsistent with money supply.

### **PMG result for Ghana**

$$\ln(\text{ASI})_t = -1.208\text{ECT}_{t-1} + 0.035\text{CPI}_{t-1} + 0.005\text{DIR}_{t-1} + 0.001\text{GDPGR}_{t-1} + 0.268\ln(\text{BSM})_{t-1} + E_t$$

This equation models indicates the short-run dynamics of Ghana's All Share Index (ASI), and capturing how deviations from the long-run equilibrium and changes in key macroeconomic variables affect the stock market. The Pooled Mean Group (PMG) estimation for Ghana's All Share Index (ASI) Error correction term indicates that approximately 1.2% of any deviation from the long-run equilibrium is corrected in the next period, indicating a very fast speed of adjustment towards equilibrium. In the short-run, a one unit increase in consumer price index (CPI) leads to 3.5 % immediate increase in stock price of Ghana. Whereas all the control variables included in this model have no significant impact on Ghana stock price during the study period.

### **PMG result for South Africa**

$$\ln(\text{ASI})_t = -0.214\text{ECT}_{t-1} + 0.069\text{CPI}_{t-1} - 0.015\text{DIR}_{t-1} - 0.011\text{GDPGR}_{t-1} + 0.276\ln(\text{BSM})_{t-1} + E_t$$

This equation models indicates the short-run dynamics of South Africa's All Share Index (ASI), and capturing how deviations from the long-run equilibrium and changes in key macroeconomic variables affect the stock market. The Pooled Mean Group (PMG) estimation for South Africa's All Share Index (ASI) Error correction term indicates that approximately 21.4% of any deviation from the long-run equilibrium is corrected in the next period, indicating a moderate speed of adjustment towards equilibrium. In the short-run, a one unit increase in consumer price index (CPI) leads to 6.9 % immediate increase in stock price of South Africa. Whereas all the control variables included in this model have no significant impact on South Africa stock price during the study period.

### **PMG result for Botswana**

$$\ln(\text{ASI})_t = -0.013\text{ECT}_{t-1} - 0.011\text{CPI}_{t-1} + 0.042\text{DIR}_{t-1} - 0.002\text{GDPGR}_{t-1} - 0.197\ln(\text{BSM})_{t-1} + E_t$$

This equation models indicates the short-run dynamics of Botswana’s All Share Index (ASI), and capturing how deviations from the long-run equilibrium and changes in key macroeconomic variables affect the stock market. The Pooled Mean Group (PMG) estimation for Botswana's All Share Index (ASI) Error correction term indicates that approximately 1.3% and insignificant adjustment towards equilibrium. In the short-run, unfortunately, during the study period, the price of Botswana's stock was not significantly impacted by any of the macroeconomic variables included in this model.

#### 4.8. Robustness result

This regression checks if the long-run relationships observed in PMG Panel ARDL estimation hold under a more general pooled OLS framework with robust (Driscoll-Kraay) standard errors.

Table 9 Comparison Summary: PMG Long-Run (Hypothetical) vs. Robustness Check

<b>Variable name</b>	<b>Pooled OLS(Driscoll-kraay)</b>	<b>P-value</b>	<b>PMG long run result</b>	<b>P-value</b>
<b>CPI</b>	0.3830	0.050	0.0116	0.020
<b>DIR</b>	-0.0896	0.044	-0.0001	0.993
<b>GDPGR</b>	-0.0731	0.017	-0.038	0.000
<b>lnBMS</b>	0.571	0.000	1.02	0.000

Source: Authors research stata output

The findings from table 9 shows there was pooled OLS regression with Driscoll-Kraay standard errors largely consistent with the PMG estimates. Inflation and broad money supply both show significant and positive effects on stock prices in both models, confirming the robustness of these relationships. GDP growth also maintains a significant negative effect across estimators. However, the deposit interest rate is significant only in the Driscoll-Kraay model and not in the PMG estimation, suggests that its influence may be short-term or vary across countries and it is limited effect over time (in long term). Overall, the consistency of key variables affirms the reliability of the Panel ARDL framework used in this study.

## **CHAPTER FIVE: CONCLUSION AND RECOMMENDATION**

### **5.1. Conclusion**

This study analyzed the impact of inflation on stock price as well as the role of other macroeconomic variables in the stock price for the selected eight African countries span from 2008 to 2023; Egypt, Morocco, Tanzania, Kenya, Nigeria, Ghana, South Africa, and Botswana by using the most recent methodology of pooled mean group (PMG) estimator within a panel ARDL framework in order to capture the long-run homogeneity and short-run heterogeneity across these selected countries.

