

EFFECT OF THE INFLATION ON STOCK MARKET INVESTMENT: A CASE  
OF RWANDA STOCK EXCHANGE (R.S.E) FROM 2013 - 2022

AMANI KADA JOEL

202111674

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of Master's Degree in Finance.

KIGALI INDEPENDENT UNIVERSITY ULK

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## **DECLARATION**

I, AMANI KADA Joel declare that this research project is my own original work and it has not been presented and will not be presented in any other university for a similar or any other degree award. Any references in terms of books or any written materials are indicated in the references. No part of this research should be reproduced without the Author's permission,

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## **APPROVAL**

This is to certify that this work entitled “Effect of the inflation on the stock market investment” is a study carried out by AMANI KADA JOEL under my guidance and supervision

Signature: ..... Date: ..... /...../2024

Prof. Rufus JAYAKUMAR

## **DEDICATION**

To my parents,

To my son and my daughter,

To my friends, brothers and sisters

## **ACKNOWLEDGEMENTS**

My foremost gratitude goes to the God Almighty who always renewed my strength at every stage of working on this proposal.

Many thanks also go to the Kigali Independent University's promoter professor RWIGAMBA BARINDA, all academic authorities and lectures who taught us in Master of Finance. I thank my supervisor Prof. Rufus JAYAKUMAR for His continuous support and encouragements throughout this tedious process. He has been a good supervisor. I acknowledge my colleagues who have been encouraging me.

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## **LIST OF ABBREVIATIONS AND SYMBOLS**

**RSE:** Rwanda Stock Exchange

**INF:** inflation

**ADF:** Augmented Dickey Fuller

**CPI:** Consumer Price Index

**MP:** Market Participation

**GDP:** Gross Domestic Product

**BTC:** Bitcoin

**WPI:** Whole Price Index

**US:** United States

**PPP:** Purchasing Power Parity

**NASDAQ:** National Association of Securities Dealers Automated Quotations

**NYSE:** News York Stock Exchange

**DJIA:** Down Jones Industrial Average

**EPS:** Earning Per Share

**ETF:** Exchange-Trade Founds

**NISR:** National Institute of Statistic of Rwanda

**BNR :** Bank National du Rwanda

**RWF** : Rwandan Francs

**VAR**: Vector Autoregressive

**ARDL**: Autoregressive Distributed Lag

**IPO**: Initial Public Offering

## ABSTRACT

Financial markets serve as the backbone of modern economies, playing a pivotal role in the allocation of capital, risk management, and wealth creation. The efficiency of these markets is essential for fostering economic growth, development and stability at both the national and global levels. RSE have been playing a very important role in the development of the Rwanda national financial system such as economic barometer, providing liquidity, capital, householder participation in the national economy growth and stability. The inflation (CPI), the Gross Domestic Product, the Money supply is one of the most important vectors that drive the economy and the research independent variables. This study had the main objective of determine the effect of the inflation on the Rwanda Stock Exchange investment, to fulfil this objective the study have analyzing the long run and short run relationship between the inflation and the Rwanda stock market participation; the result of our study has shown that there exist a long run and a short run relationship between them. By linking the specific objectives on this study such as the relationship between gross domestic product and the Rwanda stock market participation, the relationship between Money Supply and the stock market participation the study has finding a significant relationship between variables. To attain the purpose of this research, secondary data was entirely used and the research have used the annually data for 10 years. From 2013 to 2022. To get the result of our analysis, the study carried out test as Unit root test at level, Cointegration test, Residuals diagnostic, Stability test. The analysis of data has been done by using the Augmented Dickey fuller test to test the stationarity, long run relationship analysis, the short run relationship analysis and the error correction model. The result has shown that the inflation, the gross domestic product and the money supply have really a long run and a short run relationship with the market participation. The study recommended the Rwanda stock exchange to implement a trading model which allow more participants in the market such as the bot trading software (AI). Keywords: inflation, consumer price index, gross domestic product, stock market exchange, money supply,



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# CHAPTER 1: GENERAL INTRODUCTION

The relationship between inflation and stock market performance is a long-standing topic of interest among economists, financial analysts, and investors. Inflation, defined as the sustained increase in the general price level of goods and services over time, can have significant implications for the stock market and the investment decisions of individuals and institutions. Understanding the dynamics between inflation and stock market returns is crucial for investors seeking to optimize their portfolio strategies and navigate the challenges posed by inflationary environments (Fama, 1981; Geske & Roll, 1983). The case of the Rwanda Stock Exchange (RSE) from 2013 to 2022 provides a unique opportunity to examine the effect of inflation on stock market investment. Rwanda, a developing economy in East Africa, has experienced fluctuations in its inflation rate during this period, which may have had a direct impact on the performance of the RSE. Analyzing the relationship between inflation and stock market returns in the Rwandan context can offer valuable insights for investors, policymakers, and researchers interested in understanding the intricacies of stock market behavior in the face of changing macroeconomic conditions (Boudoukh & Richardson, 1993; Naes et al., 2011).

The findings of this study will be of practical relevance to individual and institutional investors operating in the Rwandan stock market, as well as policymakers and regulators seeking to promote a stable and thriving capital market in the country. By shedding light on the effects of inflation on the Rwandan stock market, this study can contribute to efforts to enhance financial inclusion and deepen capital market development in Rwanda (Antonakakis et al., 2017). The thesis is organized into several chapters, including a literature review, methodology, data analysis and findings, discussion and implications, and a conclusion with recommendations. The study will draw on a

range of academic literature and empirical evidence to provide a comprehensive understanding of the inflation-stock market nexus in the Rwandan context.

Since Fisher's initial contribution in the early thirties, several studies have looked at the ability of different assets to provide a hedge against inflation (See Fama and Schwert (1977) and the survey by Rovelli (1984). The Fisher hypothesis, relying on the idea that the monetary and real sectors of the economy are largely independent, states that expected asset returns should move one-to-one with expected inflation. In principle this hypothesis is applicable to any instrument that can serve to transfer wealth through time, but it should especially apply to assets representing physical capital, such as real estate and shares in the capital of a company. These assets should also provide a hedge against unexpected inflation.

The most common index used to measure inflation are CPI (Consumer Price Index), (PPI) Producer Price Index, (WPI) Wholesale Price index etc. However, in India inflation is measured over two major indices, WPI and CPI. Most of the developing nations use CPI as the measure to understand the levels of inflation. This CPI tracks a “basket of goods” to serve as a proxy for the economy as a whole. This basket includes the goods and services that frequently pop in month household spending, such as food, shelter, energy, autos, medical care, personal care, home furnishings and more.

Inflation up to a certain level is generally considered good for Gross Domestic Product (GPD) growth, because it can boost consumer spending, investment returns, job growth and corporate earnings, among other things. Since the 2008 Global Financial Crisis, the U.S. Federal Reserve policymakers have targeted 2% for core inflation to ensure “maximum employment and price stability” for householders and businesses. If inflation is in check, and the economy is healthy shape, corporate revenues and profits are also expected to grow, resulting in greater market demand



for shares of companies with increased profits. A healthy economy with modest inflation often sets the stage for higher stock prices.

By the way the stocks market are likely sources of possible catalysts to economic growth in many economies. They allocate funds to the most productive sectors of the economy (Cooray, 2010; Bill Meier and Massa, 2009; caporal et al 2004). More generally, stock markets can influence economic growth through mobilizing and directing savings, facilitating risk sharing, and providing a venue for investment (see Hou and Cheng 2010; Arestis et al, 2001, Rousseau and Wachtel, 2000; Enisan and Olufisayo, 2009; Levine and Zervos,1996; Levine, 1991). These interrelated functions of a stock market may explain as follows. A stock market may assist in domestic saving mobilization by availing a set of financial instruments for individuals to diversify their portfolio. It can also provide opportunities for co-ownership thereby providing individuals with an efficient means of risk sharing. Finally, a stock market not only facilitates efficient allocation of capital to productive activity in an economy. Hence, it is not surprising that a stock market is an influence on aggregate demand, particularly through aggregate consumption and investment (Nishat and Saghir, 1991).

The primary objective of this study is to investigate the effect of inflation on stock market investment, focusing on the case of the Rwanda Stock Exchange from 2013 to 2022. Specifically, the study aims to examine the relationship between the inflation rate and stock market participation, analyze the impact of macroeconomic factors such as the Gross Domestic Product, the M3 on stock market performance, evaluate investment strategies to mitigate the risks associated with inflation, and provide recommendations for policymakers and market participants to enhance the resilience of the Rwandan stock market to inflationary pressures.

## **1.1. Background of the study**

The share value per dollar of pretax earnings actually fell from 10.82 in 1967 to 6.65 in 1976.<sup>1</sup> The analysis here indicates that this inverse relation between higher inflation and lower share prices during the past decade was not due to chance or to other unrelated economic events.

On the contrary, an important adverse effect of increased inflation on share prices results from basic features of the current U.S. tax laws, particularly historic cost depreciation and the taxation of nominal capital gains. This analysis shows that in order to understand the structural relation between inflation and stocks market participation, it is crucial to distinguish the effect of a high constant rate of inflation and the effect of an increase in the rate of inflation expected for the future. When the steady-state rate of inflation is higher, share prices increase at a faster rate. More specifically, when the inflation rate is steady, share prices rise in proportion to the price level to maintain a constant ratio of share prices to real earnings. In contrast, an increase in the expected future rate of inflation causes a concurrent fall in the ratio of share prices to current earnings. Although share prices then rise from this lower level at the higher rate of inflation, the ratio of share prices to real earnings is permanently lower. This permanent reduction in the price-earnings ratio occurs because, under prevailing tax rules, inflation raises the effective tax rate on corporate source income.

Historical data supports the positive correlation between the stock market and inflation. In fact, U.S equity returns outperformed inflation 90% of the time when the inflation rate was rising but remained below the 3% benchmark. It only when inflation reaches high levels (typically considered to be 7% or more) that the relationship becomes more complex. At a macroeconomic level, high inflation can cause central banks around the world to tighten their monetary policy and raise interest rates in order to keep prices more stable. The expectation is that the resulting increase

in borrowing costs will incentivize consumers to save and help to lower the demand of goods and services, until a supply-demand equilibrium is achieved.

Over the long run, a rise in the price of goods generally increases a company's nominal revenue (their revenue before accounting for inflation), causing share price appreciation. At the same time, high inflation will also increase a company's input costs (the amount of money spent on the raw material for manufacturing or creating a product or service). However, the expectation is that companies will gradually be able to pass these costs on to consumers through higher prices without significantly impacting their own profit margins. This is called pricing power, when a company has the ability to increase prices in the face of rising costs to maintain, or even grow, their profit margins. Some sectors, like food and energy, have more pricing power than others because what they sell is more of a necessity for consumers.

According to Juzer Gabajiwala and Aashika Jain; by looking at history, the most occasions, rising inflation rates are synonymous with improving Gross Domestic Product (GDP). In fact, very low inflation rates can slow economic growth and the best example of this could be Japan, which is trying to revive its inflation. However, rising inflation should remain within defined targets. If inflation is running above targets for a prolonged period, it can create imbalance in the economy. The current of the economy in Sri Lanka is a good example; where inflation touched a year-on-year record of 54.6% in June 2022. Moreover, people there are struggling to pay the basic needs, like food, medicine and even fuel and the government's foreign exchange reserves are at a record low. so, rising inflation does have certain downside risks, it is also essential for the economic growth. Rising inflation can cause interest rates to go up in tandem. Higher interest rates are most likely accompanied by lower stock market returns and this pretty much explains why the stock markets are currently falling.

The major threat from inflation is that it erodes the purchasing power of currency. It discourages investment, reduces the value of savings, high inflation leads to fall in real wages. Apart from its inflation has a regressive effect on lower- income strata and senior citizens of the society. Real interest rate on bank deposits may be negative. Higher borrowing cost for business and industry borrowers. An economy with high inflation rate, makes it exports less competitive in global markets, reduces the exports, less job or no job creation, increase the business uncertainty and adverse effect on balance of payment.

