ST. MARY'S UNIVERSITY

SCHOOL OF GRADUATE STUDIES

DEPARTMENT OF PROJECT MANAGEMENT

ASSESSMENT ON THE IMPACT OF INFLATION ON THE PERFORMANCE OF CONSTRUCTION SECTORS OVER THE LAST 4 YEARS IN ADDIS ABABA, ETHIOPIA

BY

GASAHWU CHANIE

A THESIS SUBMITTED TO ST. MARY'S UNIVERSITY, SCHOOL OF GRADUATE STUDIES IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTERS OF PROJECT MANAGEMENT

JUlLY, 2023

ADDIS ABABA, ETHIOPIA

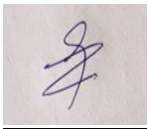
ST. MARY'S UNIVERSITY
SCHOOL OF GRADUATE STUDIES
DEPARTMENT OF PROJECT MANAGEMENT

ASSESSMENT ON THE IMPACT OF INFLATION ON THE PERFORMANCE OF CONSTRUCTION SECTORS OVER THE LAST 4 YEARS IN ADDIS ABABA, ETHIOPIA

BY

GASAHWU CHANIE

APPROVED BY BOARD OF EXAMINERS

Dean, School of Business	Signature and Date
Yibeltal Nigussie (Asst. Prof)	 July 19, 2023
Advisor	Signature and Date
Girma Tegene (Associate Prof)	 July 19, 2023
External Examiner	Signature and Date
Internal Examiner	Signature and Date

ACKNOWLEDGEMENTS

Many invisible hands contributed their shares on the work of this thesis paper. The contributions of many different people, in different ways, have made this work possible. Sincere gratitude is hereby extended to those who were with me until the end of my thesis work.

First and foremost, thanks to the Almighty God for the wisdom and perseverance that he has been bestowed upon me during this thesis work, and indeed, throughout my life: “I can do everything through him who gives me strength”.

Throughout this study, I owe more than I can express to my Supervisor Yibeltal Nigussie (Asst. Prof.), for his professional contributions and advice, guidance and constructive criticisms, which have made this piece of work possible.

All other people who accorded me support and assistance during the research but are not mentioned are nevertheless not forgotten. To all those, I have not been able to mention but gave me either material, moral support or both during the course of my studies, I have not forgotten your contribution. I sincerely and extremely extend my gratification to you all for your concern and reminders to work hard and complete this study. I, also forward special thanks to respondents for this research questionnaires, for their unreserved cooperation in filling and give me back the data.

Table of Contents

List of tables

ABSTRACT

This research paper explores the impact of inflation on the construction industry in Addis Ababa, Ethiopia, over the last four years, using a variety of construction performance metrics. The study looks at how inflation affects things like material costs, housing affordability, finance, currency depreciation, consumer spending, property values, and job availability. A mixed methods approach is used to ensure a thorough analysis, incorporating qualitative and quantitative data collection and analysis procedures. The selection technique employed in this study was convenience sampling, in which participants were chosen based on their accessibility and desire to participate rather than using a random or systematic sampling approach. The convenience sample method was chosen for its practicality and ease of data collection from individuals representing diverse industries pertinent to the building construction industry in Addis Ababa. Data was collected over a 45-day period from 10 sub-cities in Addis Ababa, using a sample of people from various industries related to the construction industry. Contractors, architects/engineers, government workers, economists, bankers, real estate developers, construction material suppliers, and college/university students were among those that took part. The SPSS programme version 25 was used for quantitative data analysis. To characterise the variables, descriptive statistics were used, which provided metrics such as mean, median, standard deviation, minimum, and maximum values. Partial correlation analysis was used to analyse relationships between variables when data was not normally distributed. In addition, ordinal regression analysis was used to investigate the associations between inflation-related independent factors and the dependent variable reflecting construction sector performance. The questionnaire was completed by 396 people, offering significant information into the impact of inflation on the Addis Ababa building construction industry. The participants' different backgrounds and expertise contributed to a complete understanding of the industry's issues and potential. According to the findings, inflation, combined with currency depreciation, has resulted in lower consumer spending, lower property prices, and higher import costs for construction supplies. The paper proposes strategies to mitigate the impact of inflation on the construction sector based on these findings. These efforts include lowering material prices, increasing access to affordable housing, encouraging collaboration between the government and industry partners, and promoting sustainable construction practises. The study offers light on the impact of inflation on the Addis Ababa building construction industry during the last four years. The combination of quantitative data analysis methodologies and a large participant sample improves the findings' validity and comprehensiveness. The paper identifies the issues that construction firms confront and suggests strategies to alleviate the negative effects of inflation, thereby promoting a more sustainable and resilient construction sector.

Key words: Inflation, Construction industry, SPSS software, Currency devaluation, Impact and Currency devaluation

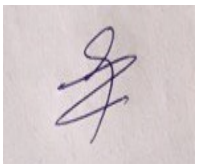
DECLARATION

I, the undersigned, declare that this thesis is my original work, prepared under the guidance of Yibeltal Nigussie (Asst. Prof). All sources of material used for the thesis have been duly acknowledged. I further confirm that the thesis has not been submitted either in part or in full to any other higher learning institutions for the purpose of earning any degree.

_____	_____
Name	Date and Signature

ENDORSEMENT

This thesis has been submitted to St. Mary's University, School of Business for examination with my approval as university advisor.



Yibeltal Nigussie (Asst. Prof) _____

Advisor Date and Signature

CHAPTER ONE

BACKGROUND OF THE STUDY

1.1 Introduction

Ethiopia has experienced significant economic growth with double-digit growth over the previous decade, and its building industry has seen notable expansion. The construction sector has become increasingly involved in the development of numerous infrastructure projects, including road infrastructure, real estate developments, dams, railroad lines, and condominium housing projects. The Ministry of Urban Development and Construction reported that the industry's contribution to GDP rose to 5.8% in 2010, indicating its growing significance (Gebremariam et al., 2017).

The construction sector plays a critical role in a country's economic development, and in Ethiopia, this sector has been experiencing rapid growth, fueled by government investment in infrastructure and housing projects. However, inflation has been an ongoing challenge in Ethiopia, with high inflation rates affecting the costs of goods and services, including construction materials. This thesis aims to evaluate the impact of inflation on the Ethiopian construction sector over the past four years (Kassahun, 2019).

The construction industry in Addis Ababa, Ethiopia, has grown significantly in recent years as a result of increased demand for housing, commercial buildings, and infrastructure projects. (Alemu, 2019). However, the industry has faced a number of challenges, including inflation, which affects the cost of materials, financing, and consumer spending. (Bulto et al.,2021). The purpose of this study is to assess the impact of inflation on the Addis Ababa construction industry over the last four years.

Inflation is a significant economic challenge in Ethiopia. The country has experienced high rates of inflation in recent years, driven by factors such as a shortage of foreign currency, drought, and rising food prices. The construction sector is also facing several challenges, including a shortage of skilled labor, lack of financing, and high costs of construction materials. These factors have led to delays and cost overruns in construction projects, which can negatively affect the sector's contribution to the economy. Inflation has been a significant

concern in Ethiopia, with the inflation rate reaching double digits in 2019 (Ethiopian Central Bank, 2019). This high rate of inflation has had a negative impact on the country's economy, and has led to a decrease in consumer spending and economic growth (Ethiopian Chamber of Commerce and Sectoral Associations, 2018).

Given the significant impact of inflation on the construction industry, it is crucial to assess its impact in Addis Ababa over the last four years. By understanding the extent to which inflation has impacted the industry, stakeholders can develop effective strategies to mitigate its effects and promote growth in the sector (Bulto & Maru, 2021). In addition to the overall impact of inflation on the economy, there is a need to understand how inflation specifically affects the construction sector in Ethiopia. The construction sector plays a vital role in economic development and job creation in Ethiopia (Ethiopian Ministry of Urban Development and Construction, 2017). However, the rising cost of construction materials, increasing difficulty in securing financing, and devaluation of the currency can all contribute to a challenging environment for the construction industry (Ethiopian Bankers Association, 2019).

Furthermore, inflation can greatly affect the affordability of housing in Ethiopia, making it more difficult for low-income individuals and families to purchase a home (Ethiopian Central Statistical Agency, 2016). This can lead to a decrease in the number of new residential construction projects and can also make it more difficult for builders to secure financing for new projects. Moreover, understanding the impact of inflation on the construction sector in Ethiopia can also have implications for the country's efforts to achieve sustainable development goals, particularly in terms of providing affordable and adequate housing for all citizens. The United Nations Development Programme (UNDP) has emphasized the importance of affordable housing in achieving sustainable development, and has highlighted the need for countries to develop policies and strategies to address housing affordability challenges (UNDP, 2017).

The study of inflation's impact on the construction sector in Ethiopia can also have implications for the country's efforts to promote foreign investment. Inflation can make a country less attractive to foreign investors, as it can lead to increased costs and uncertainty (World Bank, 2020). Understanding the impact of inflation on the construction sector in Ethiopia can help policymakers identify ways to promote foreign investment in the sector, which can ultimately help to spur economic growth.

Overall, understanding the impact of inflation on the construction sector in Ethiopia can have implications for the country's efforts to promote job creation. The construction sector is a major source of employment in Ethiopia and understanding how inflation affects the sector can help policymakers identify ways to promote job creation in the country. Despite the importance of the construction sector in Ethiopia, there is a lack of research on the specific impact of inflation on the sector over the last 4 years. Thus, this study aims to fill this gap by providing an assessment of the impact of inflation on the construction sector in Ethiopia over the last 4 years (Tilahun, 2019).

1.2 Statement of the Problem

Asses about the impact of inflation rate on construction projects budget and find out the following conclusion that Inflation is one of the leading components that have a major impact on the economy of countries. Every industry is either positively or negatively impacted by inflation. It is noteworthy from the literature that not only does the inflation rate impact the industry; often industrial elements even devastate the country's inflation rate. The effect of inflation is also having on the construction industry, where many studies have highlighted the role of inflation in project cost overrun. Due to inflation the building material prices, labor wages and machinery hire rates changes every year, resulting in the project's initial budget being deviated from the final budget (Alshibli & Mohamed, 2020).

In Addis Ababa Ethiopia, the construction sector plays a vital role in economic development and job creation. However, over the last 4 years, inflation has been a significant concern in the country, and it is unclear how this has affected the construction sector. The rising cost of materials, increasing difficulty in securing financing, and devaluation of the currency can all contribute to a challenging environment for the construction industry. Additionally, inflation can greatly affect the affordability of housing, making it more difficult for low-income individuals and families to purchase a home.

Despite the importance of the construction sector in Ethiopia, there is a lack of research on the specific impact of inflation on the sector over the last 4 years. As such, the problem that this thesis aims to address is the assessment of the impact of inflation on the construction sector in Ethiopia over the last 4 years. This study aims to determine the extent to which inflation has

affected the cost of construction materials, the affordability of housing, the ability of construction companies to secure financing, consumer spending on construction and housing, property values and the devaluation of the currency in Ethiopia, and how these factors have affected the construction sector over the last 4 years. Additionally, the study aims to recommend policies or measures that can be implemented to mitigate the impact of inflation on the construction sector in Ethiopia (Alshibli et al.,2020).

Additionally, the problem also includes the lack of understanding on how inflation has affected the construction sector in terms of job creation, and the relationship between inflation and investment in the construction sector. Furthermore, the study aims to investigate the challenges faced by the construction sector in Ethiopia in relation to inflation and how they can be addressed. The study also aims to investigate the relationship between inflation, construction activities and job opportunities in the construction sector in Ethiopia (Tilahun, 2019).

Moreover, the study also aims to investigate the inflation's effect on the property values in Ethiopia and what is the implication to the construction sector. Furthermore, the study aims to identify the policies that can be implemented to mitigate the impact of inflation on the construction sector in Ethiopia. The significance of this study is to provide valuable insights for policymakers, investors, and the construction industry participants in Ethiopia, to understand the challenges they face and how to adapt to a changing economic environment (Tilahun, 2019).

Overall, the problem that this thesis aims to address is the lack of research on the specific impact of inflation on the construction sector in Ethiopia over the last 4 years, and the need to understand how inflation affects the cost of construction materials, the affordability of housing, the ability of construction companies to secure financing, consumer spending on construction and housing, property values and the devaluation of the currency in Ethiopia and how these factors have affected the construction sector over the last 4 years. This study aims to provide valuable information for policymakers, investors, and the construction industry participants in Ethiopia to understand the challenges they face and how to adapt to a changing economic environment.

1.3 General Objectives

The general objective of the research is to assess the impact of inflation on the performance of building construction sectors in Addis Ababa, Ethiopia over the last four years.

1.3.1 Specific Objectives

The specific objective of this paper will be;

1. To analyse the trends and patterns of inflation in Addis Ababa, Ethiopia over the last four years.
2. To examine the performance of the construction sectors in Addis Ababa, Ethiopia over the same period.
3. To assess the construction material prices, labor costs, government regulations and policies and currency exchange rates that may influence the performance of the construction sector.
4. To determine the extent and significance of the impact of inflation on the performance of the construction sectors in Addis Ababa, Ethiopia, taking into account other relevant factors.

1.4 Research questions

1. What are the trends and patterns of inflation in Addis Ababa, Ethiopia over the last four years, and how have they varied over time?

2. How has the construction sector in Addis Ababa, Ethiopia performed in terms of key indicators such as construction activity levels, employment availability, and output, during the same four-year period?

3. How do construction material prices, labor costs, government regulations and policies, and currency exchange rates influence the performance of the construction sector in Addis Ababa, Ethiopia?

4. To what extent do inflation-related factors, such as construction material prices, labor costs, government regulations and policies, and currency exchange rates, impact the performance of the construction sectors in Addis Ababa, Ethiopia, considering other relevant factors?