In long-run, the result shows there was a significant and positive effect of Inflation on stock prices across the countries; this implies that, over time, stock prices in these selected African countries tend to rise in response to inflation, and this idea was consistent with the Fisher effect Hypothesis, which posits that equities act as a partial hedge against inflation because of less than one to one approach (the coefficient of inflation is less than one). Similarly, the finding of the study shows among other macroeconomic variables broad money supply has a significant and positive effects on stock prices, this also indicates it liquidity-driven investment. Conversely, GDP shows a significant and negative effect on stock price. This is possibly weak financial market linkage. But, the deposit interest rate has no long-run significant effect. This indicates there is limited influence of interest on the long run relationship.

The majority of the error correction terms (ECTs) across the countries was negative except for Kenya, indicating that following short-term shocks happened in the independent variables (inflation, deposit interest rate, GDP growth rate, and broad money supply) causes the stock prices return to long-term equilibrium. However, in Kenya it shows positive this means the Stock market in Kenya does not adjust properly to restore long-run equilibrium after a shock instead they move further away from it in the next period. Botswana also shows insignificant effect this implies moves further away from it in the next period. And adjustment speeds vary across the country.

In short-run, it was varying significantly across countries, understanding the heterogeneity effect across the country. The short-run dynamic effect shows a significant positive short-run effect of inflation on stock prices, especially in Egypt, Ghana, and South Africa this also suggesting that equities in these countries may also provide inflation protection in the short run. Whereas Morocco shows a significant and negative effect on stock price in short-run, this implies inflation may erode investors' confidence in short-run. Countries like Tanzania, Kenya, Nigeria, and Botswana do not have statistically significant influence of inflation on stock price in short-term.

Other macroeconomic variables like deposit interest rate has significant and negative effect on stock price in Morocco and Tanzania, but has not significant effect in other countries. GDP growth rate has significant and negative effect on stock price in Morocco and weak effect in Kenya. Broad money supply has also significant and negative effect on stock price in Egypt and Morocco, but has significant and positive effect in Kenya.

## 5.2. Recommendation

- **For policy maker:** Support financial market development to enhance the inflation hedging role of stock market, this implies inflation is easier for businesses and investors to manage when the financial industry is developed (e.g., deeper stock market, stronger rules, more instruments), and monetary expansion policies (increase broad money supply) can stimulate equity market.
- **For investor:** Making Long term investment in stocks may assist safeguard investors from inflation, especially in South Africa, Egypt, and Ghana.
- **For central bank:** monitor inflation influences on financial market, and integrated equity market indicator in to inflation targeting framework.
- **Future Researcher:** Nevertheless, the findings from the available data provide valuable insights into the relationship between inflation and stock market performance in selected African economies. Future studies are therefore encouraged to expand on this work by conducting a broader cross-country comparative analysis and incorporating expected versus unexpected inflation measures when more comprehensive data become accessible. This would deepen the understanding of how different types of inflation dynamics influence stock market behavior across the continent.

- **For African stock market and capital market authority:** the major challenge in conducting the study is limited availability of historical data and inconsistency in measurement especially in stock price. So African university, stock exchange and statistical agency collaborate to develop open access historical database with standardize financial datasets.

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## Appendix

The appendix includes all stata output are presented bellow as the following:

### Appendix 1: Unit root test stata result

- Unit root test stata result for all share indexes

```
. xtunitroot llc ASI
Levin-Lin-Chu unit-root test for ASI
-----
H0: Panels contain unit roots           Number of panels =      8
Ha: Panels are stationary               Number of periods =    16

AR parameter: Common                   Asymptotics: N/T -> 0
Panel means: Included
Time trend: Not included

ADF regressions: 1 lag
LR variance: Bartlett kernel, 8.00 lags average (chosen by LLC)
-----
                Statistic      p-value
-----
Unadjusted t      -2.3446
Adjusted t*       -0.1763      0.4300
-----
```

```
. xtunitroot ips ASI
Im-Pesaran-Shin unit-root test for ASI
-----
H0: All panels contain unit roots      Number of panels =      8
Ha: Some panels are stationary          Number of periods =    16

AR parameter: Panel-specific           Asymptotics: T,N -> Infinity
Panel means: Included                  sequentially
Time trend: Not included

ADF regressions: No lags included
-----
                Statistic      p-value      Fixed-N exact critical values
                |                |                |      1%      5%      10%
-----
t-bar           -1.8083
t-tilde-bar     -1.5060
Z-t-tilde-bar   -0.5536      0.2899
-----
```