Therefore, this study will evaluate the effect of inflation on stock market investment, and establish the relationship between the inflation and stocks & securities price on Rwanda stock exchange.

## **1.2. Problem statements**

When the inflation rate rises, almost all product prices in the market increase at the same time. The stock prices, however, inversely relate to the inflation in accordance with various researches (Asprem, 1989; Chen et al., 1986; Wasserfallen, 1989; Najand and Rahman, 1991).

Regarding to Brandt and Wang's model (2003), inflation is a factor that impacts the investor's risk averse and, consequently, reflects on expected high required return on capital and the real discount rate. However, the stock value is relevant to the profit from capital assets, for example the raw material, labor and capital. Inflation drives up the cost of input assets as well as the output assets. Hence, the shareholders' expected future cash flow increases from the higher selling prices. The more company's ability to transfer the inflation panic to the selling price, the higher stock return will be according to Jareno and Navarro (2009).

Siegel (2008) indicates that in developing countries the inflation associates with the negative budget and government over spending. The lower economic and private firm growths affect the

stock price owing to the government influences. Based on the Fed model, bond is the alternative investment instead of stock when the earning yield is lower than the bond yield although they are different in term of returns and the risk. The bonds investors anticipate the interest from the Relationship of Inflation and Stock Price; treasury bonds at risk-free rate while bear the inflation risk, whereas the equity investors earn the dividend and capital gain; in addition, the stock price increases align with inflation (Siegel, 2008).

There is confusion about stock prices increase when inflation rate increases, so, investors reduce the inflation risk by stock investment. In 1950, the stock investment as inflation hedge was very popular in spite of the dividend yield was low. It changed after 1970 since the annual compound return on stock, bond and Treasury bill plunge when the inflation rate was high.

In the short-term hedge against inflation, none of stock, bond and Treasury bill is effective. Nevertheless, the long run stock is good way to hedge against inflation in the stable and uncertain economic (Siegel, 2008)<sup>i</sup>.

From the controversy above, it is attention-grabbing to evaluate the inflation effect on the market participation on Rwanda stocks exchange. On top of that, how the market participation corresponded to changes in inflation during this period from 2013 to 2022.

### **1.3. Purpose**

Inflation is an economic indicator that over time has become a pillar indicator in the management of the economic and the financial system. In our study, we will focus on an existing relationship between inflation and market participation in the Rwanda stock exchange.

### **1.3.1. General objective**

The aim of the study is to evaluate the effect of the inflation on stock market investment on Rwanda stock exchange from 2013 to 2022,

### **1.3.2. Specifics objectives**

The specific objectives of the study are to:

- i. Examine the long run relationship between the inflation and the Rwanda stock Exchange participation
- ii. Find out the effects of inflation rate on Rwanda stock exchange performance.
- iii. Assess the relationship between the Gross Domestic product and the Rwanda stock market participation,
- iv. Examine the relationship between money supply and the Rwanda Stock Exchange participation.

## **1.4. Research Questions**

In order to accomplish the research objectives, the ultimate question is:

“Does the inflation affect the investment on Rwanda stock exchange?”

From the above main question, it is extended to three sub-questions which are:

- 1) What is the long run impact of inflation on Rwanda stock exchange investment?
- 2) How were the RSE total participation and inflation relationship looks from 2013 to 2022?
- 3) Did the inflation affect the Rwanda stock exchange performance from 2013 to 2022?
- 4) What is the relationship between the Gross Domestic Product and the RSE participation?

5) What is the relationship between the money supply and the Rwanda Stock Exchange participation during the period from 2013 to 2022?

## **1.5. Research Hypotheses**

This research verified the following null hypotheses:

Ho1 There is no significant impact of inflation on the Rwanda stock exchange investment;

Ho2 There is no relationship between the RSE participation and the inflation during the period of the study;

Ho3 There is no influence of the inflation on the Rwanda stock exchange performance.

Ho4 There is no relationship between the Gross Domestic Product and the RSE participation.

Ho5 There is no relationship between the money supply and the Rwanda Stock Exchange participation.

## **1.6. Justification of the study**

This study is justified by the fact that in Rwanda there is a limited number of studies that are investigate on inflation and there isn't any dealing with the effect of the inflation on stock market investment.

It well known, based on empirical studies that financial market participants are always ardent about the relationship between inflation and other macroeconomic factors such as economic growth. According to Fischer (1993) and Barro (1995) empirically documented that growth rate and inflation share inverse relationship. by the way, based on our period which have been characterize with an inflation caused by the covid19 and the Ukraine war crisis, the high inflation confirmed

by the study of Rangarajan (1998), that inflation has negative impact on growth rate of an economy because of its destructive effects on productivity and efficiency.

This study intends to evaluate the effect of inflation on the stock market investment and evaluate the performance of the stock exchange during the period of high inflation in order to propose solutions. The gap in this area is that without clear understanding of the effect of inflation on the purchasing power of investors may lead to a situation of financial investment destruction.

## **1.7. Scope of the Study**

According to Michell Grant (2021), the scope of the study discloses the extent to which your research topic will expected, as well as the variables under which the investigation will take place. It educates both the target audience and the author about the research's objective and what they might expect. As for the scope of the study, this study was limited by geography, term of domain and time.

### **1.7.1. Geographical scope**

According to Mitchell Grant (2021), the geographic scope is describing as "the area addressed by a model or analysis utilized for calculating physical alterations as a result of a planned project. The secondary data of this research were collected on Rwanda Stock Exchange, National Banque of Rwanda, and National Institute of Statistic of Rwanda all located in Kigali.



### **1.7.2. Scope in terms of domain**

According to Mitchell Grant (2021), conceive of the scope as the domain of the research, what is inside that domain, and what is not. Researchers made it as clear as possible what they examined and what elements are within the study's acceptable range. As a result, the research confined to the field of Finance.

### **1.7.3. Time scope**

According to Mitchell Grant, (2021), the period in which the study will be done, and the hypotheses that the investigation will focus on. This study run from 2013 till 2022.

## **1.8. Limitation of the Study**

The study was limited to the variables of the study that are inflation on stock market participation; inflation and stock exchange performance, Gross domestic Product and Rwanda Stock Exchange participation, Money supply and Rwanda Stock Exchange Participation.

The relevant materials needed for this research especially literature review focusing on inflation data, stock exchange data, Gross Domestic Product data, Money supply data; with defined variables and dimensions were easily available.

The study result was also limited to the effect of inflation on the stock market investment, the relationship between the inflation and stock exchange performance, the relationship between the gross domestic product and the Rwanda stock exchange participation, the relationship between Money Supply and the Rwanda Stock Exchange participation. Yet, these findings may not be generalized to give a picture of the overall finance market in all country.

## **1.9. Significant of the Study**

The significance of this study lies in its potential to provide valuable insights for personal investment decisions, contribute to the understanding of the Rwandan financial system, add to the academic knowledge in the field of finance and investment, and align with the research interests of the Kigali Independent University. The analysis of the effect of inflation on the Rwanda Stock Exchange investment from 2013 to 2022 can have far-reaching implications for various stakeholders, making it a meaningful and timely research endeavor.

### **1.9.1. Personal Interest**

As an individual investor, understanding the impact of inflation on stock market performance is of great personal interest. Investing in the Rwanda Stock Exchange (RSE) has been an area of focus, and analyzing the effects of inflation on this market from 2013 to 2022 can provide valuable insights to optimize investment strategies and manage risks more effectively. This study can help me make more informed decisions about my own investment portfolio and potentially achieve better returns.

### **1.9.2. Social Interest**

The performance of the Rwanda Stock Exchange has implications for the broader Rwandan society. Understanding the relationship between inflation and stock market dynamics can provide insights that are useful for policymakers, financial institutions, and individual investors. This information can contribute to the development of policies and regulations that foster a stable and resilient financial system, ultimately benefiting the Rwandan population by promoting economic growth and financial inclusion.

### **1.9.3. Academic Interest**

From an academic perspective, this study can contribute to the existing literature on the effects of inflation on stock market participation performance, particularly in the context of emerging markets like Rwanda. The findings can provide a basis for further research, hypothesis testing, and theory development in the field of finance and investment. Additionally, the study can serve as a valuable resource for students, researchers, and academics interested in understanding the dynamics of the Rwandan stock market and its interactions with macroeconomic factors.

### **1.9.4. University Interest (Kigali Independent University)**

The Kigali Independent University has a strong focus on promoting research and academic excellence in the field of finance and economics. This study on the effect of inflation on the Rwanda Stock Exchange aligns with the university's strategic goals of enhancing its research profile and contributing to the understanding of the Rwandan financial landscape. The findings of this study can be integrated into the university's curriculum, enriching the educational experience of students and providing valuable insights for faculty members engaged in related research.

## **1.10. Structure of the study**

In this study five chapters are the key for the research, arranged as follow:

The first chapter deal with the general introduction comprising the background on the study, problem statement, objective of the study, significance of the study, scope of the study and stricture of the study. The second chapter deal with the literature review that involve the conceptual review, related studies to this research and the conceptual framework. The third chapter deal with research methodology whereby different aspects of research used. The chapter four analyze and interprets

the finding and the chapter five composed of the summary of major findings, conclusion, and recommendation and suggestion for further research.

## **CHAPTER 2: LITERATURE REVIEW**

In theory, there is a case to support the view that since the rate of inflation means an increase in the general level of prices, and since common stocks can be considered as capital goods, then the stock prices should move with the general level of prices. So, when the general inflation rate increases, common stocks price should also increase to compensate investors for the decrease in the value of money. In this framework, it is expected that there is a positive relationship between the inflation rate and stock prices. However, as it will be seen in this chapter, a number of studies were undertaken to understand the nature of the effect of inflation on the economic growth. Only a few included the effect of inflation on stock markets investment in the economic development process. The absence of accurate stock market development indicators was one of the many reasons why a majority of the studies used bank measures of financial development and ignored the role of stock markets investment in such studies. But, recently the availability of more appropriate data has increased the scope for research in this field. In spite of this, debate still exists over the nature of the effect of inflation on stock market investment in the economic development.

### **2.1. Conceptual review**

This part of the study allows the researcher to define the key concepts of the study such as inflation, stock market and investment as linked in the research topic.

#### **2.1.1. Inflation**

Due to the fact that this study deals with inflation rate, it is essential to understand the meaning of inflation rate beforehand. According to Burda et al. (2003), inflation rate refers to rate of changes in average level of prices. The inflation rate relates closely to consumer price index (CPI). The

consumer price index means an index of prices of a set of goods which is a representative for an entire national consumption pattern.

There are a few different types of inflation but these two broad categorizations are common.

- Cost-push inflation happens when higher production costs increase overall prices in an economy.
- Demand-pull inflation happens when demand for goods and services outpaces the supply of those goods and services.

The national bank or central bank, plays a significant role in taming inflation through the use of monetary policy, usually dealing with the borrowing rate, which is the rate that banks pay for overnight borrowing. This influences the borrowing costs for household and business.

Inflation, especially at a high level, cause a chain reaction that reverberates through the stock market:

## **1. Inflation influences stock prices**

High inflation can affect stock prices in different ways depending on the strength of the business. Even amid rising prices. Some companies can still thrive because they are able to absorb or pass on price increases to consumers, while some cannot. According to Mark, Hamrick and Bankrate, Inflation that's surging above the long-term trend puts companies in awkward positions because they must make the hard judgments when and how much to raise prices, or to try to hold the line on price, which weighs on profit margins. While consumers might prefer that companies avoid passing along higher costs through price, shareholders and employees will also suffer because firms have less flexibility and lower revenues and even profits. These struggles can impact company valuation across the stock market and cause prices valuation to fluctuate. For years, it was believed that the inflation

coincided with weak economic growth and lower stock prices. But the stock market has seemed to reverse that trend.

## 2. Inflation impacts investor sentiment

Aside from company fundamentals, another reason stock prices can fall in the short term is due to weak investor sentiment. High inflation means higher interest rates are incoming, which decreases stock valuations, irrespective of the profit and operational performance of the market.