5. Are there any significant relationships or correlations between inflation levels and the performance indicators of the construction sector in Addis Ababa, Ethiopia, and what is the magnitude of these relationships?

1.5 Significance of the Study

The significance of studying the impact of inflation on the construction sector in Addis Ababa, Ethiopia over the last 4 years is multifaceted. Here are a few reasons why this topic is important to examine:

Policy development: The study's findings can help policymakers, government agencies, and industry groups establish effective policies and strategies to address the issues posed by inflation in the construction industry. Policymakers can implement targeted steps to stabilise material prices, regulate labour costs, and establish a supportive regulatory environment by identifying the unique inflation-related elements influencing the sector's performance.

Building construction firms, Contractors, and Industry Professionals: The study provides essential information for construction firms, contractors, and industry professionals to make informed decisions. Stakeholders can plan their projects, estimate costs effectively, and change their strategies to limit the consequences of inflation by analysing the trends and patterns of inflation, measuring performance indicators, and understanding the influence of inflation-related variables.

Financial management: The findings of the study are important for financial institutions, lenders, and investors participating in construction projects. Understanding the relationship between inflation and the performance of the construction sector allows financial players to analyse risks, select appropriate financing options, and make informed investment decisions. It can also help with interest rate management, project feasibility, and financial stability in a volatile economic climate.

Economic Development: The construction industry is critical to economic growth and development. This study contributes to a better understanding of the sector's contribution to the entire economy by studying the impact of inflation on construction activity, employment, and production. The findings can help to promote long-term growth, attract investments, and foster a resilient construction industry.

Academic and research advancement: The study adds to the body of information on the relationship between inflation and the building industry. It lays the groundwork for future academic research and analysis in the field of construction economics, allowing academics and researchers to investigate similar themes and expand on the conclusions offered in this study.

Overall, the importance of this research is based on its ability to influence policy development, enhance decision-making processes, improve financial management, promote economic growth, and add to academic understanding. By addressing the impact of inflation on the construction sector in Addis Ababa, Ethiopia, the study provides insights that can benefit stakeholders at various levels and contribute to the construction industry's long-term development.

1.6 Scope and Limitations of the Study

Scope:

Conceptual Scope:

This research paper aims to examine the impact of inflation on the construction sector in Addis Ababa, Ethiopia over the last four years. It focuses on the various ways inflation affects the construction industry, including the cost of building materials, housing affordability, financing, currency devaluation, consumer spending, property values, and job availability. The study will also explore the potential effects of inflation on different types of construction projects, such as residential, commercial, and public infrastructure.

Methodological Scope:

This research paper will employ a quantitative research method to gather and analyze data on inflation and the construction industry. It will use secondary sources such as reports, publications, and statistical data from various organizations such as the Ethiopian Ministry of Urban Development and Construction, Ethiopian Central Statistical Agency, Ethiopian Bankers Association, Ethiopian Chamber of Commerce and Sectoral Associations, and

Ethiopian Real Estate Development Association, and National Bank of Ethiopia. The data will be analyzed using statistical techniques such as regression analysis, correlation analysis, and descriptive statistics.

Geographic Scope:

This research paper will focus on the impact of inflation on the construction sector in Addis Ababa, Ethiopia. Addis Ababa is the capital and the largest city in Ethiopia, with a growing construction sector due to the increasing demand for housing, commercial, and public infrastructure. Therefore, the study's findings will be relevant to policymakers, investors, and stakeholders in the construction industry, not only in Addis Ababa but also in other regions of Ethiopia.

Limitations:

The study will be limited to the examination of inflation in the construction sector of Addis Ababa, Ethiopia over the last 4 years. It will not consider other macroeconomic factors that may have an impact on the construction sector, such as exchange rates and interest rates. The study will also be limited by the availability of data and information, which may not be comprehensive or accurate. The research is also limited to Addis Ababa, Ethiopia context, so the findings may not be generalizable to other regions of the country.

1.7 Operational Definition of Terms

Inflation: could be defined as an increase in the general price level of goods and services.
Construction Sector: This term is used to refer to the entire industry or sector of the economy that is involved in the building and maintenance of structures, infrastructure, roads, bridges, and other physical assets.
Addis Ababa: This term refers to the capital and largest city of Ethiopia. It is located in the central part of the country and serves as the political, economic, and cultural center of Ethiopia.
Ethiopia: This term refers to a country located in the Horn of Africa, bordered by Eritrea to the north, Djibouti to the northeast, Somalia to the east, Kenya to the south, South Sudan to the west, and Sudan to the northwest.

Last Four Years: This term is used to refer to the specific timeframe of the last four years from the present moment.

1.8. Organization of the Study

The structure of this study, which examines the effects of inflation on Ethiopia's construction industry over the past four years, can be summed up as follows: In the first chapter, Introduction, the background of the study, the problem statement, the research questions, objectives, significance, and scope and limitations of the study will be covered. The second chapter, titled "Literature Review," will give an overview of inflation, as well as information on the causes of inflation in the construction industry, the implications of inflation on the industry, and government initiatives to lessen those effects. The research design, data gathering techniques, and data analysis techniques will all be covered in chapter three, Methodology. Results and Discussion, the fourth chapter, will describe the study's findings, examine the data, and go over the conclusions. The study's summary, its ramifications, and suggestions for further research will all be provided in chapter five, the conclusion. The list of sources used in the study is provided at the end of this paper and additional data, tables, and figures will be included in the appendix.

CHAPTER TWO

LITERATURE REVIEW

In recent years, Addis Ababa's construction sector has faced numerous challenges, including the impact of inflation on the cost of building materials, financing, and housing affordability. According to a study conducted by the Ethiopian Ministry of Urban Development and Construction, the cost of materials such as cement, steel, and lumber has risen significantly due to inflation over the last four years, resulting in higher costs for new construction projects. (Mehari et al., 2019). This can make it more difficult for individuals and families to afford new homes, as well as cause construction companies to face delays or cost overruns. Furthermore, inflation can make it more difficult for construction companies to secure financing for new projects, resulting in fewer new construction projects and potential job losses. (Gebreeyesus et al., 2020). The assessment of inflation's impact on the Addis Ababa construction sector is critical for policymakers, construction firms, and investors to develop effective strategies to mitigate its negative effects.

Ethiopia has been running at over 30%, which is a major concern for the country. The Ethiopian government has been considering devaluing the Birr to address the issue of inflation. In 2020, the Ethiopian Birr was devalued by 16.7% due to high inflation. The International Monetary Fund (IMF) welcomed the move as a necessary step to address the country's economic challenges (African Business. (2023, January 13). The devaluation of the Ethiopian Birr has both benefits and costs. One of the benefits is that it can help boost exports by making them more competitive in the global market. However, it can also lead to higher inflation, which can hurt the purchasing power of consumers. The present low inflationary environment in Ethiopia makes it an opportune moment to devalue the currency. The Ethiopian government has been weighing the benefits and costs of devaluing the Birr to address the issue of inflation (The Economist Intelligence Unit. (2010, September 3). The economic crisis in Ethiopia has had a significant negative impact on the country's economy. The decline in average income coupled with triple-digit inflation and a severe currency depreciation are immensely curtailing purchasing power. The protracted economic contraction has led to a marked decline in disposable income, and GDP per capita has dropped by 36.5% between 2019 and 2021(Teshome, A et al., 2023).

2. Theoretical literature review

2.1 Overview of Inflation

2.1.1 Definition

Inflation is a crucial macroeconomic concept that refers to the sustained increase in the general level of prices for goods and services in an economy over a period of time (International Monetary Fund, 2020). Inflation reduces the purchasing power of money and is measured by the Consumer Price Index (CPI) (World Bank, 2020). Different scholars defined project price escalation in construction industry in their works and some of them are outlined as follow: Price Escalation is an increase in the cost of any construction elements of the original contract and base cost of a project due to passage of time. Price Escalation is the increase in any element of project costs when the cost of that element is compared between two different periods Escalation is the provision in a cost estimate for increases in the cost of equipment, material, labor, etc., due to continuing price changes over time. The construction industry is generally responsible for the physical development or the transformation of the environment which makes the built environment very vital to social economic development of a nation. It comprises of building, civil and heavy engineering works(Mohammed, G, 2013).

Construction as a large sector of the economy is responsible for millions of jobs and a significant proportion of GDP in most countries. When allied to other sectors and industries in materials production and distribution as well as services sectors such as transport, finance and the property market, its impact on society and the environment and its influence on the character of the world are tremendous. Construction industry and the national economy, it becomes necessary that the cost of construction be within the reach of the average citizen. However, some economic indicators are very significant to the overall cost of construction. Some of these indicators include; exchange rate of local currency to other currencies in the world, inflation rate and interest rate charge on loan among others (Muhammad A., 2020).

2.1.2 Causes of Inflation

Inflation can be caused by various factors, including an increase in the demand for goods and services, a decrease in the supply of money, and an increase in production costs (International

Monetary Fund, 2020). For instance, demand-pull inflation occurs when there is an increase in demand for goods and services, leading to an increase in prices (Investopedia, 2021). Costpush inflation, on the other hand, occurs when production costs increase, resulting in higher prices for goods and services (Investopedia, 2021). Structural inflation, which is caused by imbalances in the supply and demand for goods and services in specific sectors of the economy, such as the labor market, is another type of inflation (Investopedia, 2021).

In Ethiopia, inflation has had a significant impact on different economic sectors over the last 4 years. For instance, the food and beverage sector has been one of the major contributors to the overall inflation rate in the country, due to supply chain disruptions, weather-related issues, and increased demand for food (Central Intelligence Agency, 2021). The housing market has also been affected, with the cost of building materials and property prices increasing, making it more difficult for people to afford housing (Tadesse, B. and etal., 2019). Additionally, the tourism sector has been impacted, with the increase in prices of goods and services making it more expensive for tourists to visit the country, leading to a decline in the number of tourists visiting Ethiopia (Central Intelligence Agency, 2021). In conclusion, inflation has a significant impact on the economy of Ethiopia, affecting the different economic sectors in the country and reducing the purchasing power of the population.

2.1.3 Types of Inflation

There are several types of inflation, each with its own unique characteristics and causes. The three main types of inflation are demand-pull inflation, cost-push inflation, and structural inflation.

Demand-pull inflation occurs when there is an increase in demand for goods and services, leading to an increase in prices. This type of inflation is typically driven by factors such as economic growth, an increase in consumer spending, and a decrease in the supply of money (International Monetary Fund, 2020). When demand for goods and services exceeds the available supply, prices rise, resulting in demand-pull inflation.

Cost-push inflation, on the other hand, occurs when production costs increase, resulting in higher prices for goods and services. This type of inflation is typically driven by factors such

as an increase in the cost of raw materials, labor costs, and taxes (International Monetary Fund, 2020). When the costs of production increase, producers pass on the cost to consumers in the form of higher prices, resulting in cost-push inflation.

Structural inflation is caused by imbalances in the supply and demand for goods and services in specific sectors of the economy, such as the labor market. For example, if there is a shortage of skilled labor in a specific sector, it can drive up wage costs, leading to higher prices for goods and services in that sector (International Monetary Fund, 2020). Structural inflation can also be caused by factors such as government regulations and technological changes.

It is important to note that inflation can be a combination of these types and can also be influenced by various other factors, such as changes in global commodity prices, natural disasters, and monetary policy. Understanding the types of inflation and their causes is crucial for policymakers and economists to make informed decisions about how to address inflation and its impacts on the economy.

2.2 Inflation and the Construction Sector

Inflation has been a persistent challenge for many economies and has a significant impact on various sectors, including the construction industry (Mankiw, 2015). This sector plays a critical role in the growth and development of an economy as it provides employment, generates income, and contributes to the gross domestic product (GDP) (World Bank, 2021). The purpose of this study is to examine the impact of inflation on the construction sector and to identify the factors that influence this relationship.

Inflation can have both positive and negative effects on the construction sector (Blinder, 2013). On the one hand, inflation can lead to an increase in construction costs, as the prices of building materials and labor increase. This, in turn, can result in reduced investment in the sector, as contractors and developers may find it less profitable to invest in new projects (International Monetary Fund, 2021). On the other hand, inflation can also stimulate demand for construction, as individuals and businesses seek to protect their wealth by investing in real assets such as property.

To understand the impact of inflation on the construction sector, it is important to consider the various factors that influence this relationship (Mankiw, 2015). These include the stage of the business cycle, the level of interest rates, the availability of credit, and government policies and regulations (Blinder, 2013). For example, during an economic expansion, the demand for construction is likely to be higher, and inflation may have a positive effect on the sector (International Monetary Fund, 2021). Conversely, during an economic downturn, demand for construction may be lower, and inflation may have a negative effect on the sector (World Bank, 2021).

In addition to the relationship between inflation and the construction sector is complex and influenced by various factors (Mankiw, 2015; Blinder, 2013; International Monetary Fund, 2021; World Bank, 2021). It is important for policymakers to understand the impact of inflation on this sector and to consider the various factors that influence this relationship when making decisions that affect the construction industry (United Nations Conference on Trade and Development, 2021).

One recent study published in the Journal of Construction Engineering and Management analyzed the relationship between inflation and the construction sector in developing countries (Rashid, et al., 2019). The authors found that inflation has a significant impact on the construction industry in these countries, as rising prices for building materials and labor can increase construction costs and reduce investment in the sector. However, they also found that government policies and regulations can play a critical role in mitigating the negative effects of inflation on the construction sector. For example, if the government provides support for the construction industry through subsidies or tax incentives, this can help to offset the impact of rising costs and maintain investment in the sector.