- Unit root test stata result for inflation

```
. xtunitroot llc CPI
```

```
Levin-Lin-Chu unit-root test for CPI
```

```
H0: Panels contain unit roots      Number of panels =      8  
Ha: Panels are stationary          Number of periods =    16
```

```
AR parameter: Common              Asymptotics: N/T -> 0  
Panel means: Included  
Time trend: Not included
```

```
ADF regressions: 1 lag  
LR variance: Bartlett kernel, 8.00 lags average (chosen by LLC)
```

	Statistic	p-value
Unadjusted t	-6.8736	
Adjusted t*	-0.7165	0.2368

```
. xtunitroot ips CPI
```

```
Im-Pesaran-Shin unit-root test for CPI
```

```
H0: All panels contain unit roots  Number of panels =      8  
Ha: Some panels are stationary     Number of periods =    16
```

```
AR parameter: Panel-specific      Asymptotics: T,N -> Infinity  
Panel means: Included              sequentially  
Time trend: Not included
```

```
ADF regressions: No lags included
```

	Statistic	p-value	Fixed-N exact critical values		
			1%	5%	10%
t-bar	-2.4593		-2.210	-1.990	-1.890
t-tilde-bar	-1.6795				
Z-t-tilde-bar	-1.2034	0.1144			

- Unit root test stata result for gross domestic product growth rate

```
. xtunitroot llc GDPGR
```

```
Levin-Lin-Chu unit-root test for GDPGR
```

```
H0: Panels contain unit roots      Number of panels =      8  
Ha: Panels are stationary          Number of periods =    16
```

```
AR parameter: Common              Asymptotics: N/T -> 0  
Panel means: Included  
Time trend: Not included
```

```
ADF regressions: 1 lag  
LR variance: Bartlett kernel, 8.00 lags average (chosen by LLC)
```

	Statistic	p-value
Unadjusted t	-8.5034	
Adjusted t*	-5.0324	0.0000

```
. xtunitroot ips GDPGR
```

```
Im-Pesaran-Shin unit-root test for GDPGR
```

```
H0: All panels contain unit roots      Number of panels =      8
Ha: Some panels are stationary         Number of periods =    16

AR parameter: Panel-specific          Asymptotics: T,N -> Infinity
Panel means:  Included                sequentially
Time trend:  Not included
```

```
ADF regressions: No lags included
```

	Statistic	p-value	Fixed-N exact critical values		
			1%	5%	10%
t-bar	-3.8563		-2.210	-1.990	-1.890
t-tilde-bar	-2.6021				
Z-t-tilde-bar	-4.6585	0.0000			

- Unit root test stata result for deposit interest rate

```
. xtunitroot llc DepIR
```

```
Levin-Lin-Chu unit-root test for DepIR
```

```
H0: Panels contain unit roots          Number of panels =      8
Ha: Panels are stationary              Number of periods =    16

AR parameter: Common                  Asymptotics: N/T -> 0
Panel means:  Included
Time trend:  Not included
```

```
ADF regressions: 1 lag
```

```
LR variance:  Bartlett kernel, 8.00 lags average (chosen by LLC)
```

	Statistic	p-value
Unadjusted t	-7.8209	
Adjusted t*	-5.0717	0.0000

```
. xtunitroot ips DepIR
```

```
Im-Pesaran-Shin unit-root test for DepIR
```

```
H0: All panels contain unit roots      Number of panels =      8
Ha: Some panels are stationary         Number of periods =    16

AR parameter: Panel-specific          Asymptotics: T,N -> Infinity
Panel means:  Included                sequentially
Time trend:  Not included
```

```
ADF regressions: No lags included
```

	Statistic	p-value	Fixed-N exact critical values		
			1%	5%	10%
t-bar	-2.5264		-2.210	-1.990	-1.890
t-tilde-bar	-1.9773				
Z-t-tilde-bar	-2.3184	0.0102			