## 3. Inflation causes the market volatility

The uncertainty around the market can weather higher inflation and overall investor sentiment causes market volatility and unpredictability of the market. Some investors attempt to foresee which business will be more successful amid high inflation and rotate between market sectors. As monetary policy shifts, investors also become more reactive to news surrounding interest rate hikes and company forecast, exacerbating the volatility. Even minor changes in inflation data can cause market fluctuations.

### **2.1.2. Stocks Market**

The stock market has a rich and a longstanding history back centuries with its roots lie in Antwerp and London in the 1500s. Modern stock trading as we know it began with Amsterdam stock exchange being founded in 1668. Elements associated with modern stock markets such as an initial public offering (IPO) were first implemented via this exchange including offering Dutch East Indian company shares. Stock markets first appeared in other European cities during the late 1700s following by their introduction into newly formed United states in 1792 on wall street in New York; early trading activity largely considered of government bonds and banks stocks before 1817 when the New York Stock Exchange officially launched with trading stocks on insurance banking and coal companies located along East Coast Corridor. Through the 19th century, stock trading saw tremendous expansion across Western nations thanks to industrial revolution and railroads.

New communication technologies like the telegraph made long distance stock transactions possible and helped create an official national stock market. Over time, numerous private stock exchanges merged together into more regulated public exchanges; for example, London Stock Exchange and Paris Bourse were founded during this era. Western expansion and railroad growth led to the establishment of numerous stock exchanges throughout the US, including in San Francisco, Chicago and Kansas City; however, New York Stock Exchange remains dominant. Charles Dow created the Dow Jones Industrial Average index to measure industrial stocks traded on NYSE; today the Dow is still widely considered an indicator of performance on Wall Street. Following the stock market crash of 1929 that initiated the Great Depression, stricter controls were implemented to limit excessive speculation and fraud; eventually leading to the formation of the Securities and Exchange Commission (SEC) in 1934. Since then, stock markets worldwide have experienced remarkable growth, propelled by widespread public participation, technological innovations like electronic trading platforms, global expansion and increased regulation ultimately becoming inextricably linked with national and global economies alike. Stock markets have been identified as locations for engaging in economic transactions of buying and selling stocks or shares which are the ownership claims on businesses. This represents an aggregation of buyers and sellers of stock and need not be a physical location or a discrete entity. Stock markets are also known by different names as share markets and equity markets. A stock exchange, also called a securities exchange or bourse is the name given to the facility for engaging in buying and selling of shares of stock or bonds or other financial instruments. For a security to be traded on a stock exchange, it must be listed on a major stock exchange. In short, different stock exchanges and the inter relationships among them constitute the system of stock markets.



Stock markets are without any doubt, an integral and indispensable part of a country's economy. But the impact of stock markets on the country's economy can be different from how the other countries' stock markets affect their economies. This is because the impact of stock markets on the economy depends on various factors like the organization of stock exchanges, its relationship with other components of the financial system, the system of governance in the country etc. All of these factors are distinct for each country; therefore, the impact of stock markets on a country's economy is also distinct. Stock market can be divided in two categories, primary market which is a financial market in which freshly issued assets, such as stocks and bonds, are offered for the first time to the general public. Companies often sell shares directly to potential investors to raise capital via an IPO in the primary market. And secondary market is wherein the shares of companies are traded among investors. It means that investors can freely buy and sell shares without the intervention of the issuing company. In these transactions among investors, the issuing company does not participate in income generation, and share valuation is rather based on its performance in the market. Income in this market is thus generated via sale of the shares from one investor to another.

Financial markets provide liquidity, capital, and participation that are essential for economic growth and stability. Without financial markets, capital could not be allocated efficiently, and economic activity such as commerce and trade, investments, and growth opportunities would be greatly diminished.

### **2.1.3. Rwanda Stock Exchange (RSE)**

A stock exchange is an important factor in the capital market. It is a secure place where trading is done in a systematic way. Here, the securities are bought and sold as per well-structured rules and regulations. Securities mentioned here includes debenture and share issued by a public company that is correctly listed at the stock exchange, debenture and bonds issued by the government bodies, municipal and public bodies. Typically, bonds are traded Over-the-Counter (OTC), but a few corporate bonds are sold in a stock exchange. It can enforce rules and regulation on the brokers and firms that are enrolled with them. In other words, a stock exchange is a forum where securities like bonds and stocks are purchased and traded. This can be both an online trading platform and offline (physical location).

The Rwanda Stock Exchange Limited was incorporated on 7th October 2005 with the objective of carrying out stock market operations. The Stock Exchange was demutualized from the start as it was registered as a company limited by shares. The company was officially launched on 31st January, 2011.

As a vision of being the big contributor to the economic development and key player in leading Rwanda to be a Regional Financial Center status and the Mission of providing the main platform for promotion of savings and raising funds for long term investments in Rwanda and beyond.

#### **2.1.3.1. Functions of Rwanda Stocks Exchange:**

As all stock market exchange, RSE is following some of the most important functions in Rwanda economy:

1. **Economic Barometer:** RSE exchange serves as an economic barometer that is indicative of Rwanda economy. It records all the major and minor changes in the share prices. It is rightly said to be the pulse of the economy, which reflects the Rwanda economy.

2. Valuation of Securities: RSE helps in the valuation of securities based on the factors of supply and demand. The securities offered by companies that are profitable and growth-oriented tend to be valued higher. Valuation of securities helps creditors, investors and government in performing their respective functions.
3. Transactional Safety: Transactional safety is ensured as the securities that are traded in the stock exchange are listed, and the listing of securities is done after verifying the company's position. All companies listed have to adhere to the rules and regulations as laid out by RSE.
4. Contributor to Economic Growth: RSE offers a platform for trading of securities of the various companies. This process of trading involves continuous disinvestment and reinvestment, which offers opportunities for capital formation and subsequently, growth of the economy.
5. Making the public aware of equity investment: RSE helps in providing information about investing in equity markets and by rolling out new issues to encourage people to invest in securities.
6. Offers scope for speculation: By permitting healthy speculation of the traded securities, the RSE ensures demand and supply of securities and liquidity.
7. Facilitates liquidity: The most important role of RSE is in ensuring a ready platform for the sale and purchase of securities. This gives investors the confidence that the existing investments can be converted into cash, or in other words, stock exchange offers liquidity in terms of investment.
8. Better Capital Allocation: Profit-making companies will have their shares traded actively, and so such companies are able to raise fresh capital from the equity market. RSE helps in better allocation of capital for the investors so that maximum profit can be earned.

9. Encourages investment and savings: RSE serves as an important source of investment in various securities which offer greater returns.

#### **2.1.4. Investment**

Investment refers to the act of committing capital, whether financial, physical, or human, with the expectation of generating a future return or benefit. In the context of financial markets, investment typically involves the purchase of assets, such as stocks, bonds, or other securities, with the goal of earning a profit or generating income. Investments can be classified into different categories based on their risk-return profile, time horizon, and underlying asset class. For example, fixed-income investments, such as government bonds or corporate debt, are generally considered less risky and offer more stable, though lower, returns. Equity investments, or the purchase of stocks, are generally associated with higher risk but also the potential for higher returns over the long term. Investors can also diversify their portfolios by investing in a mix of asset classes, such as stocks, bonds, real estate, or commodities, to manage their overall risk exposure.

#### **2.2. Theoretical Review**

The relationship between inflation and stock market performance has been extensively studied in the finance and economics literature. The theoretical foundations for this relationship can be traced back to the work of Fama (1981) and Geske and Roll (1983), who proposed two competing hypotheses to explain the interaction between inflation and stock returns. The first hypothesis, known as the "Proxy Hypothesis," suggests that the negative relationship between inflation and stock returns is due to the fact that inflation is a proxy for changes in real economic activity (Fama, 1981). According to this view, high inflation is typically associated with a slowdown in economic growth, which in turn leads to lower corporate profits and, subsequently, lower stock prices.

Investors, anticipating the negative impact of inflation on future cash flows, adjust their investment decisions accordingly, leading to a decline in stock market returns.

In contrast, the "Monetary Hypothesis" proposed by Geske and Roll (1983) suggests that the relationship between inflation and stock returns is more complex and can be influenced by the actions of monetary policymakers. This hypothesis posits that when the central bank tightens monetary policy to control inflation, it can lead to higher interest rates, which in turn can have a negative impact on stock prices. Investors, anticipating the adverse effects of monetary policy on future cash flows, may adjust their investment strategies, leading to a decline in stock market performance. While these theoretical frameworks provide a foundation for understanding the relationship between inflation and stock market participation, the empirical evidence on this topic has been mixed. Some studies have found a negative relationship between inflation and stock returns (Boudoukh & Richardson, 1993; Ioannidis & Kontonikas, 2008), while others have reported a positive or insignificant relationship (Demirgüç-Kunt & Huizinga, 1996; Akmal, 2007).

The differences in findings can be attributed to several factors, including the specific economic and financial conditions of the countries studied, the time period analyzed, the methodological approaches employed, and the inclusion of other macroeconomic variables (Naes et al., 2011; Antonakakis et al., 2017). Moreover, the relationship between inflation and stock market returns may be nonlinear or time-varying, further complicating the analysis (Aye et al., 2015).

In the context of the Rwandan stock market, the existing literature on the inflation-stock market nexus is limited. However, studies on the broader macroeconomic factors influencing the Rwandan financial sector and capital market development can provide valuable insights (Kigabo et al., 2016; Donwa & Odia, 2010). These studies highlight the importance of understanding the role of monetary policy, exchange rate dynamics, and other macroeconomic variables in shaping the

performance of the Rwandan stock market. The current study aims to contribute to the existing literature by examining the effect of inflation on stock market investment in Rwanda, focusing on the period from 2020 to 2023. By employing a comprehensive analytical framework and incorporating relevant macroeconomic variables, this study will provide a deeper understanding of the inflation-stock market relationship in the Rwandan context, with implications for investment strategies and policy recommendations.

## **2.2.1. Theories on inflation**

### **2.2.1.1. Demand-Pull Inflation Theory**

The demand-pull inflation theory posits that inflation occurs when there is an excess demand for goods and services in the economy. This can happen when there is strong consumer demand, high investment spending, or expansionary fiscal and monetary policies. The increased demand allows businesses to raise prices, leading to a general rise in the price level. Proponents of this theory, such as Keynesian economists, argue that policymakers can use fiscal and monetary tools to manage aggregate demand and control inflation (Keynes, 1936).

### **2.2.1.2. Cost-Push Inflation Theory**

The cost-push inflation theory suggests that inflation can be driven by increases in the costs of production, such as rising wages or higher input prices. When businesses face higher costs, they may pass these increases on to consumers in the form of higher prices. This can trigger a self-reinforcing spiral of rising prices and wages. Factors like strong labor unions, supply chain disruptions, or increases in commodity prices (e.g., oil shocks) can contribute to cost-push inflation. Monetarist economists tend to favor this view, emphasizing the role of production-side factors in driving inflation (Friedman, 1968).

### **2.2.1.3. Monetarist Theory of Inflation**

The monetarist theory of inflation, associated with economists like Milton Friedman, emphasizes the role of the money supply in driving inflation. According to this theory, an increase in the money supply that outpaces the growth in real output will lead to a rise in the general price level. Monetarists argue that inflation is primarily a monetary phenomenon and that central banks should focus on controlling the money supply to maintain price stability. They contend that expansionary fiscal and monetary policies can fuel inflationary pressures by increasing the money supply (Friedman, 1963).

### **2.2.1.4. Structural Inflation Theory**

The structural inflation theory suggests that inflation can be rooted in the underlying structural characteristics of an economy, such as bottlenecks in production, rigidities in the labor market, or institutional factors. Developing countries, in particular, may experience structural inflation due to factors like import dependence, agricultural supply constraints, and inefficient distribution systems. Proponents of this theory, including some development economists, argue that addressing these structural issues is crucial for controlling inflation in these economies (Structuralist School of Latin American Economists, 1950s-1960s).