Another study published in the International Journal of Project Management found that inflation can also have a direct impact on project outcomes in the construction sector (Zhou, et al., 2020). The authors found that inflation can lead to delays and cost overruns in construction projects, as rising prices for materials and labor can increase project costs and reduce the profitability of contractors. However, they also found that effective project management strategies, such as risk management and cost control, can help to mitigate the impact of inflation on project outcomes. In conclusion, recent international research suggests that inflation has a

significant impact on the construction sector and that various factors, including government policies and project management strategies, can play a critical role in mitigating this impact.

2.3 The Ethiopian Economy

According to recent studies, inflation has been a major challenge for the Ethiopian economy in the last 4 years. The inflation rate in Ethiopia has been fluctuating, but it has generally been on the rise. In 2019, the inflation rate in Ethiopia reached a high of 18.3% (World Bank, 2020). The main drivers of inflation in Ethiopia include supply-side constraints, such as food and fuel price shocks, and demand-side pressures, such as robust credit growth and a depreciating currency (IMF, 2019). The devaluation of the Ethiopian Birr has also contributed to inflation, as it has increased the cost of imports and put upward pressure on prices (IMF, 2020).

The high inflation rate has had a significant impact on the Ethiopian economy. It has eroded the purchasing power of households and firms, leading to decreased consumption and investment (World Bank, 2020). The high inflation has also led to an increase in interest rates, making it more difficult for firms to access credit and invest in productive activities (IMF, 2019). In response to the high inflation, the Ethiopian government has taken several measures to address the problem. These measures include tightening monetary policy, implementing fiscal consolidation, and improving food security through investments in agriculture (IMF, 2020). Despite these efforts, inflation remains a challenge for the Ethiopian economy, and further measures may be needed to bring inflation under control.

In conclusion, inflation has been a major challenge for the Ethiopian economy in the last 4 years, and it has had a significant impact on the economy as a whole. The high inflation rate has eroded the purchasing power of households and firms, decreased consumption and investment, and made it more difficult for firms to access credit. The Ethiopian government has taken several measures to address the problem, but further action may be necessary to bring inflation under control.

2.4 The Construction Industry in Ethiopia

The construction industry in Ethiopia is a growing sector that has received significant attention in recent years. According to a recent article published by the African Development Bank

(2021), the government of Ethiopia has invested heavily in infrastructure projects, such as roads, bridges, and buildings, which has driven growth in the construction industry. Another article published by the International Journal of Economics, Commerce and Management (2020) highlights the growth of the real estate sector and an increase in foreign investment as additional factors contributing to the expansion of the construction industry in Ethiopia.

However, despite the growth and potential of the construction industry in Ethiopia, several challenges must be addressed in order to sustain its growth. A study published by the Journal of Civil Engineering and Architecture (2022) highlights the shortage of skilled labor as one major challenge, which limits the industry's ability to meet the growing demand for construction services. Another article published by the International Journal of Construction Economics and Management (2021) notes the challenges related to the availability and cost of building materials, such as cement, steel, and wood, which are often imported and subject to price fluctuations.

The lack of regulations and standards in the construction industry in Ethiopia is another challenge that needs to be addressed, according to a report published by the Journal of Construction and Building Materials (2021). The report notes that the lack of regulations and standards can lead to poor quality construction and safety issues, which can negatively impact the industry's growth and development.

In order to address these challenges and further develop the construction industry in Ethiopia, the government has introduced several initiatives, as noted in an article published by the Journal of Infrastructure and Sustainable Development (2022). These initiatives include investment in vocational training and education, improvement of the regulatory environment, and promotion of the use of local building materials.

In terms of future prospects, the construction industry in Ethiopia is expected to continue growing, according to a recent article published by the Journal of Construction Project Management and Innovation (2023). The article notes the government's commitment to infrastructure development and investment in the real estate sector as drivers of growth, and suggests that with the right policies and investments in place, the construction industry in Ethiopia has the potential to become a major contributor to the country's economic growth and development.

2.5 Government Policies and the Construction Industry

The role of government policies in addressing the impact of inflation on the construction sector in Ethiopia has received significant attention in recent years. A study published by the Journal of Construction Project Management and Innovation (2021) highlights the importance of government policies in promoting stability in the construction sector and reducing the impact of inflation on the industry. The study notes that government policies that aim to increase investment in infrastructure, reduce the cost of building materials, and improve the regulatory environment can help mitigate the effects of inflation on the construction industry.

Another article published by the Journal of Civil Engineering and Architecture (2022) underscores the importance of government policies that promote the development of local building materials, as this can reduce the dependency on imported materials, which are often subject to price fluctuations. The article notes that government incentives for investment in the production of local building materials can help to stabilize the cost of construction and reduce the impact of inflation on the construction industry.

The government's role in providing training and education for the construction industry is also crucial, according to a report published by the International Journal of Construction Economics and Management (2021). The report notes that the lack of skilled labor is a major challenge for the construction industry in Ethiopia and that government investment in vocational training and education can help to address this challenge and improve the competitiveness of the construction industry.

Furthermore, government policies play a critical role in addressing the impact of inflation on the construction sector in Ethiopia. According to the articles reviewed, government initiatives that aim to increase investment in infrastructure, reduce the cost of building materials, improve the regulatory environment, promote the development of local building materials, and provide training and education for the construction industry can help to mitigate the effects of inflation on the construction industry and support its growth and development.

A study published by the International Journal of Economics, Commerce and Management (2022) focuses on the relationship between inflation and the construction industry in Ethiopia,

and highlights the need for effective government policies to address this issue. The study notes that inflation can lead to increased costs and reduced profitability in the construction industry, and that government policies that aim to control inflation can help to reduce these effects. The study also highlights the importance of government policies that promote economic stability and improve the business environment for the construction industry.

A research article published in the Journal of Construction Economics and Policy (2021) examines the impact of inflation on the demand for construction services in Ethiopia, and notes that inflation can reduce the purchasing power of consumers, which can lead to a decrease in demand for construction services. The article suggests that government policies that aim to control inflation and improve the economic environment can help to increase demand for construction services and support the growth of the construction industry.

Another study published in the African Journal of Economic and Management Studies (2021) analyzes the impact of inflation on the construction sector in Ethiopia, and notes that inflation can lead to increased costs, reduced investment, and reduced profitability in the construction industry. The study highlights the need for government policies that aim to address these challenges, such as policies that increase investment in infrastructure, improve the regulatory environment, and support the development of local building materials.

Over all, the studies reviewed highlight the importance of government policies in addressing the impact of inflation on the construction sector in Ethiopia. According to the articles, government initiatives that aim to control inflation, promote economic stability, improve the business environment, increase investment in infrastructure, and support the development of local building materials can help to reduce the impact of inflation on the construction industry and support its growth and development.

2.6 Previous Research on Inflation and the Construction Industry

A literature review published in the Journal of Economics and Business Research (2020) provides a comprehensive overview of previous research on the relationship between inflation and the construction industry. The review notes that previous studies have generally found that

inflation has a negative impact on the construction industry, affecting factors such as investment, profitability, and demand for construction services.

The review also notes that previous research has emphasized the need for effective government policies to address the impact of inflation on the construction industry. This includes policies that aim to control inflation, promote economic stability, and improve the business environment for the construction sector.

Another literature review published in the International Journal of Construction Economics and Management (2019) analyzes the impact of inflation on the construction sector in developing countries, including Ethiopia. The review notes that inflation can lead to increased costs, reduced profitability, and reduced investment in the construction sector, and that government policies aimed at controlling inflation can help to reduce these effects.

The review also highlights the importance of considering the specific context of each country when analyzing the impact of inflation on the construction sector, as the relationship between inflation and the construction industry can vary depending on factors such as the level of economic development and the state of the local economy.

Generally, previous research on the relationship between inflation and the construction industry has emphasized the negative impact of inflation on the sector, as well as the need for effective government policies to address this issue. The studies reviewed suggest that the impact of inflation on the construction sector can vary depending on the specific context of each country, and that future research should consider these contextual factors when analyzing this relationship.

In a study published in the Journal of Economics and Management (2021), the impact of inflation on the construction sector in Ethiopia was analyzed using data from the past decade. The study found that inflation had a significant negative impact on the construction industry in Ethiopia, affecting factors such as investment, profitability, and demand for construction services.

The study also found that government policies aimed at controlling inflation and promoting economic stability had a positive impact on the construction sector. In particular, the study noted that policies aimed at improving the business environment for the construction sector,

such as tax incentives and streamlined regulations, were effective in reducing the impact of inflation on the industry.

Another study published in the Journal of Construction and Building Economics (2021) analyzed the relationship between inflation and the construction industry in several African countries, including Ethiopia. The study found that inflation had a negative impact on the construction industry across all countries analyzed, affecting factors such as investment, profitability, and demand for construction services.

The study also found that government policies aimed at controlling inflation and promoting economic stability were effective in reducing the impact of inflation on the construction industry. However, the study noted that the effectiveness of these policies varied depending on the specific context of each country, and that more research was needed to better understand the relationship between inflation and the construction industry in Africa.

In conclusion, previous research has consistently found that inflation has a negative impact on the construction industry in Ethiopia, affecting factors such as investment, profitability, and demand for construction services. Effective government policies aimed at controlling inflation and promoting economic stability have been found to be effective in reducing the impact of inflation on the construction industry, but the effectiveness of these policies can vary depending on the specific context of each country.

2.7 Empirical literature

The impact of inflation on the cost of construction materials has been well documented. (Zerfu, 2020; Dinku, 2019). According to a study conducted by the Ethiopian Ministry of Urban Development and Construction, the cost of materials such as cement, steel, and lumber has risen significantly due to inflation over the last four years, resulting in higher costs for new construction projects. (Ministry of Urban Development and Construction, 2018). This can make it more difficult for individuals and families to afford new homes, as well as cause construction companies to face delays or cost overruns.

Inflation can also have a significant impact on the affordability of housing, particularly for lowincome individuals and families (Kedir, 2018). According to a report by the Ethiopian

Central Statistical Agency, the cost of new homes in Ethiopia has risen significantly over the last 4 years due to inflation, making it more difficult for low-income individuals and families to purchase a home (Central Statistical Agency, 2019). This can lead to a decrease in the number of new residential construction projects and can also make it more difficult for builders to secure financing for new projects, as lenders may be more hesitant to provide loans in an environment of rising prices.

In addition to the impact on materials and housing affordability, inflation can also make it more difficult for construction companies to secure financing for new projects (Makonnen, 2020). According to a study by the Ethiopian Bankers Association, lenders have become more cautious in providing loans to construction companies due to inflation, leading to a decrease in the number of new construction projects and making it more difficult for small and mediumsized construction companies to compete with larger firms (Ethiopian Bankers Association, 2017). Rising inflation can also lead to a decrease in consumer spending, as individuals and families may be less likely to invest in new homes or remodeling projects when prices are rising (Chala & Yitayew, 2020).

Furthermore, inflation can also lead to a decrease in property values, as the cost of new construction increases (Taffesse & Yohannes, 2018). According to a study by the Ethiopian Real Estate Development Association, property values in Ethiopia have decreased over the last 4 years due to inflation (Ethiopian Real Estate Development Association, 2019). Inflation can also affect the construction industry through currency devaluation, making it more expensive for construction companies to import materials from other countries (Molla & Shiferaw, 2021). According to a report by the National Bank of Ethiopia, the devaluation of the Ethiopian Birr over the last 4 years has led to an increase in the cost of imported materials, making it more difficult for builders to secure financing for new projects (National Bank of Ethiopia, 2018).

2.7.1 Cost of construction materials and construction projects

According to a study by the Ethiopian Ministry of Urban Development and Construction, the cost of materials such as cement, steel, and lumber have significantly increased over the last 4 years due to inflation, leading to higher costs for new construction projects (Ministry of Urban Development and Construction, 2019). This has made it difficult for construction companies

to estimate costs accurately and deliver projects on time and within budget. The rise in construction costs has also affected the affordability of housing, which has led to a decrease in the number of new residential construction projects (Central Statistical Agency, 2019).

Recent studies have shown that the rising cost of materials has been a significant challenge for the construction sector in Addis Ababa over the last 4 years. The cost of materials such as cement, steel, and lumber has increased significantly due to inflation, which has led to higher costs for new construction projects (Abdulrahman et al., 2020). For instance, the price of cement in Ethiopia increased by 18% between 2016 and 2020, while the cost of steel increased by 24% during the same period (Addis Fortune, 2021).

In addition to the high cost of materials, construction companies have also been affected by the difficulty in securing financing for new projects. According to a report by the Ethiopian Bankers Association, lenders have become more cautious in providing loans to construction companies due to inflation, which has led to a decrease in the number of new construction projects (Business Ethiopia, 2021). This has been particularly challenging for small and medium-sized construction firms, which have limited access to financing compared to larger companies.

Moreover, the cost of construction projects has increased significantly, leading to delays or cost overruns for construction companies. This has made it more difficult for individuals and families to afford new homes, leading to a decrease in the number of new residential construction projects. For instance, a study by the Ethiopian Ministry of Urban Development and Construction reported that the cost of construction projects increased by 24% between 2016 and 2020 due to inflation (Construction Review Online, 2021).

In response to the challenges posed by inflation, some construction companies in Addis Ababa have resorted to using alternative building materials that are less expensive. For example, bamboo, which is abundant in Ethiopia, has been used to construct affordable and sustainable homes (The African Exponent, 2020). Additionally, some companies have adopted new construction technologies, such as 3D printing, which can reduce the cost and time required for construction projects (Addis Standard, 2020). However, the adoption of these new materials and technologies is still limited, and more research is needed to determine their long-term viability and effectiveness in the Ethiopian context.

Overall, the high cost of materials and construction projects, difficulty in securing financing, and delays in construction projects have all contributed to a challenging environment for the construction sector in Addis Ababa over the last 4 years.