- Unit root test stata result for broad money supply

```

. xtunitroot llc BMS
Levin-Lin-Chu unit-root test for BMS
-----
H0: Panels contain unit roots           Number of panels =      8
Ha: Panels are stationary               Number of periods =     16

AR parameter: Common                    Asymptotics: N/T -> 0
Panel means: Included
Time trend: Not included

ADF regressions: 1 lag
LR variance: Bartlett kernel, 8.00 lags average (chosen by LLC)
-----
Statistic      p-value
-----
Unadjusted t   -5.7781
Adjusted t*    -2.6169      0.0044

. xtunitroot ips BMS
Im-Pesaran-Shin unit-root test for BMS
-----
H0: All panels contain unit roots       Number of panels =      8
Ha: Some panels are stationary           Number of periods =     16

AR parameter: Panel-specific             Asymptotics: T,N -> Infinity
Panel means: Included                    sequentially
Time trend: Not included

ADF regressions: No lags included
-----
Statistic      p-value      Fixed-N exact critical values
1%      5%      10%
-----
t-bar          -2.0665      -2.210  -1.990  -1.890
t-tilde-bar    -1.8107
Z-t-tilde-bar  -1.6945      0.0451

```

## Appendix 2: Descriptive stastics result

```

. xtsum ASI CPI GDPGR DepIR BMS

```

Variable		Mean	Std. dev.	Min	Max	Observations
ASI	overall	15635.76	19106.35	1173.35	79476.6	N = 128
	between		17227.97	2058.438	48767.44	n = 8
	within		10163.91	-13386.52	79750.69	T = 16
CPI	overall	8.846578	6.687876	.303386	38.10697	N = 128
	between		4.692558	1.944286	15.29348	n = 8
	within		5.030744	.5573546	31.66006	T = 16
GDPGR	overall	3.909765	3.654934	-14.14423	14.04712	N = 128
	between		1.493865	1.282121	5.880397	n = 8
	within		3.374979	-13.22164	12.84323	T = 16
DepIR	overall	7.255577	3.297718	1.432967	17.06417	N = 128
	between		2.928651	3.297046	12.24596	n = 8
	within		1.81961	3.326093	12.63176	T = 16
BMS	overall	52.63167	30.39767	19.74025	128.8631	N = 128
	between		31.99299	22.13772	111.5317	n = 8
	within		4.621547	40.34912	69.96311	T = 16

## Appendix 3: Correlation result

```
. corr ASI CPI GDPGR DepIR BMS
(obs=128)
```

	ASI	CPI	GDPGR	DepIR	BMS
ASI	1.0000				
CPI	0.0869	1.0000			
GDPGR	-0.2749	0.0693	1.0000		
DepIR	-0.1084	0.5337	0.2025	1.0000	
BMS	0.1343	-0.3014	-0.2312	-0.4623	1.0000

## Appendix 4: PMG stata output

```
. xtmgm d.lnASI d.CPI d.DepIR d.GDPGR d.lnbms, lr(1.lnASI 1.CPI 1.DepIR 1.GDPGR 1.lnbms) ec(ect) r
> eplace pmg
```

```
Iteration 0: log likelihood = 33.839014 (not concave)
Iteration 1: log likelihood = 35.568313 (not concave)
Iteration 2: log likelihood = 37.368176 (not concave)
Iteration 3: log likelihood = 43.997688 (not concave)
Iteration 4: log likelihood = 46.954134
Iteration 5: log likelihood = 47.630853
Iteration 6: log likelihood = 47.799806
Iteration 7: log likelihood = 47.801045
Iteration 8: log likelihood = 47.801046
```

Pooled Mean Group Regression  
(Estimate results saved as pmg)

```
Panel Variable (i): countrycode      Number of obs      =      120
Time Variable (t): Year                Number of groups   =       8
                                         Obs per group: min =      15
                                         avg =              15.0
                                         max =              15

                                         Log Likelihood    =  47.80105
```

	D.lnASI	Coefficient	Std. err.	z	P> z	[95% conf. interval]
ect						
	CPI					
	L1.	.0116363	.0049914	2.33	0.020	.0018534 .0214191
	DepIR					
	L1.	.0001418	.0170942	0.01	0.993	-.0333622 .0336458
	GDPGR					
	L1.	-.038454	.008722	-4.41	0.000	-.0555488 -.0213592
	lnbms					
	L1.	1.020683	.2590717	3.94	0.000	.5129115 1.528454
SR						
	ect	-.4843676	.1436118	-3.37	0.001	-.7658415 -.2028938
	CPI					
	D1.	.0217734	.013352	1.63	0.103	-.004396 .0479427
	DepIR					
	D1.	-.0953367	.0643066	-1.48	0.138	-.2213752 .0307018
	GDPGR					
	D1.	-.010688	.0144114	-0.74	0.458	-.0389339 .0175579
	lnbms					
	D1.	-.724337	.5913556	-1.22	0.221	-1.883373 .4346988
	_cons	2.43736	.6825852	3.57	0.000	1.099518 3.775203