### **2.2.1.5. Adaptive Expectations Theory**

The adaptive expectations theory posits that individuals form their inflation expectations based on past inflation experiences. As people observe higher prices, they adjust their expectations and behavior accordingly, leading to a self-fulfilling cycle of rising prices. This theory suggests that if people expect higher inflation, they may demand higher wages or increase their spending, further contributing to inflationary pressures. Policymakers may need to break this cycle of adaptive expectations to effectively manage inflation (Friedman, 1957).

### **2.2.1.6. Review of related studies**

The relationship between inflation and stock market performance has been a topic of extensive research, with varying conclusions. In the case of the Rwanda Stock Exchange (RSE) from 2020 to 2023, several studies have examined the impact of inflation on stock market investment.

Ndikumana and Shingiro (2021) investigated the impact of inflation on stock prices in Rwanda. The study found that there is a significant negative relationship between inflation and stock prices on the RSE. The authors argued that high inflation erodes the purchasing power of investors, leading to a decrease in demand for stocks and, consequently, a decline in stock prices.

Mutesi and Munyankindi (2022) analyzed the effect of macroeconomic factors, including inflation, on the performance of the RSE. Their findings suggest that inflation has a negative and statistically significant impact on stock market returns. The study concluded that policymakers should implement measures to stabilize the inflation rate in order to promote a favorable investment climate on the RSE.

Gasana and Nkurunziza (2023) examined the dynamic relationship between inflation and stock market volatility in Rwanda. Their findings indicate that an increase in the inflation rate leads to



higher stock market volatility on the RSE. The authors attributed this to the uncertainty and risk associated with high inflation, which can discourage investors from participating in the stock market.

Furthermore, a report by the Rwanda Capital Market Authority (2022) highlighted the challenges faced by the RSE due to the high inflation environment. The report noted that the rising cost of living and the erosion of purchasing power have dampened investor sentiment and reduced the attractiveness of stock market investments in Rwanda.

These studies suggest that high inflation has a detrimental impact on the performance of the Rwanda Stock Exchange. Elevated inflation rates are found to be associated with lower stock prices, reduced stock market returns, and increased stock market volatility, which can discourage investors from participating in the stock market.

The existing literature also highlights the importance of policymakers implementing measures to stabilize the inflation rate in order to promote a favorable investment climate on the RSE. Addressing the challenges posed by high inflation is crucial for the development and growth of the Rwandan stock market.

It is worth noting that the reviewed studies cover the period from 2020 to 2023, a time when Rwanda, like many other countries, has faced the economic challenges posed by the COVID-19 pandemic and subsequent inflationary pressures. The findings from this period may provide valuable insights for policymakers and investors in the Rwandan stock market.

Overall, the review of related studies suggests that the effect of inflation on stock market investment in Rwanda is a critical area of research that deserves continued attention from academics and policymakers. Understanding the dynamics of this relationship can inform

strategies to enhance the resilience and attractiveness of the Rwanda Stock Exchange. The existing literature on the effect of inflation on stock market investment in Rwanda provides a comprehensive understanding of the challenges faced by the RSE and the need for effective policy interventions to mitigate the negative impacts of high inflation on the Rwandan stock market.

#### **2.2.1.7. Research gap**

While the reviewed studies provide valuable insights into the relationship between inflation and stock market performance in Rwanda, there are several research gaps that warrant further investigation. First, the existing studies primarily focus on the period from 2020 to 2023, which coincides with the COVID-19 pandemic and the subsequent inflationary pressures. Expanding the temporal scope of the research to include a longer historical period could provide a more comprehensive understanding of the long-term dynamics between inflation and the Rwandan stock market (Ndikumana & Shingiro, 2021; Mutesi & Munyankindi, 2022).

The current literature examines the overall impact of inflation on the Rwanda Stock Exchange, but there is a lack of research that delves into the differential effects on various sectors or individual firms. Analyzing the heterogeneous responses of different industries or companies to inflation could yield valuable insights for investors and policymakers (Gasana & Nkurunziza, 2023).

Comparing the Rwandan experience with the effects of inflation on stock markets participation, in other developing or neighboring countries could provide a broader perspective and identify potential regional or global trends (Rwanda Capital Market Authority, 2022).

The existing studies are predominantly quantitative in nature, focusing on statistical analyses of the relationship between inflation and stock market performance. Incorporating qualitative methods, such as interviews with market participants or case studies, could provide a more

nuanced understanding of the underlying mechanisms and decision-making processes (Ndikumana & Shingiro, 2021).

While the studies suggest the need for policy interventions to stabilize inflation, there is limited research on the specific policy measures that could be effective in the Rwandan context. Investigating the potential policy options and their practical implementation could inform policymakers and contribute to the development of the Rwandan stock market (Mutesi & Munyankindi, 2022).

The existing literature does not adequately address the role of investor sentiment in the relationship between inflation and stock market investment. Exploring how investor perceptions and behaviors are influenced by inflationary pressures could yield valuable insights (Rwanda Capital Market Authority, 2022).

The current research focuses on the macroeconomic aspects of the inflation-stock market relationship, but there is a need to investigate the microstructural dynamics, such as trading patterns, liquidity, and price discovery mechanisms, that may be affected by inflation (Gasana & Nkurunziza, 2023).

#### **2.2.1.8. Conceptual framework**

The conceptual framework is an analytical tool with several variations and contexts. It is used to make conceptual distinctions and organize ideas. Strong conceptual frameworks capture something real and do this in a way that is easy to remember and apply.

## **2.2.1.8.1. Elements determining the inflation**

### **1. Inflation Rate**

The inflation rate refers to the measure of the rate of change in the general price level of goods and services in an economy over time (Mankiw, 2020). It is typically expressed as a percentage change in the price level, often calculated on an annual basis. The inflation rate is a crucial economic indicator that helps policymakers and consumers understand the erosion of the purchasing power of a currency (Blanchard, 2017).

- **Consumer Price Index (CPI)**

The Consumer Price Index (CPI) is a widely used measure of inflation that tracks the changes in the prices of a basket of consumer goods and services over time (Samuelson & Nordhaus, 2010). The CPI is calculated by the statistical agencies of various countries and is often used as the benchmark for monitoring and targeting inflation by central banks (Mishkin, 2019). The CPI is crucial for understanding the changes in the cost of living and the purchasing power of a currency.

- **Purchasing Power of Currency**

The purchasing power of a currency refers to the amount of goods and services that can be bought with a given unit of that currency (Krugman & Wells, 2018). Inflation erodes the purchasing power of a currency, as the same amount of money can buy fewer goods and services over time (Dornbusch et al., 2014). Monitoring the purchasing power of a currency is essential for understanding the real value of a currency and the standard of living in an economy.

## **2. Theory on stock market investment**

- **Efficient Market Hypothesis**

The efficient market hypothesis (EMH) suggests that stock prices reflect all available information, and that it is impossible for investors to consistently outperform the market (Fama, 1970). According to this theory, stock prices adjust rapidly to new information, making it impossible to identify undervalued or overvalued stocks. Proponents of EMH argue that the best investment strategy is to hold a diversified portfolio that tracks the overall market, as active stock picking is unlikely to generate superior returns (Malkiel, 2003).

- **Behavioral Finance Theory**

Behavioral finance theory challenges the assumptions of the efficient market hypothesis by incorporating psychological factors that influence investor behavior and decision-making (Shiller, 2003). This theory suggests that investors are not always rational and can be influenced by cognitive biases, emotions, and herd behavior, leading to mispricing of assets in the stock market. Proponents of this theory argue that investors can potentially exploit these market inefficiencies by using behavioral insights to make informed investment decisions (Kahneman & Tversky, 1979).

- **Modern Portfolio Theory**

The modern portfolio theory (MPT) developed by Harry Markowitz suggests that investors can optimize their portfolios by diversifying their investments across different assets, aiming to maximize returns while minimizing risk (Markowitz, 1952). This theory emphasizes the importance of considering the covariance between different assets in a portfolio, rather than just

focusing on the individual risks of each asset. MPT provides a framework for investors to construct efficient portfolios that balance risk and return (Bodie et al., 2018).

- **Valuation Models**

Valuation models, such as the discounted cash flow (DCF) model and the dividend discount model, provide a framework for investors to estimate the intrinsic value of a stock (Damodaran, 2012). These models analyze factors like a company's future cash flows, growth potential, and risk profile to determine whether a stock is undervalued or overvalued compared to its market price. Investors can then use these valuation estimates to identify potentially mispriced stocks and make informed investment decisions (Brealey et al., 2020).

### **3. Elements determining the stock market investment.**

- **Stock Market Performance**

Stock market performance refers to the overall movement and behavior of the stock market, typically measured by the performance of major stock market indices like the S&P 500, NASDAQ Composite, or Dow Jones Industrial Average (Bodie et al., 2018). Stock market performance is influenced by various factors, such as economic conditions, corporate earnings, investor sentiment, and geopolitical events. Analyzing stock market performance is crucial for investors, policymakers, and economists to understand the health and direction of the economy (Mishkin, 2019).

- **Stock Prices**

Stock prices represent the market value of a company's shares, determined by the supply and demand for those shares in the stock market (Brealey et al., 2020). Stock prices fluctuate based on various factors, including the company's financial performance, market sentiment, industry trends, and macroeconomic conditions. Understanding the factors that influence stock prices is essential for investors to make informed decisions about buying, holding, or selling stocks (Damodaran, 2012).

- **Investment in Stocks**

Investing in stocks, also known as equities, involves purchasing shares of publicly traded companies with the goal of generating returns, either through capital appreciation (the increase in the stock's market price) or dividends (the periodic payments made to shareholders) (Sharpe et al., 1999). Investors can pursue various strategies, such as value investing, growth investing, or index investing, depending on their risk tolerance, investment objectives, and market conditions (Bodie et al., 2018). Effective stock investment requires a thorough understanding of the stock market, **company fundamentals, and investment theories.**

#### **4. Overview on related concepts**

- **Unemployment rate**

The unemployment rate is the proportion of the labor force that is jobless, expressed as a percentage. It is an important macroeconomic indicator that reflects the overall health and productivity of an economy. (Ghosh & Ghoshdastidar, 2020)

- **Gross Domestic Product (GDP)**

GDP is the total monetary value of all the finished goods and services produced within a country's borders in a specific time period. It is a comprehensive measure of a country's economic activity and is widely used to assess economic growth and development. (Mankiw, 2020)

- **Exchange rates**

The exchange rate is the price of one currency in terms of another. It determines the relative value of different currencies and can have significant impacts on international trade, investment, and financial markets. (Salvatore, 2019)

- **Commodity prices**

Commodity prices refer to the market prices of raw materials or basic agricultural products, such as oil, gold, wheat, or coffee. Fluctuations in commodity prices can affect inflation, consumer spending, and the stock market. (Gorton & Rouwenhorst, 2006)

- **Investor sentiment**

Investor sentiment refers to the overall attitude or mood of investors towards the stock market. It can be influenced by various psychological factors, such as fear, greed, and optimism, and can affect investment decisions and market volatility. (Baker & Wurgler, 2007)



- **Risk tolerance**

Risk tolerance is an individual's willingness to accept the possibility of financial loss in exchange for potential gains. It is a key factor in investment decision-making and can influence the types of assets an investor chooses to hold. (Grable, 2000)

- **Diversification strategies**

Diversification is the process of allocating capital across different asset classes, sectors, or geographic regions to reduce the overall risk of an investment portfolio. According to Markowitz, 1952, the effective diversification can help investors mitigate the impact of inflation and market volatility.

- **Regulatory environment**

The regulatory environment refers to the laws, regulations, and policies that govern the financial and investment markets. It can have a significant impact on the operation and performance of stock markets, as well as the investment decisions of market participants. (Albuquerque, 2014)

- **Technological advancements**

According to Fisch & Sporrer, 2019, technological advancements, such as the development of digital trading platforms, big data analytics, and artificial intelligence, have transformed the stock market and investment landscape. These innovations can affect market efficiency, trading patterns, and investment strategies.

- **Geopolitical factors**

According to Apergis & Apergis, 2016, the Geopolitical factors, such as political instability, trade tensions, or global conflicts, can have significant impacts on the stock market and investment decisions. These factors can introduce uncertainty and volatility in financial markets.