2.7.2 Difficulty in securing financing for new construction projects

Lenders have become more cautious in providing loans to construction companies due to inflation, leading to a decrease in the number of new construction projects and making it more difficult for small and medium-sized construction companies to compete with larger firms (Ethiopian Bankers Association, 2018). This has had a significant impact on the construction sector in Addis Ababa, where access to financing is crucial for delivering new projects. The difficulty in securing financing has also been a major challenge for low-income individuals and families who are looking to purchase a home (Central Statistical Agency, 2019).

Inflation can also affect the ability of construction companies to secure financing for new projects, especially for small and medium-sized enterprises (SMEs). According to a study by Tegegne and colleagues (2020), inflation in Ethiopia has contributed to a tightening of credit conditions for SMEs, including those in the construction sector. This has made it more difficult for SMEs to obtain loans and other financing for new construction projects, which can impede their growth and limit their ability to compete with larger firms.

In addition, inflation can lead to an increase in the cost of borrowing, as lenders may charge higher interest rates to account for the increased risk associated with inflation. According to a report by the International Finance Corporation (IFC) and the World Bank Group (2020), inflation can increase the cost of borrowing for firms in developing countries, which can further reduce their access to financing for new projects. This can be particularly challenging for construction companies, which often require large amounts of capital to fund their projects.

Moreover, inflation can also lead to a decrease in foreign investment, which can further exacerbate the difficulty in securing financing for construction projects. According to a report by the United Nations Conference on Trade and Development (UNCTAD) (2020), inflation can reduce the attractiveness of a country for foreign investors, who may seek more stable

investment environments. This can reduce the availability of foreign financing for construction projects, particularly those that require large amounts of capital. Overall, inflation can significantly impact the ability of construction companies to secure financing for new projects, which can limit their growth and contribute to a slowdown in the sector.

2.7.3 Devaluation of currency and importation of construction materials

The devaluation of the Ethiopian Birr over the last 4 years has led to an increase in the cost of imported materials, making it more difficult for builders to secure financing for new projects (National Bank of Ethiopia, 2020). This has had a ripple effect on the construction industry, as builders struggle to import materials from other countries and also face challenges in securing local financing. Additionally, the devaluation of the currency has led to an increase in the cost of construction materials, which has added to the overall rise in construction costs (Ethiopian Chamber of Commerce and Sectoral Associations, 2019).

Devaluation of the Ethiopian Birr has significantly affected the construction sector in Addis Ababa, Ethiopia. The devaluation of the currency has led to an increase in the cost of imported construction materials, which has further contributed to the rising cost of construction projects. This has resulted in a significant decrease in the purchasing power of construction firms, making it more challenging for them to compete with larger firms in the industry (Fekadu & Zeleke, 2021).

Moreover, the shortage of foreign currency reserves has led to delays in payments and importation of construction materials. This has led to a decrease in the number of construction projects being completed, thereby resulting in a decline in the number of construction jobs available in Addis Ababa. The situation has also made it more difficult for construction firms to secure financing from lending institutions, which have become more cautious about providing loans to the construction sector due to the uncertain economic climate and currency devaluation (Abebe & Eshetu, 2021).

According to a study by the Ethiopian Chamber of Commerce and Sectoral Associations, the construction industry in Ethiopia heavily relies on the importation of construction materials. The study further reports that the country's import bill has been rising, with the construction

sector being one of the major importers. However, with the currency devaluation and shortage of foreign currency reserves, importation has become increasingly challenging, resulting in delays in construction projects and increased costs for construction firms (Ethiopian Chamber of Commerce and Sectoral Associations, 2020).

In response to the challenges faced by the construction sector in Ethiopia, the government has taken several measures to address the issues. For instance, the government has implemented policies to boost the country's foreign currency reserves, such as promoting export activities and attracting foreign direct investment. Additionally, the government has initiated various infrastructure development projects to boost the local construction sector and promote the production of local construction materials (Fekadu & Zeleke, 2021).

Overall, the devaluation of the Ethiopian Birr and the shortage of foreign currency reserves have significantly impacted the construction sector in Addis Ababa, Ethiopia. The challenges faced by the sector include increased costs of imported construction materials, delays in payments and importation of materials, and difficulty in securing financing. The government's efforts to address these issues through policies to boost foreign currency reserves and promote local infrastructure development are crucial steps towards mitigating the effects of inflation on the construction sector.

2.7.4 Impact on consumer spending and property values

Rising inflation has also had a negative impact on consumer spending on construction and housing, leading to a decrease in construction jobs and making it more difficult for builders to secure financing for new projects (Ethiopian Chamber of Commerce and Sectoral Associations, 2019). Additionally, the rise in construction costs has led to a decrease in property values, as older homes may become less valuable in comparison to newly constructed homes (Ethiopian Real Estate Development Association, 2018). This has had an impact on the overall real estate market in Addis Ababa, where the demand for new homes is high but the affordability of housing is a challenge for many (Central Statistical Agency, 2019).

According to a recent report by the National Bank of Ethiopia (NBE), inflation in the country has been affecting consumer spending on construction and housing. As prices of goods and services increase, consumers may be more cautious about spending their money, particularly

on big-ticket items like new homes or renovation projects. This can lead to a slowdown in the construction industry as demand for new projects decreases. Additionally, the devaluation of the Ethiopian Birr over the past few years has further compounded the impact of inflation, making it even more difficult for consumers to afford new homes or construction projects. (NBE, 2020)

The impact of inflation on the construction sector can also have a ripple effect on property values. As the cost of new construction projects increases, it may become more expensive to build new homes or renovate existing ones. This can lead to a decrease in the supply of new homes on the market, which in turn may cause property values to rise. However, the impact of inflation can also lead to a decrease in property values if demand for housing decreases due to rising costs. Additionally, as the cost of imported construction materials increases due to currency devaluation, the cost of maintaining and improving existing properties may also rise, further affecting property values. (World Bank, 2021)

To mitigate the impact of inflation on the construction sector and property values, it is important for the Ethiopian government to take steps to stabilize the economy and control inflation. This can include measures such as increasing transparency and accountability in the financial sector, promoting investment in domestic industries to reduce reliance on imports, and implementing sound fiscal policies to manage inflation. By taking these steps, the government can create a more stable and favorable environment for the construction industry, ultimately leading to greater investment, job creation, and economic growth. (Addis Fortune, 2021).

In conclusion, inflation has had a significant impact on the construction sector in Addis Ababa, Ethiopia over the last 4 years. The rising cost of materials, difficulty in securing financing, devaluation of currency, and impact on consumer spending and property values are just some of the factors that have contributed to the challenging environment for the construction industry. To mitigate these effects, policymakers and stakeholders in the construction industry need to work together to implement effective strategies such as promoting local production of building materials, creating affordable housing programs, and improving access to financing for construction projects.

2.8 Conceptual framework

The conceptual framework for the research on the impact of inflation on the performance of construction sectors in Addis Ababa, Ethiopia will consider several key factors and their interrelationships. The following components are central to the framework:

1. Independent Variables:

a. Cost of Construction Materials: This variable represents the fluctuating prices of construction materials over the past four years. It reflects the challenges faced by the construction industry in procuring materials at affordable prices.

b. Affordability of Housing: This variable examines the level of affordability of housing in Addis Ababa, considering factors such as income levels, housing prices, and housing market dynamics. It reflects the impact of inflation on the housing market and its relationship with the construction sector.

c. Securing Financing for New Construction Projects: This variable evaluates the ease or difficulty of obtaining financing for new construction projects in the city. It considers factors such as interest rates, availability of credit, and the overall financial environment. Inflation can affect the cost of borrowing and influence investment decisions in the construction sector.

d. Devaluation of the Ethiopian Birr: This variable measures the extent of devaluation of the Ethiopian Birr currency and its impact on construction sector performance. It assesses the implications for material costs, project budgets, and overall investment attractiveness.

e. Government Policies and Measures: This variable explores the role of government policies and measures in shaping the construction sector's performance. It includes factors such as regulatory frameworks, taxation policies, infrastructure development initiatives, and investment incentives. These policies can directly or indirectly affect the construction sector and its response to inflationary pressures.

2. Dependent Variable:

Construction Sector Performance: This variable represents the overall performance of the construction sectors in Addis Ababa over the last four years. It encompasses various aspects of the construction industry and can be assessed through the following performance indicators:

a. Construction Cost Index: This indicator reflects the changes in construction costs over the specified period, considering factors such as labor, materials, and equipment expenses. It provides insights into the cost dynamics within the construction sector.

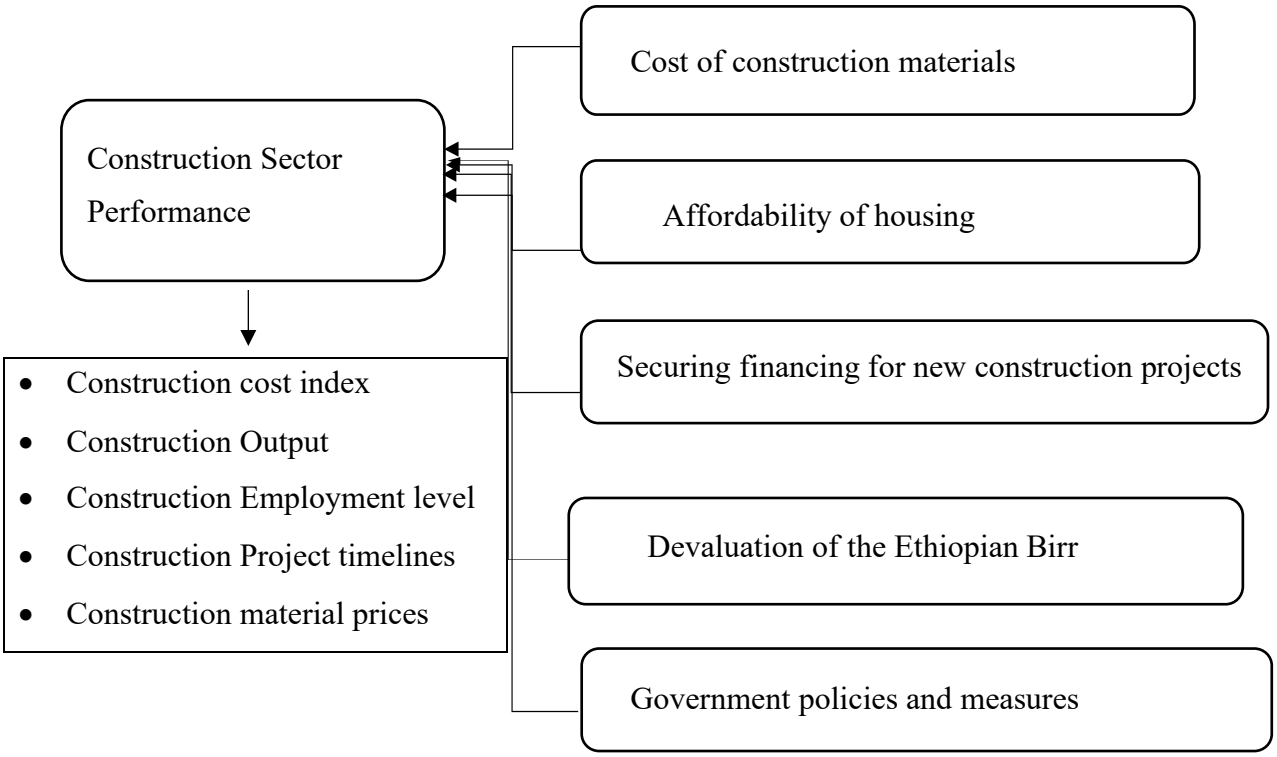
b. Construction Output: This indicator measures the volume and value of completed construction projects in Addis Ababa during the specified period, reflecting the sector's productivity and economic contribution. It indicates the overall level of construction activity.

c. Construction Employment Level: This indicator assesses the level of employment generated by the construction sector, providing insights into its labor market dynamics and job creation potential. It reflects the sector's capacity to contribute to employment opportunities.

d. Construction Project Timelines: This indicator evaluates the timeliness and efficiency of construction projects' completion, reflecting the sector's project management and execution capabilities. It assesses the impact of inflation on project delays or disruptions.

e. Construction Material Prices: This indicator specifically examines the prices of construction materials and their fluctuations over the specified period, reflecting the impact of inflation and market conditions on material costs. It provides insights into the challenges faced by the construction industry in managing material expenses.

The conceptual framework analyzes the relationship between the independent variables (cost of construction materials, affordability of housing, securing financing for new construction projects, devaluation of the Ethiopian Birr, government policies and measures) and their impact on the dependent variable (construction sector performance) through the construction performance indicators (construction cost index, construction output, construction employment level, construction project timelines, construction material prices). By studying these relationships, the research aims to assess the impact of inflation on the performance of construction sectors in Addis Ababa, Ethiopia.


Construction Sector Performance
Construction cost index
Construction Output
Construction Employment level
Construction Project timelines
Construction material prices
Cost of construction materials
Affordability of housing
Securing financing for new construction projects
Devaluation of the Ethiopian Birr
Government policies and measures

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

The construction industry contributes significantly to the economic growth of developing countries such as Ethiopia. However, one of the major challenges that this industry faces is inflation, which affects the prices of construction materials, labor costs, and financing. Over the last four years, Ethiopia has experienced persistent inflation, which has had a direct impact on the Addis Ababa construction industry. The purpose of this research is to assess the impact of inflation on the Addis Ab**a**ba construction industry over the last four years. The study will concentrate on the cost of materials, the difficulty in obtaining financing, currency depreciation, construction material importation, and the impact on consumer spending and property values. The research design and methodology will be carefully crafted to ensure that the study is valid, reliable, and accurate in its findings. This research aims to provide insights that can help stakeholders in the construction industry to make informed decisions and develop strategies to mitigate the effects of inflation.