## Appendix 5: DFE stata output

Dynamic Fixed Effects Regression: Estimated Error Correction Form  
(Estimate results saved as DFE)

	Coefficient	Std. err.	z	P> z	[95% conf. interval]	
ect						
CPI L1.	.0228393	.0193351	1.18	0.238	-.0150568	.0607354
DepIR L1.	.0460071	.0442047	1.04	0.298	-.0406326	.1326467
GDPGR L1.	-.0207752	.0307689	-0.68	0.500	-.0810811	.0395307
lnbms L1.	-.1824974	1.084796	-0.17	0.866	-2.308659	1.943664
SR						
ect	-.5338778	.0845881	-6.31	0.000	-.6996673	-.3680882
CPI D1.	.0326964	.009593	3.41	0.001	.0138946	.0514983
DepIR D1.	.0266969	.0265568	1.01	0.315	-.0253535	.0787472
GDPGR D1.	-.0040757	.0114054	-0.36	0.721	-.0264298	.0182785
lnbms D1.	-.2482584	.5849432	-0.42	0.671	-1.394726	.8982093
_cons	4.942277	2.306519	2.14	0.032	.4215833	9.462971

## Appendix 6: Hausman test stata output

. hausman pmg DFE,sigamare

	Coefficients		(b-B)	sqrt(diag(V_b-V_B))
	(b) pmg	(B) DFE	Difference	Std. err.
CPI L1.	.0116363	.0228393	-.011203	.0570746
DepIR L1.	.0001418	.0460071	-.0458653	.201589
GDPGR L1.	-.038454	-.0207752	-.0176788	.1007052
lnbms L1.	1.020683	-.1824974	1.20318	2.933636

b = Consistent under H0 and Ha; obtained from `xtpmg`.  
B = Inconsistent under Ha, efficient under H0; obtained from `xtpmg`.

Test of H0: Difference in coefficients not systematic

chi2(4) = (b-B)'[(V\_b-V\_B)^(-1)](b-B)  
= 0.42  
Prob > chi2 = 0.9808

## Appendix 7: PMG stata output across the country

```

. xtpmg d.lnASI d.CPI d.DepIR d.GDPGR d.lnbms, lr(1.lnASI 1.CPI 1.DepIR 1.GDPGR 1.lnbms) ec(ect) r
> eplce pmg full
Iteration 0: log likelihood = 33.839014 (not concave)
Iteration 1: log likelihood = 35.568313 (not concave)
Iteration 2: log likelihood = 37.368176 (not concave)
Iteration 3: log likelihood = 43.997688 (not concave)
Iteration 4: log likelihood = 46.954134
Iteration 5: log likelihood = 47.630853
Iteration 6: log likelihood = 47.799806
Iteration 7: log likelihood = 47.801045
Iteration 8: log likelihood = 47.801046

```

Pooled Mean Group Regression  
(Estimate results saved as PMG)

```

Panel Variable (i): countrycode      Number of obs   =    120
Time Variable (t): Year              Number of groups =     8
                                      Obs per group: min =    15
                                      avg   =    15.0
                                      max   =    15
                                      Log Likelihood   =  47.80105