## **5. Other important elements related terms**

### **1. Arbitrage**

Arbitrage refers to purchasing an asset from one market and selling it to another market where the selling price is higher than what you paid for it, resulting in profit.

### **2. Asset allocation**

Asset allocation is an investment strategy that aims to balance risk and reward by dividing a certain percentage of investments like stocks, bonds, real estate, cash, etc. across different assets in an investment portfolio.

### **3. Asset Classes**

Asset classes are categories of assets, such as stocks, bonds, real estate, or cash.

### **4. Averaging down**

Averaging down is an investing strategy that involves buying additional shares of an asset or stock after its price has fallen, resulting in a lower average purchase price.

### **5. Bear market**

A bear market is a market condition in which prices are expected to fall. Typically, this entails major indexes or stocks decreasing by 20% or more compared to previous highs.

## **6. Beta**

Beta is the measure of an asset's risk in relation to the market. A stock with a beta of 1.5 means that the stock typically moves 50% more than the market in the same direction. Generally, a higher beta indicates a riskier investment if the market rises 10%, the stock will rise by 15%, but if the market falls by 10%, the stock will fall by 15%.

## **7. Bid**

The price a trader is willing to pay for shares of a stock or other asset.

## **8. Ask**

An ask is the selling price that a trader offers for their shares.

## **9. Bid-ask spread**

Bid-ask spread is the difference between what buyers are willing to pay and the price sellers are asking for a stock.

## **10. Blockchain**

The Blockchain is a record-keeping database in which transactions made in Bitcoin or other cryptocurrencies are recorded across multiple computers and distributed across the entire network of those computers.

## **11. Blue-chip stocks**

Blue-chip stocks are common stocks of well-known companies known for their quality and history of growth.

## **12. Bond**

A Bond is a type of security loaned by an investor to a borrower like a company or government used to fund its operations.

## **13. Bull market**

A Bull market is a market condition in which prices are expected to rise.

#### **14. Buyback**

A Buyback is when a company repurchases outstanding shares to reduce the number of shares on the market and return profits to their investors, resulting in an increased value of the remaining shares.

#### **15. Capitalization**

Also known as market cap, capitalization is the total market value of all a company's outstanding shares. It's calculated by multiplying the total number of shares by the current share price. Check out the largest companies by market cap here.

#### **16. Capital gains**

Capital gains refers to the profit earned after selling an asset or investment for a higher price than you paid for it.

#### **17. Common stock**

This is one of the most basic stock market terms to know. Common stock is a type of security that represents ownership in a company. Holders of common stock are able to vote on matters like corporate policies and elect directors within that company.

#### **18. Day trading**

Day trading is the practice of buying and selling shares of stock within a single day.

#### **19. Debt-to-equity ratio**

Debt-to-equity ratio represents a function of a company's debt relative to its equity, or the value of its assets minus its liabilities. The ratio is found by dividing total liabilities by total shareholder equity.

## **20. Diversification**

Diversification is an investment strategy that divides investment funds across a variety of assets in order to minimize overall risk.

## **21. Dividend**

Dividend is one of the most basic terms for the stock market. It's simply a portion of a company's earnings paid out to its shareholders.

## **22. Dollar-Cost Averaging**

is an investment strategy in which you invest a fixed amount on a regular basis regardless of the price of the asset.

## **23. Dow Jones Industrial Average (DJIA)**

Also known as Dow 30, the Dow Jones Industrial Average is a stock market index consisting of the 30 most-traded blue-chip stocks on the New York Stock Exchange. It's used to measure the performance of shares among the largest U.S. companies and gauge the overall direction of stock

## **24. Earnings per Share (EPS)**

Earnings per Share (EPS) is a company's profit divided by its number of outstanding shares, and is used to measure corporate profitability.

## **25. Economic Bubble**

An economic bubble is a situation where asset prices surge to significantly higher levels than the fundamental value of that asset.

## **26. Equal Weight Rating**

An equal weight rating is a measure used by equity analysts to signify how well a stock is performing relative to other stocks. An equal weight rating suggests that a stock will perform similarly with the average of all the stocks being used for comparison.

## **27. Equity Income**

Equity income is used to describe any income received from stock dividends.

## **28. Exchange**

An exchange, or stock exchange, is a marketplace where investors and traders buy and sell stocks. You've probably heard of the most well-known exchanges in the U.S: the New York Stock Exchange (NYSE) and Nasdaq; in our case we have the Kigali stock exchange.

## **29. Exchange-Trades Funds (ETFs)**

Commonly known as ETFs, exchange-traded funds are a collection of stocks or bonds combined in a single fund that can be purchased and traded on major stock exchanges. Similar to mutual funds, they're a pooled investment fund, meaning a "pool" of money is aggregated from multiple investors.

## **30. Expense ratio**

An expense ratio measures the cost of owning a mutual fund, including expenses like the management of the fund, overhead fees, and any other costs associated with running the fund. It's essentially an administrative fee paid to the company in return for owning the fund. The ratio is measured as a percentage of your total investment, for example, if you invest \$10,000 in a fund with an expense ratio of 0.20%, you'll pay \$20 on top of your investment.

## **31. futures**

A future is a contract that requires a buyer to purchase a specific asset, and the seller to sell that asset at a certain future date at an agreed-upon price. Futures are a way for investors to hedge current investments a risk management strategy intended to offset potential losses in other investments.

### 32. Going Long

Going long refers to the act of buying stock shares with the expectation that the asset's price will rise, resulting in a profit.

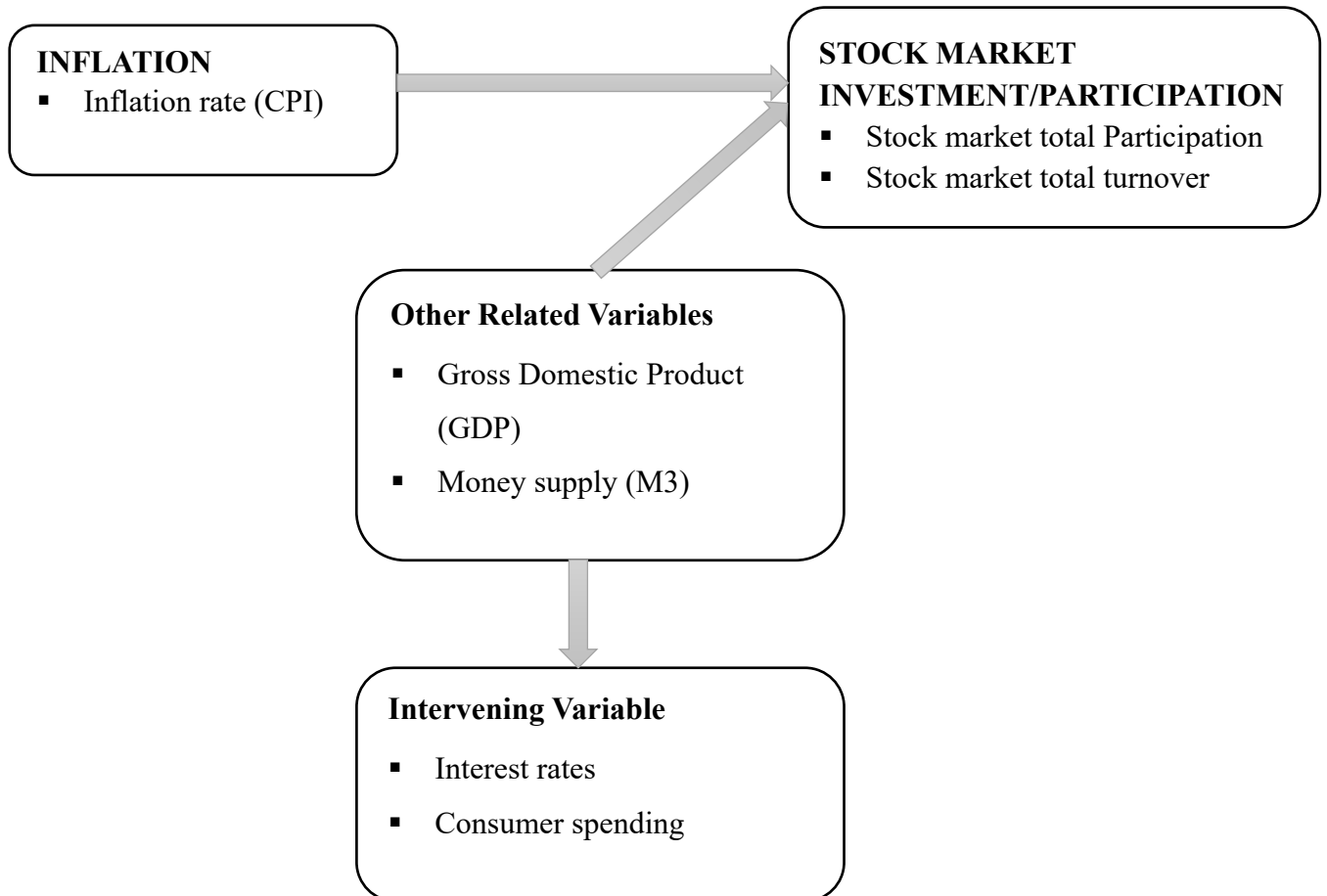
### 33. Going Short

Going Short is the opposite of going long, and it refers to the act of selling stock shares with the expectation that the asset's price will fall. When an investor goes short on an asset, they borrow that asset, sell it, and hopefully purchase it later at a lower price if the price does decline, resulting in profit.

**Figure 1: Conceptual framework**

Independent Variable

Dependent Variable



The primary independent variable in this research is inflation, which can be measured through indicators such as the inflation rate and the Consumer Price Index (CPI). Inflation reflects the overall increase in the general price level of goods and services, which ultimately erodes the purchasing power of a country's currency. This can have significant implications for stock market investment, as it affects the real returns earned by investors. The dependent variable in this context is stock market investment, which can be examined through various metrics such as stock market performance, stock prices, and the level of investment in stocks. Inflation can impact stock market investment in several ways. Higher inflation can lead to rising input costs for companies, which can squeeze profit margins and negatively affect stock prices. Inflation can also influence investor sentiment, leading to increased risk aversion and a shift away from equity investments. Additionally, inflation can prompt central banks to raise interest rates, which can make alternative investments, such as fixed-income securities, more attractive relative to stocks.

The relationship between inflation and stock market investment is further mediated by a range of intervening variables, including interest rates, economic growth, consumer spending, investor confidence, corporate earnings, and monetary policy. For instance, the central bank's response to inflationary pressures through adjustments in interest rates can have a direct impact on the stock market, as higher interest rates tend to make borrowing more expensive and reduce the present value of future cash flows. Similarly, economic growth and consumer spending can influence corporate earnings and the overall attractiveness of stocks as an investment option. Investor confidence and risk tolerance are also crucial factors that can shape investment decisions and stock market performance in the face of inflationary pressures.



## **CHAPTER 3: RESEARCH METHODOLOGY**

The research methodology for this study employed a quantitative approach to investigate the effect of inflation on stock market investment using the case of the Rwanda Stock Exchange (RSE) from 2019 to 2023. Secondary data on key macroeconomic indicators such as inflation rates and stock market performance metrics will be collected from official government and regulatory sources. Regression analysis will be utilized to model the relationship between inflation and stock returns, trading volumes, and other relevant stock market variables. The study will also incorporate appropriate control variables to isolate the specific impact of inflation on the Rwandan stock market. The findings from this empirical analysis will provide insights into how changes in the general price level have influenced investment decisions and overall stock market dynamics in the Rwandan context during the period of interest.

### **3.1. Research Design**

The research design for this study adopted a historical, time-series approach to investigate the relationship between inflation and stock market investment in the context of the Rwanda Stock Exchange (RSE) from 2019 to 2023. This research design is well-suited for the study as it allows for the examination of past events and their effects on current phenomena (Salkind, 2010). The historical research design is particularly relevant as it enables the researchers to analyze the historical data on inflation and stock market performance, identify trends, patterns, and the direction and magnitude of the relationships over the specified period. According to Gujarati & Porter, 2009, This approach is widely used in the literature on the impacts of macroeconomic factors on financial markets, as it provides insights into how changes in the economic environment have influenced investment decisions and overall stock market dynamics.