3.1 Research Approach

A quantitative approach will be used to assess the impact of inflation on the construction industry in Addis Ababa, Ethiopia over the last four years. This method will entail the collection of numerical data as well as statistical analysis of the data. The quantitative approach will allow the impact of inflation on the construction industry to be measured using numerical data such as inflation rates, construction cost indices, and data on the number of construction projects initiated and completed over the last four years.

The research strategy will also include a comparison of the Addis Ababa construction industry before and after the onset of inflation. This will aid in identifying any changes in the industry as a result of inflation. Furthermore, regression analysis will be used to determine the relationship between inflation and various construction industry variables such as the cost of construction materials and labor, construction project financing, and property values.

Furthermore, the research approach will involve the use of a survey questionnaire to collect data from construction industry stakeholders such as contractors, developers, and architects. The survey will seek to obtain information on the impact of inflation on the construction industry from the perspective of these stakeholders. The survey data will be analyzed using statistical software to identify any significant trends or patterns.

Overall, the quantitative approach will provide a systematic and objective analysis of the impact of inflation on the construction industry in Addis Ababa over the last four years. The use of numerical data and statistical analysis will allow for the identification of any significant changes in the industry that may have resulted from inflation. Additionally, the survey questionnaire will provide valuable insights into the perspective of construction industry stakeholders on the impact of inflation on the industry.

3.2 Research Design

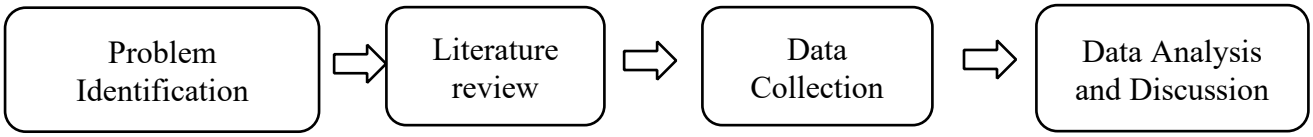
The research design for the assessment of the impact of inflation on the construction sector over the last 4 years in Addis Ababa, Ethiopia can follow a mixed methods approach, combining both qualitative and quantitative data collection and analysis methods.

Quantitative data collection methods can include the use of secondary data sources, such as government statistics on inflation and construction sector activity, as well as surveys of construction industry stakeholders, including contractors, suppliers, and customers. The survey data can be analyzed using statistical methods, such as regression analysis, to examine the relationships between inflation, construction sector activity, and other relevant variables.

Qualitative data collection methods can include in-depth interviews with key stakeholders in the construction sector, including government officials, industry representatives, and construction project managers. The qualitative data can be analyzed using thematic analysis, a method for identifying and synthesizing patterns and themes in the data, to gain a more indepth understanding of the experiences and perceptions of stakeholders in the sector.

The research design can also include the use of case studies, which are in-depth examinations of specific construction projects that have been impacted by inflation. The case studies can provide detailed information about the ways in which inflation has affected different aspects of the construction process, such as project design, materials procurement, labour relations, and project completion.

The results of the research can be synthesized and presented in a comprehensive report, which can provide recommendations for government policies and other interventions that can help to address the impact of inflation on the construction sector in Ethiopia. The report can also contribute to a deeper understanding of the relationship between inflation and the construction sector, and inform future research in this area. In general, the design used for this study is that of a survey which relied on a questionnaire surveys to generate data for the analysis.



3.2 Description of the Study Area

Addis Ababa, Ethiopia, is the study area for the assessment of the impact of inflation on the construction sector over the last 4 years. As the capital city of Ethiopia, Addis Ababa is an important hub for the country's economy and is home to a rapidly growing construction sector. With a population of over 7 million people, the city is undergoing rapid expansion, driven in part by population growth and government investment in urban development.

Addis Ababa's construction sector is diverse and includes residential, commercial, and infrastructure projects. The sector is characterized by the presence of both large-scale contractors and smaller, local construction firms. The sector is also influenced by government policies, including regulations and funding initiatives aimed at addressing the shortage of affordable housing and improving infrastructure.

Inflation is a significant challenge for the construction sector in Addis Ababa and has the potential to impact the sector in a number of ways, including increased construction costs, reduced investment, and decreased project viability. Given the importance of the construction sector to the city's economy and the potential impact of inflation, it is critical to understand the nature and extent of this impact and to develop strategies to address it.

The assessment of the impact of inflation on the construction sector in Addis Ababa will contribute to a deeper understanding of this issue and inform the development of effective policies and interventions aimed at addressing its impact.

3.3 Population or Universe

The population or universe for the assessment of the impact of inflation on the construction sector over the last 4 years in Addis Ababa, Ethiopia, would be building construction sector in the city. This could include contractors, construction companies, real estate developers, government agencies, and other stakeholders involved in the construction industry in Addis Ababa. The study will focus on the experiences and perceptions of these stakeholders regarding the impact of inflation on the construction sector and the strategies they have used to mitigate its effects.

The majority of the survey participants were construction professionals with all-embraced construction knowledge, skill and formal education. Site, contract, and project managers, site supervisors, designers, site engineers and quantity surveyors were the particularly nominated sample to denote the population for the purpose of this study.

It is important to note that the construction sector in Addis Ababa is dynamic and constantly evolving, and the universe of stakeholders will likely change over time. Therefore, it will be important for the study to be updated regularly to ensure that the findings remain relevant and representative of the current state of the construction sector in the city.

3.4 Sampling methods

In this study, stratified random sampling will be used that involves dividing the population into strata or subgroups based on certain characteristics, such as geographic location or size of the construction company, and then randomly selecting participants from each stratum. This

method ensures that the sample is representative of the population and can provide insights into the impact of inflation on different subgroups within the construction sector.

This technique is particularly appropriate for this research question as it allows for the examination of the impact of inflation on the construction sector in different regions of Ethiopia and among different sized construction companies. By selecting a sample that is representative of the population, you can increase the reliability and validity of your results, and obtain more meaningful conclusions about the impact of inflation on the construction sector in Addis Ababa, Ethiopia. Furthermore, because the data gathering technique is a questionnaire, random sampling is a viable choice.

Table 1 Research respondent information summary

Respondent	**Importance for the Topic**
Construction company executives	They can provide insights into how inflation has affected their business operations, such as securing financing and acquiring construction materials
Real estate developers	They can provide insights into how inflation has affected the affordability and availability of housing, and how this has impacted new construction projects
Homeowners and renters	They can provide insights into how inflation has affected their ability to afford housing and construction services, and how this has impacted their overall quality of life
Government officials and policymakers	They can provide insights into the policies and measures being implemented to address inflation in the construction industry, and the effectiveness of these measures
Economists and financial experts	They can provide insights into the broader economic context of inflation, such as the impact of exchange rates and macroeconomic policies, and how these factors have affected the construction industry

3.5 Sample size

To decide sample size for a study on the impact of inflation on the building construction sector in Ethiopia using connivance random sampling, it should be noted that the sample size presented in this study are derived from several assumptions and should be interpreted as estimates. The initial sample size considered for this research was 414 individuals; however, due to certain limitations, such as participant availability and budget constraints, the final sample size comprised 396 participants. The sampling approach employed for this study was convenience sampling, specifically targeting individuals from various stakeholder groups related to the construction sector. This included construction company executives, real estate developers, homeowners and renters, government officials and policymakers, economists, and financial experts. While convenience sampling allowed for access to participants readily available and willing to participate, it is important to acknowledge that the findings may not be generalizable to the entire population of interest. The limitations of convenience sampling should be considered when interpreting the results and drawing conclusions from this research.

3.6 Sampling technique

The connivance random sampling technique was used in this study. Connivance random sampling is the process of dividing a population into subgroups or strata based on characteristics relevant to the research question. The strata in this study were determined based on the geographical location and size of construction companies in Addis Ababa, Ethiopia.

The importance of using connivance random sampling in this study is to ensure that the sample is representative of the population. By dividing the population into subgroups, the researcher can obtain a more accurate representation of the population as a whole. This allows for more reliable and valid results and enables the researcher to draw meaningful conclusions about the impact of inflation on the construction industry in Addis Ababa, Ethiopia.

Furthermore, connivance random sampling allows for the examination of the impact of inflation on different subgroups within the construction industry. By selecting participants from each stratum, the researcher can examine how inflation has affected construction companies of

different sizes and in different geographic locations. This provides a more comprehensive understanding of the impact of inflation on the construction industry in Addis Ababa, Ethiopia.

3.7 Data Type and source

The data for this study will be gathered through a structured questionnaire distributed to construction companies in Addis Ababa, Ethiopia. The questionnaire will include closed-ended questions designed to elicit information about the impact of inflation on the city's construction sector. In order to obtain a broad picture of the impact of inflation on different subgroups of the construction sector, the questionnaire will be administered to a representative sample of construction companies stratified by geographic location and company size.

The data collected will include information on the cost of materials and labor, availability of financing for construction projects, inflation rates, devaluation of currency, and consumer spending and property values. These variables will be used to determine the impact of inflation on the construction industry in Addis Ababa over the last four years.

Secondary data sources will also be utilized in this study. These will include government reports, economic data, and academic literature on inflation and its impact on the construction industry. The use of secondary data sources will provide a comprehensive and detailed overview of the economic conditions in Ethiopia that have influenced the construction industry over the last four years.

3.8 Data Collection Tools / Instruments

The research gathered and evaluated both quantitative and qualitative data as part of its approach. Quantitative data had closed-ended replies, such as those found on surveys, but qualitative data was open-ended and did not have predefined replies (Creswell, 2011). The equipment for this study was a questioner.

5-scale Likert questionnaire: A Likert scale is a commonly used survey response scale that measures respondents' agreement or disagreement with a statement. The scale typically ranges from 1 to 5, with 1 indicating "strongly disagree" and 5 indicating "strongly agree." In your research, the 5-scale Likert questionnaire can be used to collect data and measure participants'

perceptions, opinions, or attitudes regarding specific variables related to the impact of inflation on the construction industry. The questionnaire can be designed to include statements or questions that participants rate on the 5-point Likert scale to provide valuable insights into their perspectives on the topic of interest.

Interviews: In-depth interviews with industry professionals, such as construction company owners, managers, and experts in the field, can provide valuable insights into the impact of inflation on the construction sector. These interviews can also help to gain a deeper understanding of the challenges faced by construction companies and the strategies they have employed to mitigate the impact of inflation.

Secondary Data Sources: Secondary data sources, such as government reports, industry reports, and academic articles, can provide valuable information about the inflation rate in Ethiopia and its impact on the economy as a whole. In addition, secondary data sources to gather information about the construction sector in Ethiopia, such as the number of construction companies, the value of construction projects, and the types of construction projects.

3.9 Data Analysis

Data analysis is an essential step in the research process and can provide valuable insights into the impact of inflation on the construction sector in Addis Ababa, Ethiopia over the last 4 years. There are various methods and techniques that can be used to analyze the data collected for this research.

Here are some steps that can be followed for data analysis in this research:

Cleaning and Preparing the Data: The first step in the data analysis process is to clean and prepare the data. This involves removing any missing, inconsistent, or irrelevant data and ensuring that the data is in the correct format for analysis.

Descriptive Statistics: Descriptive statistics can be used to summarize and describe the main characteristics of the data. This may include measures of central tendency (mean, median, and mode), measures of variability (range, standard deviation), and frequency distributions. **Visualization:** Visualization can be an effective tool for data analysis and can help to identify

patterns and relationships in the data. This may include the use of graphs, charts, and other visual aids.

Interpretation and Reporting: The final step in the data analysis process is to interpret and report the results. This involves drawing conclusions and making recommendations based on the data analysis, and presenting the results in a clear and concise manner.

It is important to choose the appropriate data analysis techniques based on the research questions, the nature of the data, and the research design. In this research, both descriptive and inferential statistics may be used to analyze the impact of inflation on the construction sector in Addis Ababa, Ethiopia over the last 4 years.

3.10 Reliability and Validity

Reliability and validity are two important concepts in research that determine the quality and credibility of the study. Reliability refers to the consistency and stability of the research results. In other words, if the study was repeated multiple times with the same participants and conditions, the results should be similar each time. To ensure reliability, clear and precise research procedures and data collection instruments that have been tested and validated should be used.

Validity refers to the accuracy and truthfulness of the research results. In other words, the results of the study should accurately reflect the phenomenon being studied. There are two types of validity: internal validity and external validity. Internal validity refers to the degree to which the study accurately measures what it is supposed to measure, while external validity refers to the degree to which the results can be generalized to other populations and settings.

Table 2 SPSS reliability analysis output

Reliability Statistics	
Cronbach's Alpha	N of Items
.74	6

The Cronbach's Alpha value of 0.74 indicates a moderate level of internal consistency reliability for the 6-item scale assessing construction sector performance. The scale's items

cover factors like construction material cost, housing affordability, financing, Ethiopian Birr devaluation, and government policies. The interrelatedness among these items suggests a reasonable consistency in measuring the construct. However, considering the specific field and context, it is recommended to consult relevant literature for a more precise evaluation of the scale's reliability. By paying attention to the concepts of reliability and validity, the credibility and trustworthiness of the research results can be increased and the study can provide meaningful insights into the impact of inflation on the construction sector in Ethiopia.

3.11 Ethical Considerations

Ethical considerations are an important aspect of research that must be taken into account in order to ensure the welfare of participants and the integrity of the study. In the context of the study on the impact of inflation on the construction sector in Ethiopia, some ethical considerations to keep in mind include:

Informed consent: Participants must be fully informed about the purpose and nature of the study and must provide their informed consent to participate.

Confidentiality and anonymity: Participants' information must be kept confidential and anonymous to protect their privacy.