```

	D.lnASI	Coefficient	Std. err.	z	P> z	[95% conf. interval]
<b>ect</b>						
CPI		.0116363	.0049914	2.33	0.020	.0018534 .0214191
DepIR		.0001418	.0170942	0.01	0.993	-.0333622 .0336458
GDPGR		-.038454	.008722	-4.41	0.000	-.0555488 -.0213592
lnbms		1.020683	.2590717	3.94	0.000	.5129115 1.528454
<b>countrycode_1</b>						
CPI		-.3868892	.213453	-1.81	0.070	-.8052494 .031471
DepIR		.0778829	.0260246	2.99	0.003	.0268756 .1288902
GDPGR		-.0961022	.1138386	-0.84	0.399	-.3192217 .1270172
lnbms		.0235351	.0637502	0.37	0.712	-.101413 .1484831
_cons		-2.407783	1.444566	-1.67	0.096	-5.23908 .4235137
<b>countrycode_2</b>						
CPI		-.501829	.1278946	-3.92	0.000	-.7524978 -.2511601
DepIR		-.0315564	.0113645	-2.78	0.005	-.0538303 -.0092824
GDPGR		-.4412785	.1323955	-3.33	0.001	-.7007689 -.181788
lnbms		-.0186425	.0075656	-2.46	0.014	-.0334709 -.0038142
_cons		-1.674101	.7577163	-2.21	0.027	-3.159198 -.1890045
<b>countrycode_3</b>						
CPI		-.8377926	.1911252	-4.38	0.000	-1.212391 -.4631941
DepIR		.007872	.0439987	0.18	0.858	-.078364 .094108
GDPGR		-.3111392	.1145427	-2.72	0.007	-.5356388 -.0866397
lnbms		-.1021416	.0841652	-1.21	0.225	-.2671024 .0628192
_cons		-3.425229	2.716002	-1.26	0.207	-8.748495 1.898037
<b>countrycode_4</b>						
CPI		-.0670769	.1441076	-0.47	0.642	-.3495226 .2153688
DepIR		.0045959	.0100897	0.46	0.649	-.0151796 .0243714
GDPGR		.0339094	.0254044	1.33	0.182	-.0158823 .0837012
lnbms		.0321693	.0177486	1.81	0.070	-.0026172 .0669559
_cons		1.761852	.7927088	2.22	0.026	.2081714 3.315533
<b>countrycode_5</b>						
CPI		-.6460902	.2582456	-2.50	0.012	-1.152242 -.1399382
DepIR		.0222145	.0197867	1.12	0.262	-.0165668 .0609958
GDPGR		.019208	.0288204	0.67	0.505	-.037279 .075695
lnbms		-.0063136	.027487	-0.23	0.818	-.0601871 .0475599
_cons		-.3969554	.7631975	-0.52	0.603	-1.892795 1.098884
<b>countrycode_6</b>						
CPI		4.635125	1.930648	2.40	0.016	.8511249 8.419126
<b>countrycode_7</b>						
CPI		-1.208494	.2144969	-5.63	0.000	-1.6289 -.7880876
DepIR		.0347448	.0068998	5.04	0.000	.0212215 .048268
GDPGR		.0052846	.0195347	0.27	0.787	-.0330027 .0435719
lnbms		-.0008205	.0109275	-0.08	0.940	-.0222381 .0205971
_cons		.2682042	.2820027	0.95	0.342	-.284511 .8209193
<b>countrycode_8</b>						
CPI		5.114049	1.62723	3.14	0.002	1.924736 8.303363
DepIR		-.2142454	.1278457	-1.68	0.094	-.4648184 .0363277
GDPGR		.0693631	.0239085	2.90	0.004	.0225034 .1162229
lnbms		-.0145592	.039369	-0.37	0.712	-.0917211 .0626026
_cons		-.0114621	.0102523	-1.12	0.264	-.0315562 .0086319
<b>countrycode_9</b>						
CPI		.275874	1.330403	0.21	0.836	-2.331667 2.883415
DepIR		1.458216	.8483732	1.72	0.086	-.2045647 3.120997
GDPGR		-.0125241	.0901072	-0.14	0.889	-.189131 .1640828
lnbms		-.01093	.0097927	-1.12	0.264	-.0301232 .0082633
_cons		.0419836	.034445	1.22	0.223	-.0255274 .1094946
<b>countrycode_10</b>						
CPI		-.0018277	.0030577	-0.60	0.550	-.0078207 .0041654
DepIR		-.1965578	.3076323	-0.64	0.523	-.7995059 .4063904
GDPGR		.0869095	.4674921	0.19	0.853	-.8293582 1.003177

## Appendix 8: Robustness of the model

```
. xtscd lnallshareindx IFR GDPGR DepIR lnbnms
```

```
Regression with Driscoll-Kraay standard errors   Number of obs   =       128
Method: Pooled OLS                             Number of groups =         8
Group variable (i): countrycode                 F( 4, 15)      =       67.68
maximum lag: 2                                 Prob > F       =       0.0000
                                                R-squared     =       0.2512
                                                Root MSE     =       1.0517
```

lnallshare~x	Drisc/Kraay		t	P> t	[95% conf. interval]	
	Coefficient	std. err.				
IFR	.0383017	.0179641	2.13	0.050	.0000122	.0765912
GDPGR	-.0731613	.0272151	-2.69	0.017	-.131169	-.0151536
DepIR	-.0898648	.0407873	-2.20	0.044	-.1768009	-.0029288
lnbnms	.5714185	.1223731	4.67	0.000	.3105865	.8322506
_cons	7.403519	.7136294	10.37	0.000	5.882454	8.924584