The time-series approach, in particular, is appropriate for this study as it captures the dynamic nature of the relationship between inflation and stock market variables. By analyzing the data over time, the researchers can examine how changes in inflation affect stock market returns, trading volumes, and other relevant indicators, allowing for a deeper understanding of the underlying mechanisms and the potential lags or feedback effects (Brooks, 2014). The study will utilize secondary data, which will be collected from various official sources, such as the National Institute of Statistics of Rwanda (NISR), the National Bank of Rwanda (BNR), and the Rwanda Stock Exchange (RSE). The key variables to be included in the analysis are inflation rates, stock market returns, trading volumes, and other relevant macroeconomic indicators.

To ensure the reliability and validity of the data, the researchers will cross-check the information from multiple credible sources and verify the consistency and accuracy of the data. Additionally, the data will be subjected to appropriate statistical tests to identify and address any issues related to stationarity, autocorrelation, and heteroskedasticity (Brooks, 2014). The empirical analysis will be conducted using regression techniques, such as ordinary least squares (OLS) regression and possibly more advanced techniques like autoregressive distributed lag (ARDL) models or vector autoregressive (VAR) models. These methods will help to establish the nature and strength of the relationship between inflation and stock market variables, while also accounting for the potential endogeneity and dynamic interactions between the variables (Gujarati & Porter, 2009; Brooks, 2014).

To enhance the robustness of the findings, the study will incorporate relevant control variables, such as the Gross Domestic Product, the M3, and global market conditions, to isolate the specific impact of inflation on the Rwandan stock market. This approach will help to disentangle the effects of inflation from other macroeconomic factors that may also influence stock market dynamics

(Gokmenoglu & Fazlollahi, 2015; Tripathi & Kumar, 2014). The study will also examine the potential asymmetric or non-linear effects of inflation on stock market performance, as the relationship may not be linear or consistent across different levels of inflation (Izeddin & Lebo, 2018; Rapach, 2002). This analysis will provide a more comprehensive understanding of how inflation affects the stock market in the Rwandan context.

The findings from this study will contribute to the existing literature on the relationship between macroeconomic factors and stock market performance, with a specific focus on the Rwandan stock market. The results will have important implications for policymakers, investors, and other stakeholders in the Rwandan financial sector, as they strive to develop effective strategies to mitigate the potential adverse effects of inflation on stock market investment and overall financial stability.

## **3.2. Population and Sample size of the study**

### **3.2.1. Population Study**

The population for this study encompasses the entire universe of data related to the Rwanda Stock Exchange (RSE) from 2013 to 2022. This includes the historical time-series data on key macroeconomic indicators, such as CPI, GDP, M3, as well as the Stock Market Participation and other relevant variables.

Defining the population is crucial as it establishes the boundaries of the study and ensures that the findings can be generalized to the broader context of the Rwandan stock market. By considering the entire population of data, the researchers can obtain a comprehensive understanding of the relationships and trends within the RSE during the specified period of 10 years.

Since the study will be using secondary data, the sample size will encompass the complete set of available data points from 2013 to 2022. This approach is advantageous as it eliminates the need for sampling techniques, which are typically employed when working with primary data (Saunders et al., 2019). By utilizing the full population of data, the researchers can ensure the accuracy and reliability of the findings, as they will not be subject to the potential biases or limitations associated with sample selection.

Moreover, the use of the complete population of data allows for a more robust and comprehensive analysis, as it captures the full spectrum of the stock market's behavior and the interactions between inflation and other macroeconomic variables (Brooks, 2014). This approach is particularly suitable for time-series studies, where the objective is to uncover the dynamic relationships between variables over an extended period of 10 years.

The benefits of using the entire population of data for this study are manifold. Firstly, it eliminates the potential sampling error that can arise when working with a subset of the population, thereby enhancing the internal validity and reliability of the findings (Creswell & Creswell, 2018). Secondly, the use of the full population of data allows for more precise and robust statistical analysis, as the researchers can leverage the complete information available to model the complex relationships and interactions between the variables of interest (Brooks, 2014).

### **3.2.2. Sample size**

In this study, the sample size encompasses the complete set of available data of Inflation, Gross Domestic Products, Money Supply and Rwanda Stock Market participation from 2013 to 2022 for the Since the study is utilizing secondary data, there is no need to calculate a specific sample size, as the researchers will have access to the entire population of relevant data.

By using the full population of data, the researchers can ensure that the analysis is based on the most comprehensive and reliable information available. This approach eliminates the potential issues associated with sample selection, such as sampling bias or errors, and allows for a more robust and accurate investigation of the relationship between inflation and stock market investment in the Rwandan context (Brooks, 2014). The use of the complete data set also enables the researcher to capture the dynamic nature of the stock market and the interactions between macroeconomic variables over the specified period, leading to more reliable and meaningful conclusions.

### **3.3.3. Data Collection Techniques and Tools**

#### **3.3.3.1. Secondary Data Collection**

The primary data collection technique for this study involves the use of secondary data sources. The researchers gathered time-series data on key macroeconomic indicators, such as Inflation rates, Gross Domestic Product rate, Money supply, as well as stock market participation, and other relevant variables, from the official websites and databases of the National Institute of Statistics of Rwanda (NISR), the National Bank of Rwanda (BNR), and the Rwanda Stock Exchange (RSE).

#### **3.3.3.2. Data Verification and Cross-Checking**

To ensure the reliability and validity of the data, the researchers cross-check the information from multiple credible sources and verify the consistency and accuracy of the data. This process will involve comparing the data from the NISR, BNR, and RSE, and resolving any discrepancies or inconsistencies that may arise (Saunders et al., 2019).

### **3.3.3.3. Secondary Data Supplementation**

In addition to the primary data sources, the researchers may also consult academic journals, industry reports, and other relevant publications to gather supplementary information that could enhance the understanding of the Rwandan stock market and the macroeconomic environment during the study period. This secondary data collection approach will provide a more comprehensive and well-rounded understanding of the research topic.

### **3.3.3.4. Statistical Software for Data Processing**

The data collection process also involve the use of specialized software and tools to extract, organize, and process the data. This may include the use of statistical software packages, such as e-views, to import the time-series data, clean and transform the variables, and prepare the dataset for the subsequent analysis.

### **3.3.3.5. Web Scraping Techniques**

The researchers may also utilize web scraping techniques to collect data directly from the websites of the NISR, BNR, and RSE, particularly if the data is not readily available in a downloadable format. This approach can help to automate the data collection process and ensure the timeliness and completeness of the dataset (Gandomi & Haider, 2015). The data collection techniques and tools employed in this study will be designed to ensure the highest possible level of data quality, reliability, and accessibility, enabling the researchers to conduct a thorough and rigorous analysis of the relationship between inflation and stock market investment in the Rwandan context.

### **3.3.4. Validity and reliability tests**

By incorporating these validity and reliability tests, the researchers can enhance the credibility and trustworthiness of the study's findings, ensuring that the conclusions drawn are both accurate and

generalizable within the context of the Rwanda Stock Exchange (RSE) during the 2013-2022 period.

#### **3.3.4.1. Validity Tests**

To ensure the validity of the research findings, the study will employ various techniques to assess the validity of the data and the analytical methods used. The researcher will carefully examine the secondary data sources, such as the official websites and databases of the National Institute of Statistics of Rwanda (NISR), the National Bank of Rwanda (BNR), and the Rwanda Stock Exchange (RSE), to ensure that the collected data accurately reflects the variables of interest and is representative of the Rwandan stock market and macroeconomic conditions (Creswell & Creswell, 2018). The operationalization of the key variables, such as inflation rates and stock market performance metrics, will be thoroughly reviewed to ensure that they effectively capture the underlying concepts and are consistent with the theoretical framework of the study (Saunders et al., 2019). The researcher will assess the extent to which the findings of the study can be generalized to the broader context of the Rwandan stock market and potentially other emerging markets. This will involve evaluating the representativeness of the data and the robustness of the empirical analysis (Creswell & Creswell, 2018).

### **3.3.4.2. Reliability Tests**

The reliability of the study will be assessed through various statistical techniques to ensure the consistency and stability of the data and the analytical methods employed. The researcher will examine the internal consistency of the data by conducting appropriate statistical tests, such as Cronbach's alpha, to measure the reliability of the variables and ensure that they are consistently measured over time. He may also perform test-retest reliability assessments, where the analysis is repeated using the same data and methods, to ensure that the findings are consistent and stable over time (Creswell & Creswell, 2018).

The researcher will conduct various robustness checks, such as sensitivity analyses and alternative model specifications, to ensure that the results are not sensitive to the choice of estimation techniques or the inclusion/exclusion of specific variables (Brooks, 2014).

### **3.3.5. Data processing**

#### **3.3.5.1. Data Editing and Cleaning**

The first step in the data processing phase will involve carefully editing and cleaning the raw data collected from the various secondary sources, such as the National Institute of Statistics of Rwanda (NISR), the National Bank of Rwanda (BNR), and the Rwanda Stock Exchange (RSE). This process will ensure the accuracy, consistency, and completeness of the data by identifying and addressing any errors, missing values, or outliers that may be present in the dataset (Saunders et al., 2019). The researchers will employ various techniques, such as checking for data entry errors, verifying the units of measurement, and handling any inconsistencies or discrepancies in the data.



### **3.3.5.2. Data Coding and Transformation**

After the initial editing and cleaning, the researchers will proceed to code and transform the data into a format suitable for statistical analysis. This may involve assigning numerical values to categorical variables, creating dummy variables, or transforming the variables to ensure they meet the assumptions of the statistical techniques to be employed (Gujarati & Porter, 2009). The coding and transformation of the data will be guided by the research objectives and the theoretical framework of the study, ensuring that the processed data accurately represents the key variables and their relationships.

### **3.3.5.3. Data Tabulation and Organization**

The processed data will then be organized into a structured tabular format, which will facilitate the subsequent analysis and interpretation of the results. This may involve creating spreadsheets or importing the data into statistical software packages, such as STATA or EViews, IBM SPSS to arrange the variables and observations in a way that enables efficient data manipulation and analysis (Brooks, 2014). The tabulation of the data will also help the researchers to identify any potential patterns, trends, or anomalies in the stock market and macroeconomic variables.

### **3.3.5.4. Data Synchronization and Integration**

To ensure the coherence and consistency of the dataset, the researchers will carefully synchronize the data from different sources, aligning the time periods, frequency, and units of measurement across the various variables. This process will involve merging the data from the NISR, BNR, and RSE into a single, comprehensive dataset, allowing for the seamless integration of the macroeconomic and stock market variables (Saunders et al., 2019). The synchronized and integrated dataset will form the basis for the subsequent empirical analysis, enabling the

researchers to examine the dynamic relationships between inflation and stock market investment in the Rwandan context.

### **3.3.6. Methods of data analysis**

The researcher will employ a range of data analysis methods to investigate the relationship between inflation and stock market investment in the Rwandan context. The choice of analytical techniques will be guided by the research objectives, the nature of the data, and the theoretical framework underpinning the study.

#### **3.3.6.1. Structural Analysis Method**

The study will utilize the structural analysis method to examine the underlying structure and the direction of the relationship between inflation and stock market variables. This approach will involve the use of regression techniques, such as ordinary least squares (OLS) regression, to model the impact of inflation on stock market returns, trading volumes, and other relevant indicators (Gujarati & Porter, 2009). The researchers will also explore the potential non-linear or asymmetric effects of inflation on the stock market by incorporating appropriate techniques, such as threshold regression or piecewise linear models (Izeddin & Lebo, 2018).

#### **3.3.6.2. Systemic Analysis Method**

To account for the dynamic and interdependent nature of the variables, the researcher may also employ systemic analysis methods, such as vector autoregressive (VAR) models or autoregressive distributed lag (ARDL) models. These techniques will allow the researchers to capture the potential feedback effects and the lagged relationships between inflation and stock market performance, providing a more comprehensive understanding of the underlying mechanisms (Brooks, 2014).