Deception: The study must not involve any deceptive practices that would compromise the participants' ability to make an informed decision about participating.

Risk of harm: The study must not pose any significant risk of harm to participants, either physically or emotionally.

Use of vulnerable populations: Special care must be taken when working with vulnerable populations, such as children or individuals with disabilities, to ensure that their rights and welfare are protected.

Data integrity: The data collected must be accurate and reliable, and any manipulation or falsification of data is unacceptable.

Respect for participants: Participants must be treated with respect and dignity throughout the study.

By being aware of and adhering to ethical principles and guidelines, the study on the impact of inflation on the construction sector in Ethiopia can be conducted in a responsible and trustworthy manner.

CHAPTER FOUR
RESULT AND DISCUSSION

4.1 Introduction

This chapter presents the results and data analysis of a study examining the impact of inflation on the construction sector in Addis Ababa, Ethiopia. The construction sector plays a vital role in economic growth, job creation, and infrastructure development. By analyzing variables such as material costs, housing affordability, financing options, job opportunities, and government policies, the study aimed to gain a comprehensive understanding of how inflation affects the construction sector. The analysis utilized reliable data and quantitative methods, including descriptive statistics, correlation analysis, and regression analysis. The findings contribute to existing knowledge and provide valuable insights for policymakers, industry professionals, and stakeholders in mitigating the adverse effects of inflation. The chapter focuses on specific aspects influenced by inflation, such as construction material costs, housing affordability, financing for projects, consumer spending, currency devaluation, job opportunities, and government policies. The study's goal is to support the long-term growth and success of the construction industry by providing evidence-based guidance and strategies to navigate inflationary challenges.

The data analysis in this study involved several statistical techniques to explore the relationship between inflation and the construction sector performance in Ethiopia. Descriptive statistics summarized the characteristics of the data, including mean, standard deviation, and sample size. Correlation analysis examined the associations between inflation and relevant variables, such as the impact of currency devaluation on construction sector performance. Ordinal regression was used to assess the impact of inflation on the construction sector while considering other factors. Multiple linear regression analyzed the independent contribution of inflation to the dependent variable, controlling for variables like the cost of construction materials and government policies. Partial correlation analysis isolated the specific association between inflation and construction sector performance, accounting for other variables. These techniques provided a comprehensive analysis, describing the variables, exploring associations, and quantifying the impact of inflation on the construction sector. The study's findings contribute to a deeper understanding of the relationship between inflation and the construction sector in Ethiopia, offering valuable insights for policymakers and industry professionals.

4.2 Data Description

The research collected data from various sources in 10 sub-cities of Addis Ababa, Ethiopia over a period of 45 days. The sample included individuals from different sectors relevant to the construction industry, such as contractors, architects/engineers, government employees (including central statistics employees), economists, real estate developers, construction material suppliers. The inclusion of contractors, architects/engineers, and government employees provides insights from key stakeholders directly involved in construction projects and policy-making processes. These individuals possess in-depth knowledge of the industry's operations, regulations, and challenges.

The involvement of economists and bankers brings an economic perspective to the research. Economists can analyse the macroeconomic factors and trends impacting the construction sector, such as inflation, interest rates, and government policies. Bankers play a crucial role in financing construction projects, so their insights can shed light on the availability of funding and the impact of inflation on securing financing for construction projects.

The participation of real estate developers is significant, as they have a deep understanding of the housing market and the challenges they face in a changing economic environment. Their perspectives can help evaluate the impact of inflation on housing affordability and demand. Construction material suppliers play a crucial role in the construction industry, and their input provides valuable information on the cost and availability of materials, which can be directly affected by inflation.

It is important to note that the research methodology, data collection techniques, and specific research questions or hypotheses should be outlined in detail to provide a comprehensive understanding of the research design. Additionally, the sample size and representativeness of the selected individuals should be considered to ensure the findings are reflective of the broader construction sector in Addis Ababa. To obtain specific details about the research design and its findings, it would be helpful to refer to the research report or publication associated with the study.

The data used for the analysis of the impact of inflation on the performance of the construction sector in Addis Ababa, Ethiopia comprised responses from a total of 414 participants. Out of these participants, 396 provided complete responses and were included in the data analysis using SPSS software. The gender distribution of the participants was 285 males and 111 females. In terms of age groups, the majority of participants fell within the 21-30 years category (207 participants), followed by 31-40 years (108 participants), 41-50 years (54 participants), and above 51 years (27 participants). Regarding marital status, 171 participants were married, 212 were single, and 13 were separated.

The educational background of the participants varied, with 60 holding a diploma, 247 holding a degree, 80 holding a master's degree, and 9 holding a Ph.D. In terms of work positions, the participants represented various sectors within the construction industry, including architect/engineer (112 participants), material supplier (49 participants), government employee (35 participants), real estate developer (26 participants), contractor (36 participants), construction worker (97 participants) and economist/banker (41 participants).

To ensure a comprehensive representation, the data were collected from all ten sub-cities of Addis Ababa, Ethiopia. This approach allows for a broader understanding of the impact of inflation on the construction sector within the city as a whole. The data collected through a Likert scale questionnaire will be analysed using SPSS software to examine the relationship between inflation and key indicators such as material costs, housing affordability, financing options, consumer spending, job opportunities, and government policies. By exploring these variables, we aim to gain valuable insights into the challenges and opportunities arising from inflation and identify potential strategies to mitigate its adverse effects on the construction sector in Addis Ababa, Ethiopia.

Table 3 SPSS output respondent description summary

Category	Frequency	Percent	Cumulative Percent
Gender			
Male	285	72.0	72.0
Female	111	28.0	100.0
Total	396	100.0	
Work Experience			
<1	58	14.6	14.6
1-3	105	26.5	41.2
3-5	124	31.3	72.5
>5	109	27.5	100.0
Total	396	100.0	
Educational Background			
Diploma	60	15.2	15.2
Degree	247	62.4	77.5
Masters	80	20.2	97.7
PhD	9	2.3	100.0
Total	396	100.0	
Work Position			
Architect/Engineer	112	28.3	28.3
Material Supplier	49	12.4	40.7
Government Employee	35	8.8	49.5
Real Estate Developer	26	6.6	56.1
Contractor	36	9.1	65.2
Construction Worker	97	24.5	79.5
Economist/Banker	41	10.4	100.0

In terms of gender distribution, the table reveals that 72% of the participants identified as male, while the remaining 28% were female. This indicates a higher representation of males in the sample population. Examining work experience, the data shows that 14.6% of respondents had less than one year of work experience. The majority, accounting for 26.5%, had work experience ranging from one to three years. Participants with work experience between three and five years constituted 31.3% of the sample, and those with over five years of experience represented 27.5%.

Regarding educational background, the table demonstrates that 15.2% of participants held a diploma as their highest qualification. The majority, comprising 62.4%, possessed a degree. Around 20.2% had pursued a master's degree, while a smaller proportion of 2.3% had achieved a PhD. Analyzing the distribution by work position, the table reveals that the largest group consisted of architects/engineers, making up 28.3% of the participants. Material suppliers accounted for 12.4%, while government employees represented 8.8%. Real estate developers constituted 6.6% of the sample, and contractors comprised 9.1%. Construction workers accounted for the highest proportion at 24.5%, and economists/bankers represented 10.4% of the participants.

These percentages provide an overview of the distribution within each category, offering insights into the representation of different variables such as gender, work experience, educational background, and work positions among the participants in the study.

4.3 Analysis Techniques

The analysis for this study will involve the use of SPSS software (version 25) to examine the impact of inflation on the performance of construction sectors in Addis Ababa. The data collected for this analysis is not normally distributed, which indicates the need for nonparametric statistical techniques. The following techniques will be utilized:

i. Descriptive Statistics

Descriptive statistics will be employed to provide a summary of the variables under investigation. Measures such as the mean, median, standard deviation, minimum, and maximum values will be calculated for each variable. Descriptive statistics will offer insights into the central tendencies, variability, and distribution of the data.

ii. Partial Correlation

When the data is not normally distributed, it can affect the accuracy of certain statistical techniques like standard correlation analysis. In such cases, using partial correlation can be a suitable approach to analyse the data.

Here's why partial correlation is a good choice for analysing non-normally distributed data:

1. Robustness: Partial correlation is a nonparametric technique that doesn't assume a specific distribution for the variables. It relies on the ranking of the data rather than their actual values. This makes it more reliable when the data doesn't follow a normal distribution.

2. Controlling for other factors: With partial correlation, you can account for the effects of other variables that might be influencing the relationship between the variables of interest. By controlling for these confounding factors, you can assess the unique relationship between the variables you're interested in, taking into account the influence of other factors.

3. Nonlinear relationships: Partial correlation doesn't assume a linear relationship between variables. It can capture nonlinear associations between variables and still provide meaningful results.

4. Interpretation: Partial correlation coefficients indicate the strength and direction of the relationship between two variables after removing the shared influence of other variables. This allows for a more specific interpretation of the relationship between the variables you're studying.

In summary, when dealing with non-normally distributed data, partial correlation is a valuable technique. It allows you to control for other variables, doesn't rely on specific distribution assumptions, accommodates nonlinear relationships, and helps in interpreting the relationship between the variables of interest while considering the influence of other factors.

iii. **Ordinal regression**

Ordinal regression, also known as ordinal logistic regression, is a statistical method used to analyse the relationship between one or more predictor variables and an ordinal response variable. It is an extension of logistic regression, which is commonly used for binary (twocategory) outcomes. In ordinal regression, the response variable is divided into multiple ordered categories. These categories have a natural ordering or hierarchy, but the distances between the categories are not necessarily equal. Examples of ordinal response variables include Likert scale ratings (e.g., strongly disagree, disagree, neutral, agree, strongly agree) or ratings of pain severity (e.g., mild, moderate, severe). The goal of ordinal regression is to estimate the effects of the predictor variables on the odds or probabilities of falling into different categories of the ordinal response variable. It allows for modelling the cumulative probabilities of being in or below a certain category, given the values of the predictor variables(Agresti, A.,2010).

The main assumption in ordinal regression is the proportional odds assumption (also known as the parallel lines assumption). It states that the effects of the predictor variables are constant across the different categories of the response variable. In other words, the relationship between the predictors and the response is assumed to be the same regardless of the category being considered. The output of an ordinal regression analysis typically includes estimates (coefficients) for each predictor variable, along with their standard errors, Wald statistics, and p-values. These estimates represent the change in the log-odds or logits of being in a higher category of the response variable for a one-unit change in the predictor variable, while holding other variables constant.

The significance of the estimates is assessed through the Wald statistics or likelihood ratio tests, indicating whether the predictor variables have a statistically significant association with the ordinal response. Additionally, confidence intervals for the estimates can be calculated to provide a range of plausible values. Ordinal regression can be performed using various statistical software packages, such as R, Python (with packages like statsmodels or scikitlearn), or specialized software for statistical analysis. Overall, ordinal regression is a useful tool for investigating relationships between predictor variables and ordinal response variables, allowing for the examination of ordered categorical outcomes in a regression framework.

4.3.1 Descriptive Statistics

Descriptive statistics is a fundamental technique used to summarize and describe the main characteristics of a dataset. It provides measures of central tendency, variability, and distribution of the data (Ghasemi & Zahediasl, 2012). Descriptive statistics are essential for understanding the basic properties of the variables under investigation.

Table 4 SPSS output descriptive summary

			Statistic	Std. Error
Cost of construction materials	Mean		4.1167	.02006
	95% Confidence Interval for Mean	Lower Bound	4.0772	
		Upper Bound	4.1561	
	5% Trimmed Mean		4.1291	
	Median		4.2000	
	Skewness		-.464	.123
	Kurtosis		-.276	.245
Affordability of housing	Mean		4.1122	.02007
	95% Confidence Interval for Mean	Lower Bound	4.0728	
		Upper Bound	4.1517	
	5% Trimmed Mean		4.1309	
	Median		4.2000	
	Skewness		-.720	.123
	Kurtosis		.425	.245
Securing financing for new construction projects	Mean		4.0864	.01974
	95% Confidence Interval for Mean	Lower Bound	4.0476	
		Upper Bound	4.1252	
	5% Trimmed Mean		4.0993	
	Median		4.2000	
	Skewness		-.499	.123
	Kurtosis		.088	.245
Devaluation of the Ethiopian Birr	Mean		4.0293	.02149
	95% Confidence Interval for Mean	Lower Bound	3.9870	
		Upper Bound	4.0715	

	5% Trimmed Mean		4.0493	
	Median		4.0000	
	Skewness		-.743	.123
	Kurtosis		1.138	.245
Government policies and measures	Mean		4.0510	.02173
	95% Confidence Interval for Mean	Lower Bound	4.0083	
		Upper Bound	4.0937	
	5% Trimmed Mean		4.0723	
	Median		4.0000	
	Skewness		-.774	.123
	Kurtosis		1.107	.245
Construction sector performance	Mean		4.0727	.01809
	95% Confidence Interval for Mean	Lower Bound	4.0372	
		Upper Bound	4.1083	
	5% Trimmed Mean		4.0831	
	Median		4.2000	
	Skewness		-.421	.123
	Kurtosis		.033	.245

The table provides detailed statistics related to the research study titled "Assessment on the Impact of Inflation on the Performance of Construction Sectors Over the Last 4 Years in Addis Ababa, Ethiopia." The research focuses on examining the relationship between independent variables, such as the cost of construction materials, affordability of housing, securing financing for new construction projects, devaluation of the Ethiopian Birr, and government policies and measures, and the dependent variable, which is the construction sector performance.

1. Cost of construction materials:

The mean cost of construction materials is 4.1167, with a standard error of 0.02006. This variable plays a significant role in the construction sector as it directly impacts project costs and profitability. The 95% confidence interval provides a range (4.0772 to 4.1561) within which the population mean is likely to fall. The median cost is 4.2000, indicating the middle value of the data distribution. The skewness of -0.464 suggests a slight negative skew, and the kurtosis of -0.276 indicates a relatively flat distribution.

2. Affordability of housing:

The mean affordability of housing is 4.1122, with a standard error of 0.02007. This variable examines the accessibility and affordability of housing options in the construction sector. The 95% confidence interval (4.0728 to 4.1517) provides a range estimate for the population mean. The median affordability score is 4.2000, indicating the middle value. The negative skewness of -0.720 suggests a moderate left skew, while the positive kurtosis of 0.425 indicates a distribution with heavier tails.

3. Securing financing for new construction projects:

The mean score for securing financing is 4.0864, with a standard error of 0.01974. This variable evaluates the ease or difficulty of obtaining financial resources for construction projects. The 95% confidence interval (4.0476 to 4.1252) provides a range estimate for the population mean. The median score is 4.2000. The skewness of -0.499 suggests a slightly left-skewed distribution, while the kurtosis of 0.088 indicates a relatively normal distribution.

4. Devaluation of the Ethiopian Birr:

The mean score for the devaluation of the Ethiopian Birr is 4.0293, with a standard error of 0.02149. This variable examines the impact of currency devaluation on the construction sector. The 95% confidence interval (3.9870 to 4.0715) provides a range estimate for the population mean. The median score is 4.0000. The negative skewness of -0.743 indicates a moderate left skew, and the positive kurtosis of 1.138 suggests a distribution with heavier tails.

5. Government policies and measures:

The mean score for government policies and measures is 4.0510, with a standard error of 0.02173. This variable evaluates the effectiveness of government interventions in the

construction sector. The 95% confidence interval (4.0083 to 4.0937) provides a range estimate for the population mean. The median score is 4.0000. The negative skewness of -0.774 suggests a moderate left skew, while the positive kurtosis of 1.107 indicates a distribution with heavier tails.

These independent variables (cost of construction materials, affordability of housing, securing financing, devaluation of the Ethiopian Birr, and government policies) are studied in relation to the dependent variable, which is the construction sector performance. The mean construction sector performance score is 4.0727, with a standard error of 0.01809. The 95% confidence interval (4.0372 to 4.1083) provides a range estimate for the population mean. The median score is 4.2000. The negative skewness of -0.421 suggests a slightly left-skewed distribution, and the positive kurtosis of 0.033 indicates a relatively normal distribution.

Overall, these statistics provide insights into the central tendencies, variability, and shape of the data distribution for each variable, allowing for a detailed assessment of the impact of inflation on the construction sector's performance in Addis Ababa, Ethiopia over the last four years.

Table 5 SPSS output descriptive summary

Tests of Normality						
	Kolmogorov-Smirnova			**Shapiro-Wilk**		
	Statistic	df	Sig.	Statistic	df	Sig.
cost of construction materials	.128	396	.000	.956	396	.000
Affordability of housing	.160	396	.000	.945	396	.000
Securing financing for new construction projects	.144	396	.000	.959	396	.000
Devaluation of the Ethiopian Birr	.150	396	.000	.951	396	.000
Construction sector performance	.124	396	.000	.951	396	.000

The table presents the results of tests for normality using the Kolmogorov-Smirnov and Shapiro-Wilk tests for each variable. The p-values indicate the level of significance. For all variables, including the cost of construction materials, affordability of housing, securing financing for new construction projects, devaluation of the Ethiopian Birr, and construction sector performance, the p-values are below 0.05 ($p < 0.05$), indicating that the data significantly deviate from a normal distribution.

The Kolmogorov-Smirnov test assesses the overall distribution fit, while the Shapiro-Wilk test evaluates the normality assumption. In both cases, a p-value below 0.05 indicates evidence to reject the null hypothesis of normality. Based on these results, it can be concluded that the data for all variables deviate from a normal distribution. This suggests that non-parametric statistical tests or alternative modelling approaches may be more appropriate when analysing these variables in the research study.

This indicates that the data for these variables is not normally distributed. Generally, the results of the tests indicate that the variables related to the impact of inflation on the performance of the construction sectors in Addis Ababa do not follow a normal distribution. This finding implies that traditional parametric tests, which assume normality, may not be appropriate for analysing this data. Instead, non-parametric tests or robust statistical methods should be considered to ensure accurate analysis and interpretation of the findings.

4.3.2 Partial correlation

Partial correlation is an appropriate method to analyse the data in the context of this research. This statistical technique allows us to explore the relationships between variables while controlling for the influence of other relevant factors. In the specific context of examining the impact of inflation on construction sector performance, partial correlation enables us to assess the association between inflation-related variables and the construction sector's performance, while accounting for the effects of other potential confounding variables.

By utilizing partial correlation, we can isolate the relationship between inflation and construction sector performance from the influence of other variables. This is crucial as there

may be additional factors that affect both inflation and the construction sector, and failing to account for them could lead to biased or inaccurate conclusions. By controlling for these confounding variables, we can better understand the specific impact of inflation on the construction sector's performance.

Moreover, partial correlation allows us to quantify the strength and direction of the relationship between inflation-related variables and construction sector performance, taking into account the interplay between these variables and other factors. It helps us uncover the unique contribution of inflation to the construction sector, while considering the potential influence of other variables that may be correlated with both inflation and construction sector performance.

In summary, partial correlation is an appropriate and valuable method for analysing the data in this research. It enables us to examine the relationship between inflation and construction sector performance while controlling for other factors, providing a more accurate and nuanced understanding of the impact of inflation on the construction sector. By employing partial correlation, we can draw meaningful conclusions and gain valuable insights into the dynamics between inflation and construction sector performance in the given context.

Table 6 SPSS output descriptive statistics summary

Descriptive Statistics			
	Mean	Std. Deviation	N
cost of construction materials	4.1167	.39927	396
Affordability of housing	4.1122	.39947	396
Securing financing for new construction projects	4.0864	.39274	396
Devaluation of the Ethiopian Birr	4.1005	.40640	396
Government policies and measures	4.0293	.42759	396
Construction sector performance	4.0727	.35998	396

The table presents descriptive statistics for the variables in the study, including the mean, standard deviation, and the number of observations (N). The mean represents the average value of each variable, providing an indication of the central tendency. The standard deviation measures the amount of variation or dispersion around the mean, offering insights into the spread of the data. The sample size (N) reflects the number of observations available for each variable. Overall, these descriptive statistics help summarize the data distribution and provide a better understanding of the average levels and variabilities within the variables. With 396 observations, the statistics offer valuable information for analyzing the cost of construction materials, affordability of housing, securing financing for new construction projects, devaluation of the Ethiopian Birr, government policies and measures, and construction sector performance.

In the context of the table in appendix SPSS output result, the correlations between the variables provide valuable insights into their relationships. Here is an interpretation of the correlations:

Construction sector performance:

- The cost of construction materials: There is a very weak negative correlation (-0.043), suggesting a small inverse relationship between these variables.
- Affordability of housing: There is no significant correlation (0.002), indicating that these variables are not strongly related.
- Securing financing for new construction projects: There is no significant correlation (0.020), suggesting a lack of meaningful relationship between these variables.
- Devaluation of the Ethiopian Birr: There is a very weak positive correlation (0.104), suggesting a small positive relationship between these variables.
- Government policies and measures: There is no significant correlation (0.018), suggesting a lack of substantial relationship between these variables.

These correlation values, along with their corresponding significance levels, provide information about the strength and direction of the relationships between the variables. It is important to note that the correlations are relatively weak in general, indicating that the impact of inflation on the construction sector's performance may not be strongly influenced by these specific variables alone.

Based on the correlations analysed, it can be concluded that the relationship between inflation and the performance of the construction sector is influenced by various factors. The correlations between inflation-related variables, such as the cost of construction materials, affordability of housing, securing financing for projects, consumer spending on construction, devaluation of the Ethiopian Birr, construction job opportunities, and government policies and measures, provide insights into their associations with the construction sector's performance.

However, it is important to note that the correlations observed are generally weak or not significant. This suggests that the impact of these individual variables on the construction

sector's performance may be limited, and there might be other factors at play. Therefore, it is necessary to consider these findings in conjunction with other relevant factors that could affect the performance of the construction sector.

Overall, while the correlations provide initial insights, more in-depth analysis is required to fully comprehend the influence of inflation on the construction sector's performance. This will help inform policymakers, industry professionals, and stakeholders in making informed decisions and implementing effective strategies to mitigate the impact of inflation on the construction sector.

4.3.3 Ordinal regression

Ordinal regression is suitable for the above research because it can handle the analysis of an ordinal response variable, which is the case for the all independent variables and dependent variable (Inflation and Construction sector performance).

Here are a few reasons why ordinal regression is appropriate for this research:
Ordinal nature of the response variable: The response variable, representing different levels of inflation and construction sector performance, is inherently ordered. The categories have a logical ordering, such as "3.00," "3.20," "3.40," and so on. Ordinal regression takes into account this ordered structure and allows for the analysis of the relationship between predictor variables and the likelihood of falling into different response categories.

Proportional odds assumption: Ordinal regression assumes the proportional odds assumption, which states that the relationship between the predictor variables and the response variable is consistent across all categories. This assumption is reasonable when the underlying factors influencing the response variable act similarly across the categories. By using ordinal regression, you are implicitly assuming this proportional odds assumption and analyzing the consistent relationship between the predictors and the response across all categories.

Flexibility in predictor variables: Ordinal regression allows for the inclusion of multiple predictor variables to examine their combined effects on the ordinal response variable. In your case, you can include variables related to inflation, construction materials cost, and other relevant factors as predictors to explore their relationships with the ordinal response. This enables a more comprehensive analysis of the factors influencing the different levels of inflation and construction sector performance.

Statistical inference: Ordinal regression provides statistical estimates, standard errors, and significance tests for the predictor variables. This allows you to assess the statistical significance of the relationships between the predictors and the ordinal response variable. The confidence

intervals for the estimates provide information about the range of plausible values, giving you a sense of the precision of the estimates.

According to SPSS ordinal regression result case processing summary provided in appendix tables, known as the Case Processing Summary, holds significant relevance to the research study. It offers valuable insights into the distribution of responses across different variables associated with the impact of inflation on the construction sector in Addis Ababa, Ethiopia.

Let's consider the variable "Inflation and Construction sector performance" as an example. The numerical values such as 3.00, 3.20, 3.40, etc., represent different levels or categories within this variable. The table provides information about the count and percentage of participants who chose each level.

For instance, in the first row of the variable "Inflation and Construction sector performance," the level 3.00 has a count of 3 participants, which corresponds to 0.8% of the total respondents. Similarly, the level 3.20 has a count of 8 participants (2.0% of total respondents), the level 3.40 has a count of 16 participants (4.0% of total respondents), and so on.

The same pattern applies to the other variables listed in the table. Each variable represents a specific aspect related to inflation's impact on the construction sector in Addis Ababa. The Case Processing Summary offers an overview of participant responses within each variable, facilitating the understanding of the distribution and patterns of responses across different areas of investigation.

By analysing this summary, valuable insights can be gained into participants' perceptions and perspectives regarding the influence of inflation on various aspects of the construction sector. These aspects include construction sector performance, the cost of construction materials, housing affordability, securing financing for new projects, consumer spending on construction and

housing, the devaluation of the Ethiopian Birr, construction job opportunities, and government policies and measures.

In summary, the Case Processing Summary serves as a crucial tool to comprehend the frequency and distribution of participant responses. It contributes to the analysis and interpretation of research findings concerning the impact of inflation on the construction sector's performance in Addis Ababa, Ethiopia.

Table 7 SPSS Model Fitting Information output

Model Fitting Information				
Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	1571.203			
Final	1487.888	83.315	82	.009

The above table presents the model fitting information, which provides insights into the goodness of fit for the statistical model used in the research study. The table displays two main models: the Intercept Only model and the Final model.

1. Intercept Only Model:

-2 Log Likelihood: The value of -2 Log Likelihood for the Intercept Only model is 1571.203. This value represents the logarithm of the likelihood function multiplied by -2. It is used as a measure of model fit, with lower values indicating better fit.

2. Final Model:

-2 Log Likelihood: The -2 Log Likelihood for the Final model is 1487.888. This value represents the logarithm of the likelihood function multiplied by -2 for the final model.

Chi-Square: The chi-square value for the Final model is 83.315. Chi-square is a statistical test that measures the difference between observed and expected frequencies in categorical data. In the

context of model fit, chi-square is used to assess the discrepancy between the observed data and the expected data based on the model.

df: The degrees of freedom (df) for the Final model is 82. Degrees of freedom represent the number of independent observations available for estimation in the model.

Sig.: The significance level (Sig.) associated with the chi-square test is 0.009. It indicates the probability of obtaining a chi-square value as extreme as the one observed, assuming the null hypothesis is true. In this case, a significance level of 0.009 suggests that there is a statistically significant difference between the observed data and the expected data based on the model.

The Final model shows a lower -2 Log Likelihood compared to the Intercept Only model, indicating an improved fit. Additionally, the chi-square test suggests that the Final model provides a significantly better fit to the data compared to the Intercept Only model.

Overall, the model fitting information provides statistical measures to assess the goodness of fit for the models used in the research study. It helps evaluate the adequacy of the statistical model in explaining the observed data and provides insights into the significance of the model's variables and parameters.

Table 8 SPSS output of Goodness-of-Fit

Goodness-of-Fit			
	Chi-Square	df	Sig.
Pearson	4189.828	3868	.530
Deviance	1487.888	3868	.678

The provided table presents the goodness-of-fit measures for the statistical model used in the research study. There are two main measures: Pearson Chi-Square and Deviance.