### **3.3.6.3. Comparative Analysis Method**

The researcher may also adopt a comparative analysis approach, where the findings from the Rwandan stock market are compared to those of other emerging markets or regional peers. This analysis will help to identify any unique characteristics or patterns in the Rwandan stock market's response to inflation, as well as to draw broader conclusions about the relationship between macroeconomic factors and stock market dynamics in similar economic contexts (Gokmenoglu & Fazlollahi, 2015).

### **3.3.6.4. Historical Analysis Method**

Given the time-series nature of the study, the researchers will also leverage historical analysis methods to examine the long-term trends and the evolution of the relationship between inflation and stock market investment in Rwanda. This approach will involve the use of techniques such as time-series decomposition, trend analysis, and structural break tests to uncover the underlying patterns and the potential shifts in the dynamics over the 2019-2023 period (Rapach, 2002).

### **3.3.7 Specification of the model**

$$MP = \beta_0 + \beta_1 \text{INF} + \beta_2 \text{GDP} + \beta_3 \text{M3} + \beta_4 \text{ER} + \mu$$

This model will be linearized by using logarithmic function. Hence

$$\log MP = \log \beta_0 + \beta_1 \log \text{INF} + \beta_2 \log \text{GDP} + \beta_3 \log \text{M3} + \beta_4 \log \text{ER} + \log \mu$$

Whereby  $\beta_0$ ,  $\beta_1$ ,  $\beta_2$ ,  $\beta_3$ , and  $\beta_4$  are parameter of the model and  $\log \mu$  is the error term.

### **3.3.7. Limitations**

The limitation of our study is based on the use of world bank data, that sometime are not corresponding with the National published data.

### **3.3.8. Ethical Considerations**

As this study relies on the use of secondary data from official sources, the ethical considerations primarily involve the handling of the data and ensuring the integrity and transparency of the research process. The researchers will ensure the strict confidentiality of the data collected from the National Institute of Statistics of Rwanda (NISR), the National Bank of Rwanda (BNR), and the Rwanda Stock Exchange (RSE). All the data will be securely stored, and access will be limited only to the research team to protect the privacy and confidentiality of the information (Saunders et al., 2019).

The researcher is committed to maintaining the highest standards of research integrity and truthfulness throughout the study. This includes accurately representing the data, faithfully reporting the findings, and avoiding any form of fabrication, falsification, or misrepresentation of the results (Creswell & Creswell, 2018). The researcher will also strictly avoid any form of plagiarism or unauthorized copying of content from other sources. All references and citations will be properly acknowledged, and the researchers will ensure that the written work is original and reflects their own intellectual contribution (Saunders et al., 2019).

As the study relies on secondary data, there is no requirement for obtaining individual consent from the data subjects. However, the researcher will maintain transparency by clearly communicating the purpose, methods, and intended use of the data to the relevant authorities, such as the NISR, BNR, and RSE, to ensure their understanding and approval (Creswell & Creswell, 2018). The nature of this study, which involves the analysis of historical financial and macroeconomic data, does not pose any direct risks or safety concerns to the participants or the researchers. Nevertheless, the researcher will ensure that the research process and the

dissemination of the findings do not inadvertently cause any harm or unintended consequences to the individuals, institutions, or the broader Rwandan financial sector (Saunders et al., 2019).

## CHAPTER 4: DATA ANALYSIS AND DISCUSSION OF FINDINGS

This chapter presents the findings, analysis, interpretation and discussions of the research based on the research instruments used. Data analysis and discussion of the results are essential component of this research because they provide insights into the effect of the inflation on the stocks market investment.

In order to observe the inflation-stock market participation relationship as the main variable, the relationship between inflation and other two variables GDP and M3; four variables are taken into consideration, which are inflation rate, the Market Participation volume, Grosse Domestic Product and Money Supply.

The main characteristic of the data or variable is time series. With the purpose of conducting time series analysis, it is necessary to test that the variable is stationary or, constant, the variable have unit root. Additionally, co-integration process required to examine.

### 4.1 Data descriptive table

Variables	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Inflation rate (%)	5.9	2.35	2.53	7.17	8.23	-0.31	3.35	9.85	-0.39	17.69
Market Participation	10811	11360	13593	15777	17077	18764	20556	22844	52000	59530
GDP (%)	4.72	6.17	8.86	5.97	3.93	8.54	9.46	-3.38	10.88	8.16
M3 in Billions of rwf	1028.69	1223.87	1482.1	1594.68	1791.68	2071.29	2371.87	2787.08	3264.94	4000.4

Table 4.1 data descriptive.

From the proceeding table above, we observe the inflation rate in Rwanda from 2013 to 2022, the Market participation on the RSE from 2013 to 2022, the Gross Domestic Product in Rwanda from 2013 to 2022 and the Money supply in Rwanda from 2013 to 2022.

### **Table 4.2. Unit root test at level**

If the variable has a unit-root property, the variable is non-stationary. The null hypothesis for the unit-root testing is  $\rho=0$  according (Koop, 2008). The critical value to decide whether accepted or rejected the null hypothesis is -2.89 according to ADF test statistic. A variable has a unit-root when the test statistic of the variable is less negative than -2.89 and the value of it probability is more than 0.05 at 95% confidence level (Koop, 2008).

Variable	Lag	ADF t-statistic test	Pob*	observation
Inflation	1	-0.230527	0.5714	There is no stationarity
MP	0	-2.286251	0.1960	There is no stationarity
GDP	0	-1.298275	0.1657	There is no stationarity
M3	0	-0.194941	0.5850	There is no stationarity

Table:4.2. Stationarity at level

### **Interpretation**

From testing the unit-root of the inflation the ADF t-statistic is -0.230527 which is less negative than the critical value and the p-value is 0.5717. therefore, the unit-root hypothesis is accepted. Concerning the Market Participation, the ADF test statistic is -2.286251 which is less than the critical value and the probability value is 0.1960; the unit-root hypothesis is accepted. About the Gross Domestic Product, the ADF test statistic is -298275 which is more than the critical value, by the way the probability value is 0.1657; this show that the unit-root hypothesis is not rejected.

For the money supply, the ADF test statistic is -0.194941, which is less negative than the critical value and the probability value is 0.5850. the unit-root hypothesis is accepted.

In summary, all the variable; Inflation, Market Participation, Gross Domestic Product and Money Supply, have the unit-root and are not stationary at level. For this reason, we are going to apply the first difference on all variables in order to remove the unit-root.

**Table 4.3 Stationary at 1<sup>st</sup> difference**

Variable	Lag	ADF t-statistic test	Pob*	observation
Inflation	1	-3.507240	0.0040	stationarity
MP	0	-4.376624	0.0160	There is stationarity
GDP	1	-6.775998	0.0001	There is stationarity
M3	0	-3.457735	0.0043	There is stationarity

Table 4.3 stationary at 1<sup>st</sup> difference

**Interpretation**

From testing the stationarity at the 1<sup>st</sup> difference, for the inflation the ADF t-statistic is -3.507240 which is less negative than the critical value and the p-value is 0.0040, for the Market Participation, the ADF test-statistic is -4.376624 which is less than the critical value and the probability value is 0.0160; About the Gross Domestic Product, the ADF test statistic is -6.775998 which is more than the critical value, and the probability value is 0.0001; For the money supply, the ADF test statistic is -3.457735 which is less negative than the critical value and the probability value is 0.0043. This show that there is stationarity at the 1<sup>st</sup> difference for all variables



In summary, all the variable; Inflation, Market Participation, Gross Domestic Product and Money Supply are stationary at 1<sup>st</sup> difference. When the variables have unit root, co-integration process is needed to be examined.

#### 4.4. Cointegration test

Co-integration refers to a relationship between non-stationary, unit root processes. The existence of a co-integration relationship between variables has the following economic intuition. When variables series are co-integrated it suggests that even though both processes are non-stationary, there is some long-run equilibrium relationship linking both series so that relationship is stationary. This long run relationship is represented by the linear combination implicit in the cointegration relationship.” (Escudero, 2000, P. 12).

**Table 4.4. Test statistic and p-value from co-integration**

Date: 09/20/24 Time: 12:07

Sample (adjusted): 2016 2022

Included observations: 7 after adjustments

Trend assumption: Linear deterministic trend

Series: MP INF

Lags interval (in first differences): 1 to 1

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Unrestricted Cointegration Rank Test (Trace)

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.975894	27.60556	15.49471	0.0005
At most 1	0.196160	1.528486	3.841466	0.2163

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Table 4.4. Test statistic and p-value from co-integration

## Interpretation

From testing for the cointegration process between Inflation and the market participation, there is cointegration between those. The Trace statistic of the cointegration is 27.60556 which is greater than the critical value which is 15.49471, this showing us that there is a long run relationship between variables.

### Table 4.4 Estimation of long run

Dependent Variable: LOG(MP)  
Method: Least Squares  
Date: 09/20/24 Time: 11:24  
Sample: 2013 2022  
Included observations: 10

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.764692	1.196380	2.839171	0.0463
INF	0.013871	0.014283	4.671187	0.0190
GDP	0.032404	0.017997	4.200484	0.0219
LOG(M3)	1.168528	0.165352	7.066922	0.0004
R-squared	0.928325	Mean dependent var	9.921556	
Adjusted R-squared	0.892488	S.D. dependent var	0.582208	
S.E. of regression	0.190900	Akaike info criterion	-0.184959	
Sum squared resid	0.218657	Schwarz criterion	-0.063925	
Log likelihood	4.924796	Hannan-Quinn criter.	-0.317733	
F-statistic	25.90391	Durbin-Watson stat	1.429327	
Prob(F-statistic)	0.000783			

Table 4.4 Estimation of long run

## Interpretation

For our estimation of the long run effect of the variables, the inflation coefficient showing that for 1 unit of increase of the inflation is associated to the increase of 0.013871 of market participation and with the p-value of 0.0190 which is less than the 0.05 show that the coefficient is statistically

significant; for 1 unit increase of the Gross Domestic Product growth is associated to the increase of 0.032404 and with the p-value of 0.0219 which is less than 0.05 show that the coefficient is statistically significant; the increase of a unit of the money supply in the market is associated to the increase of the market participation by 1.168528 in coefficient and with the p-value of 0.0004 which is more less than 0.05 show that the coefficient is statistically significant. The R-squared which is 0.928325 means that at 92.8% our result are confident which is confirm by the probability(F-statistic) of 0.000783.

### Table 4.5 Unit root test of residuals

Null Hypothesis: REDISUALS has a unit root  
 Exogenous: Constant  
 Lag Length: 0 (Automatic - based on SIC, maxlag=1)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.423003	0.0046
Test critical values:		
1% level	-2.937216	
5% level	-2.006292	
10% level	-1.598068	

Table 4.5 Unit root test of residuals

### Interpretation

From testing the unit root of the residual, the test statistic is -3.423003 which is less than the critical value and the p-value is 0.0046 more less than 0.05. this means the residuals are stationary at level.

Now this allows us to do the estimation of shot run.

**Table 4.6. Short run equation**

Dependent Variable: D(LOG(MP))  
 Method: Least Squares  
 Date: 09/20/24 Time: 12:58  
 Sample (adjusted): 2016 2022  
 Included observations: 7 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.045744	0.478823	0.095534	0.9326
D(INF)	-0.003512	0.009718	-3.178115	0.0050
D(GDP)	0.021628	0.022445	0.963625	0.4369
D(LOG(M3))	1.234214	3.397977	0.363220	0.7512
REDISUALS (-1)	-0.043257	0.007283	-4.017675	0.0075
R-squared	0.590245	Mean dependent var		0.210989
Adjusted R-squared	-0.529265	S.D. dependent var		0.270824
S.E. of regression	0.300268	Akaike info criterion		0.607528
Sum squared resid	0.180322	Schwarz criterion		0.568892
Log likelihood	2.873652	Hannan-Quinn criter.		0.129999
F-statistic	0.720241	Durbin-Watson stat		1.359858
Prob(F-statistic)	0.651611			

*Table 4.6. Short run equation***Interpretation**

For our estimation of the short run equation, the inflation coefficient show that for 1 unit of increase of the inflation is associated to the increase of -0.003512 of market participation and with the p-value of 0.0050 which is less that the 0.05 show that the coefficient is statistically significant; for 1 unit increase of the Gross Domestic Product growth is associated to the increase of 0.021628 and with the p-value of 0.4369 which is greater than 0.05 show that the coefficient is not statistically significant; the increase of a unit of the money supply in the market is associated to the increase of of the market participation by 1.234214 in coefficient and with the p-value of

0.7512 which is greater than 0.05 show that the coefficient is not statistically significant. The R-squared which is 0.590245 means that result are confident at 59.02%.

**Figure 4.7. Residuals diagnostic Normality test**

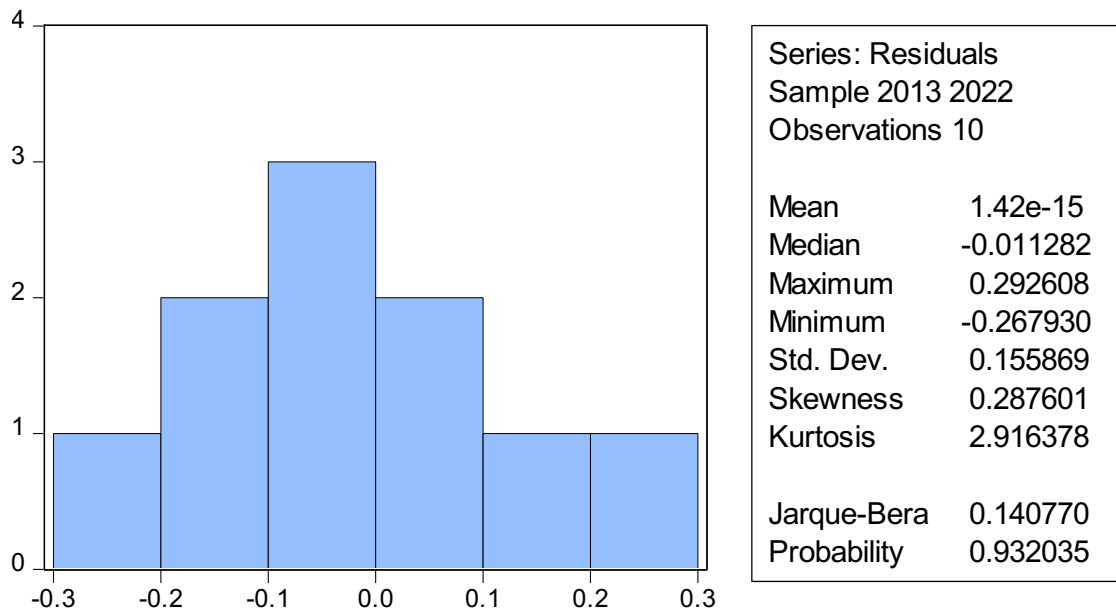


Figure 4.2. Normality test.

### Interpretation

The residuals diagnostic at normality test is showing that the p-value of 0.932035 is greater than 0.05 this confirms the veracity of our model.

### Table 4.8: Serial correlation LM test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	2.820449	Prob. F(2,4)	0.1721
Obs*R-squared	5.851009	Prob. Chi-Square(2)	0.0536

Table 4.8. Breusch-Godfrey Serial Correlation LM Test:

#### Interpretation

The null hypothesis is rejected because the probability Chi-Square is 0.0536. this means there is autocorrelation.

### Table 4.9 Residuals diagnostic

#### 4.9.1. Multicollinearity

Date: 09/20/24 Time: 13:05

Sample: 2013 2022

Included observations: 10

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob
		1 0.206	0.206	0.5672	0.451
		2 -0.406	-0.468	3.0397	0.219
		3 -0.136	0.111	3.3591	0.340
		4 0.061	-0.159	3.4339	0.488
		5 -0.143	-0.200	3.9229	0.561
		6 -0.366	-0.390	7.9334	0.243
		7 0.010	0.053	7.9372	0.338
		8 0.250	-0.193	11.694	0.165
		9 0.023	-0.092	11.760	0.227

Table 4.9: residuals diagnostic multicollinearity

#### Interpretation

The probability of 9<sup>th</sup> lag is 22.7% which is greater than the 5%, this indicate that our model are correlated until 9<sup>th</sup> lag. It's a good position for our model that is simply integrated one time in order to be stationary.

### Table 4.10. Heteroscedasticity Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	2.115661	Prob. F(3,6)	0.1996
Obs*R-squared	5.140513	Prob. Chi-Square(3)	0.1618
Scaled explained SS	1.773210	Prob. Chi-Square(3)	0.6208

Table 4.10. Residuals diagnostic heteroscedasticity

#### Interpretation

The F-statistic probability value is 19.96% which is greater than 5% this shows a good position of our model and means that there no heteroscedasticity.

### Stability test

#### Figure 4.3. Cusum test

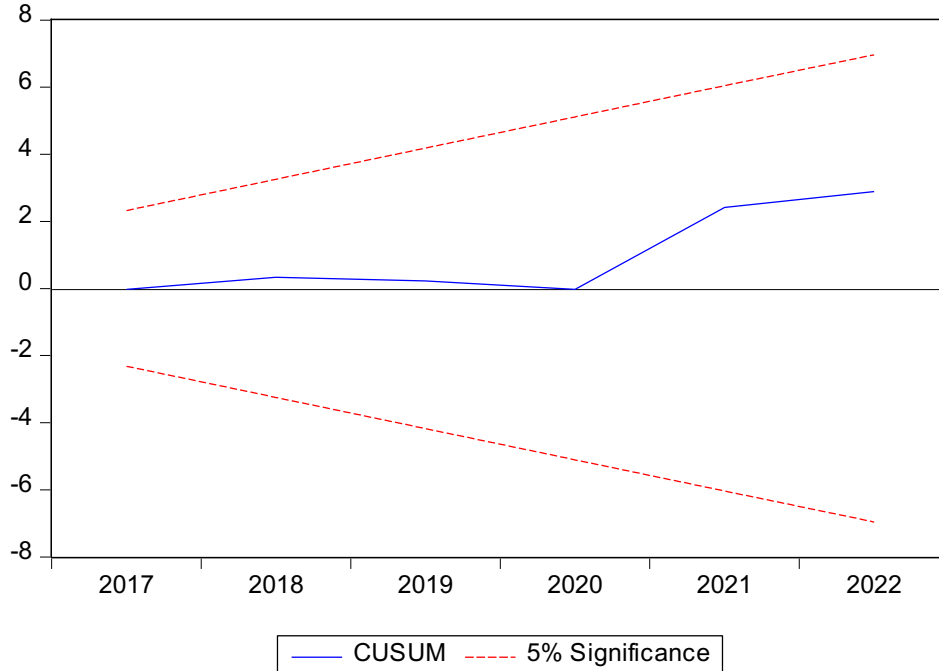


Figure 4.3. Cusum test

## **Interpretation**

By judging the above graph, it is clear that our model is stable because the navigating blue line of the graph doesn't cross the borders. The straight lines represent critical bounds at 5% significance level. This indicates that the inflation has been moving in stable way in Rwanda during the period of our study.

## **4.11. Discussion of Findings**

This chapter focused on the analysis of the relationship between variables. Using the unit root at level, from testing the inflation, the Market participation, the Gross Domestic Product and the Money supply the ADF t-statistic is respectively -0.230527, -2.286251, -2.98275, -0.194941 all less than the critical and with their p-value of 0.5717, 0.1960, 0.1657, 0.5850 respectively. this finding shows that the unit root hypothesis is accepted and the data are not stationary at level. By looking the stationarity at the first difference the finding shows us that the inflation, the market participation, the GDP, and the M3 have respectively the ADF t-statistic of -3.507240, -4.376624, -6.775998, -3.457735 with respectively a p-value of 0.0040, 0.0160, 0.0001, 0.0043. this means that the null hypothesis is rejected with the presence of the stationarity at the first difference. The using of the co-integration test, the long-run test test have allows us to see the great relationship between variables and getting the result as when the inflation rate increases by 1 unit the market participation increases by 1.38 with the probability of 1.9; for 1 unit increase of the Gross Domestic Product growth, the market participation increases by 3.24% with the probability of 2.19%; the increase of a unit of the money supply in the market impact the increase of the market participation by 116.8% with a probability of 0.04%.

The short run estimation shown that 1 unit increase of the inflation have a negative effect on the market participation of 0.35% with a probability of 0.5%; the 1 unit increase of the Gross Domestic



Product growth increase of 2.16% the market participation with the probability of 43.69%; the increase of a unit of the money supply in the market impact the increase of the market participation by 123.42% with a probability of 75.12%.

## **CHAPTER 5: SUMMARY, CONCLUSION, RECOMMENDATION AND SUGGESTION**

### **5.0 Summary**

This section summarizes the entire study, to remind the purpose of the research is assessing on the topic of this study which is the effect of the inflation on the Rwanda Stock Exchange participation. To attain this purpose, secondary data was entirely used. The research has applied yearly data for a period of 10 years, from 2013 to 2022. To get the result of our analysis, the study carried out test as Unit root test at level, Cointegration test, Residuals diagnostic, Stability test.

The literatures demonstrate to both positive and negative relationship between the inflation and stock market participation. Moreover, the conclusions regarding to relationship, found in the literature review, have conflict among vast literatures. However, most of the research's study in both developed and emerging stock market throughout the world but our study aims at Rwanda Stock market Exchange in particular at the time period for ten years including period of covid 19. Therefore, this study is conducted to find the inflation-stock market participation relationship by the quantitative and qualitative method. The statistical analysis is used to serve the method. In the analysis chapter, the empirical finding in form of statistical interpretation is used. The results is applied to answer the question in this chapter.

### **5.1 Finding and Conclusion**

The results on summary statistics established that the average of the inflation, market participation, Gross Domestic Product, and Money Supply was respectively 5.637%, 22.948B, 6.331%, 2013.45B. The evolution of yearly data has established that the Inflation (CPI) has been rising from 2013 to 2022 though some declines were experienced in some years and the trend the market

participation has been steadily increasing. The trend of Gross Domestic Product has been rising and also the trend of Money supply has been rising too from 2013 to 2022.

The study founding that the correlation between the inflation, the market participation, Gross Domestic Product and Money Supply are strong and positive. The R-square value obtained that 92.8% of the variation of the dependent variables is explained by the independent and control variables considered by the research and that the regression model was significant and good predictor of the existing relationship between the dependent and the independents variables. Coefficient result found that the inflation, the money supply, the gross domestic product has significantly affected the stock market participation.

The long run estimation has shown that, when the inflation rate increases by 1 unit the market participation increases by 1.38% with the probability of 1.9%; for 1 unit increase of the Gross Domestic Product growth, the market participation increases by 3.24% with the probability of 2.19%; the increase of a unit of the money supply in the market impact the increase of the market participation by 116.8% with a probability of 0.04%.

The short run estimation shown that 1 unit increase of the inflation have a negative effect on the market participation of 0.35% with a probability of 0.5%; the 1 unit increase of the Gross Domestic Product growth increase of 2.16% the market participation with the probability of 43.69%; the increase of a unit of the money supply in the market impact the increase of the market participation by 123.42% with a probability of 75.12%.

All our finding allows us to conclude that there is a significant relationship between the inflation and the market participation. This unconfirm our hypothesis.

### **5.3 Recommendation and Suggestion**

Our recommendation to the Rwanda stock exchange is that they should take consideration of the expected inflation rate in the daily strategies,

The RSE, should deeply follow the National Bank money supply model, and take advantage on this because it has a positive impact on the market participation;

The RSE should also take consideration of the decentralizing competition us cryptocurrency and work hard in the population education of the participation in the stock market. To not take consideration of this should be considered as an opportunity cost in this technology expansion period. The RSE should implement a bot trading to facilitate an increase of the market participation because this one allows peoples who doesn't have more knowledge of trading to do it with artificial intelligent.

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## APPENDICES



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