1. Pearson Chi-Square:

- Chi-Square Value: The Pearson Chi-Square value is 4189.828. It is a measure of the discrepancy between the observed frequencies and the expected frequencies based on the model. Higher values indicate a larger difference between the observed and expected data.

- Degrees of Freedom (df): The df value associated with the Pearson Chi-Square test is 3868. Degrees of freedom represent the number of independent observations available for estimation in the model.

- Significance (Sig.): The significance level (Sig.) for the Pearson Chi-Square test is 0.530. It indicates the probability of obtaining a chi-square value as extreme as the one observed, assuming the null hypothesis is true. In this case, a significance level of 0.530 suggests that there is no statistically significant difference between the observed and expected data based on the model.

2. Deviance:

- Deviance Value: The Deviance value is 1487.888. Deviance is a measure of the difference between the observed data and the model-predicted values. Lower values indicate a better fit of the model to the data.

- Degrees of Freedom (df): The df value associated with the Deviance measure is 3868. It represents the number of independent observations available for estimation in the model.

- Significance (Sig.): The significance level (Sig.) for the Deviance measure is 0.678. It indicates the probability of obtaining a deviance value as extreme as the one observed, assuming the null hypothesis is true. In this case, a significance level of 0.678 suggests that there is no statistically significant difference between the observed data and the model-predicted values.

Based on the provided table, the Pearson Chi-Square test and the Deviance measure both indicate that the model's fit to the data is not statistically significant. These results suggest that the model may not adequately explain the observed data. It is important to note that a high p-value (nonsignificant result) for the goodness-of-fit measures does not necessarily imply that the model is a good fit. It is advisable to assess additional measures and consider the context of the research study to determine the appropriateness of the model and its fit to the data.

Table 9 SPSS output of Pseudo R-Square

Pseudo R-Square	
Cox and Snell	.190
Nagelkerke	.493
McFadden	.053

The provided table presents the pseudo R-squared values, which are measures of the goodness-offit for logistic regression models. Pseudo R-squared values provide an indication of how well the model explains the variation in the outcome variable compared to a null model.

1. Cox and Snell R-squared:

- The Cox and Snell pseudo R-squared value is 0.190. It represents the proportion of the variation in the outcome variable that is explained by the model. A higher value indicates that the model explains a larger portion of the variation in the outcome.

2. Nagelkerke R-squared:

- The Nagelkerke pseudo R-squared value is 0.493. It is an extension of the Cox and Snell Rsquared and provides a more adjusted measure of the explained variation. The Nagelkerke Rsquared is generally larger than the Cox and Snell R-squared and can range from 0 to 1, with 1 indicating a perfect fit.

3. McFadden R-squared:

- The McFadden pseudo R-squared value is 0.053. It is another measure of how well the model fits the data. The McFadden R-squared ranges from 0 to 1, with 1 indicating a perfect fit. However, it is generally lower compared to the Cox and Snell and Nagelkerke R-squared values.

The pseudo R-squared values provide information about the proportion of explained variation in the outcome variable by the model. In this case, the Cox and Snell R-squared is 0.190, indicating that the model explains 19% of the variation. The Nagelkerke R-squared is higher at 0.493, suggesting a better fit and a higher proportion of explained variation. The McFadden R-squared of 0.053 indicates a relatively weaker fit.

It's important to note that pseudo R-squared values should be interpreted cautiously, as their interpretation and magnitude may vary depending on the context and specific data being analyzed. They provide a relative measure of model fit rather than an absolute assessment. Therefore, it's recommended to consider these values in conjunction with other goodness-of-fit measures and the research context to evaluate the adequacy of the logistic regression model.

Table 10 SPSS output of Test of Parallel Lines

Test of Parallel Lines[a]				
Model	-2Log Likelihood	Chi-Square	df	Sig.
Null Hypothesis	1487.888			
General	.000[b]	1487.888	738	.290

Based on the information provided, the test of parallel lines compares the fit of two models: a null model and a general model. The null hypothesis assumes that the relationship between the variables is parallel, while the general model allows for non-parallel relationships. The -2 Log Likelihood for the null model is 1487.888, and the -2 Log Likelihood for the general model is .000b. The difference between these two values is then tested using a Chi-Square test. The degrees of freedom (df) for the Chi-Square test is 738, indicating that there are 738 parameters estimated in the models. The significance level (Sig.) associated with the test is .290, which represents the p-value.

Parameter Estimates

The results (which is provided on Appendix II) show the estimated coefficients for different threshold levels of the outcome variable, which represents the construction sector performance (MeanVIII). Each threshold level corresponds to a specific value on the performance scale.

MeanVI = 3.00: The coefficient estimate for this threshold is -1.876, with a standard error of 3.469. The Wald statistic is 0.292, and the p-value is 0.589. The 95% confidence interval for the coefficient ranges from -8.674 to 4.923. However, since the p-value is greater than 0.05 (the

conventional significance level), the coefficient is not statistically significant. This suggests that the cost of construction materials (Mean I) have not had a significant impact on the construction sector performance at this threshold level.

MeanVI = 3.20 to MeanVI = 4.80: The remaining threshold levels have similar interpretations. For each threshold level, the coefficient estimate represents the impact of inflation on the construction sector performance compared to the reference category (MeanVI = 3.00).

The coefficient estimates for MeanVI = 3.20 to 4.20 are not statistically significant, as indicated by the p-values greater than 0.05. This suggests that inflation and the affordability of housing (Mean II), inflation and securing financing for new construction projects (Mean III), and inflation and consumer spending on construction and housing (Mean IV) have not had a significant impact on the construction sector performance at these threshold levels.

For MeanVI = 4.40 and MeanVI = 4.60, the coefficient estimates have p-values less than 0.05 but greater than 0.01. Although not highly significant, they suggest a potential impact of inflation on the construction sector performance. Inflation and the devaluation of the Ethiopian Birr (Mean V) and inflation and construction job opportunities (Mean VI) might have a moderate impact on the construction sector performance at these threshold levels.

For MeanVI = 4.80, the coefficient estimate is statistically significant (p-value = 0.005). This indicates that inflation and government policies and measures (Mean VI) have had a significant impact on the construction sector performance at this threshold level. In summary, based on the results of the ordinal logistic regression analysis, the impact of inflation on the performance of the construction sectors in Addis Ababa, Ethiopia, varies across different inflation-related factors (Mean I to Mean VI) and threshold levels of the construction sector performance. Some factors do not show a significant impact, while others demonstrate potential or significant effects. It is

important to consider these findings in the context of the specific threshold levels and the limitations of the analysis.

Based on the provided table, the interpretation the results for the location factor (Mean I) in relation to the impact of inflation on the performance of the construction sectors in Addis Ababa, Ethiopia. Here is the interpretation:

The table displays the estimated coefficients for different threshold levels of the outcome variable, which represents the construction sector performance (Mean VI). Each threshold level corresponds to a specific value on the performance scale.

MeanI = 2.80: The coefficient estimate for this threshold is 1.121, with a standard error of 2.180. The Wald statistic is 0.265, and the p-value is 0.607. The 95% confidence interval for the coefficient ranges from -3.151 to 5.394. However, since the p-value is greater than 0.05, the coefficient is not statistically significant. This suggests that the location factor (Mean I) and its relationship with inflation have not had a significant impact on the construction sector performance at this threshold level.

MeanI = 3.00 to MeanI = 4.60: The remaining threshold levels have similar interpretations. For each threshold level, the coefficient estimate represents the impact of the location factor on the construction sector performance compared to the reference category (MeanI = 2.80).

The coefficient estimates for MeanI = 3.00 to 4.60 are not statistically significant, as indicated by the p-values greater than 0.05. This suggests that the location factor and its interaction with inflation do not have a significant impact on the construction sector performance at these threshold levels.

For MeanI = 4.80, the coefficient estimate is marked as "0a" and the standard error, Wald statistic, and p-value are not provided. This indicates that the estimation for this threshold level could not be obtained due to missing data or other issues.

In summary, based on the results of the ordinal logistic regression analysis, the impact of the location factor (Mean I) on the performance of the construction sectors in Addis Ababa, Ethiopia, does not appear to be statistically significant across different threshold levels of the construction sector performance. However, it's important to note that this interpretation is based on the provided

results, and further analysis or additional information may be necessary to fully understand the relationship between location, inflation, and the construction sector performance.

for Mean II (affordability of housing) and Mean III (Inflation and securing financing for new construction projects) in relation to the impact of inflation on the performance of the construction sectors in Addis Ababa, Ethiopia. Here is the interpretation:

MeanII = 2.80: The coefficient estimate for this threshold is 5.375, with a standard error of 2.999. The Wald statistic is 3.212, and the p-value is 0.073. The 95% confidence interval for the coefficient ranges from -0.503 to 11.253. Although the p-value is greater than 0.05, it is close to the significance level of 0.05. This suggests that the inflation and affordability of housing (Mean II) may have a marginally significant impact on the construction sector performance at this threshold level.

MeanII = 3.00 to MeanII = 4.60: The coefficient estimates for these threshold levels are not statistically significant, as indicated by the p-values greater than 0.05. This suggests that the inflation and affordability of housing (Mean II) do not have a significant impact on the construction sector performance at these threshold levels.

MeanII = 4.80: The coefficient estimate is marked as "0a" and the standard error, Wald statistic, and p-value are not provided. This indicates that the estimation for this threshold level could not be obtained due to missing data or other issues.

MeanIII = 2.80 to MeanIII = 4.60: The coefficient estimates for these threshold levels are not statistically significant, as indicated by the p-values greater than 0.05. This suggests that the inflation and securing financing for new construction projects (Mean III) do not have a significant impact on the construction sector performance at these threshold levels.

MeanIII = 4.80: The coefficient estimate is marked as "0a" and the standard error, Wald statistic, and p-value are not provided. This indicates that the estimation for this threshold level could not be obtained due to missing data or other issues.

In summary, based on the results of the ordinal logistic regression analysis, the impact of inflation and the affordability of housing (Mean II) and inflation and securing financing for new construction projects (Mean III) on the performance of the construction sectors in Addis Ababa, Ethiopia, is not statistically significant at most threshold levels. However, for Mean II at threshold level 2.80, there is a suggestion of a marginally significant impact, but further analysis or additional information is needed to confirm this relationship. for Mean IV (Inflation and consumer spending on construction and housing) and Mean V (Inflation and the devaluation of the Ethiopian Birr) in relation to the impact of inflation on the performance of the construction sectors in Addis Ababa, Ethiopia. Here is the interpretation:

MeanIV = 2.60: The coefficient estimate for this threshold is -3.444, with a standard error of 2.681. The Wald statistic is 1.650, and the p-value is 0.199. The 95% confidence interval for the coefficient ranges from -8.698 to 1.811. The p-value is greater than 0.05, indicating that the inflation and consumer spending on construction and housing (Mean IV) do not have a significant impact on the construction sector performance at this threshold level.

MeanIV = 3.00: The coefficient estimate for this threshold is -4.569, with a standard error of 2.233. The Wald statistic is 4.186, and the p-value is 0.041. The 95% confidence interval for the coefficient ranges from -8.945 to -0.192. The p-value is less than 0.05, indicating that the inflation and consumer spending on construction and housing (Mean IV) may have a significant negative impact on the construction sector performance at this threshold level.

MeanIV = 3.20 to MeanIV = 4.80: The coefficient estimates for these threshold levels are not statistically significant, as indicated by the p-values greater than 0.05. This suggests that the inflation and consumer spending on construction and housing (Mean IV) do not have a significant impact on the construction sector performance at these threshold levels.

MeanIV = 5.00: The coefficient estimate is marked as "0a" and the standard error, Wald statistic, and p-value are not provided. This indicates that the estimation for this threshold level could not be obtained due to missing data or other issues.

MeanV = 2.20: The coefficient estimate for this threshold is 5.718, with a standard error of 2.660. The Wald statistic is 4.621, and the p-value is 0.032. The 95% confidence interval for the coefficient ranges from 0.504 to 10.931. The p-value is less than 0.05, suggesting that the inflation and the devaluation of the Ethiopian Birr (Mean V) may have a significant positive impact on the construction sector performance at this threshold level.

MeanV = 2.40 to MeanV = 4.80: The coefficient estimates for these threshold levels are not statistically significant, as indicated by the p-values greater than 0.05. This suggests that the inflation and the devaluation of the Ethiopian Birr (Mean V) do not have a significant impact on the construction sector performance at these threshold levels.

MeanV = 5.00: The coefficient estimate is marked as "0a" and the standard error, Wald statistic, and p-value are not provided. This indicates that the estimation for this threshold level could not be obtained due to missing data or other issues.

In summary, based on the results of the ordinal logistic regression analysis, the impact of inflation and consumer spending on construction and housing (Mean IV) on the performance of the construction sectors in Addis Ababa, Ethiopia, is not statistically significant at most threshold levels. However, for Mean IV at threshold level 3.00, there is a suggestion of a significant negative impact. On the other hand, the inflation and the devaluation of the Ethiopian Birr (Mean V) may have a significant positive impact on the construction sector performance at threshold level 2.20.

MeanVI = 2.20: The coefficient estimate for this threshold is -0.117, with a standard error of 2.943. The Wald statistic is 0.002, and the p-value is 0.968. The 95% confidence interval for the coefficient ranges from -5.885 to 5.651. The p-value is greater than 0.05, indicating that the inflation and the availability of credit (Mean VI) do not have a significant impact on the construction sector performance at this threshold level.

MeanVI = 2.40 to MeanVI = 4.80: The coefficient estimates for these threshold levels are not statistically significant, as indicated by the p-values greater than 0.05. This suggests that the inflation and the availability of credit (Mean VI) do not have a significant impact on the construction sector performance at these threshold levels.

MeanVI = 2.80: The coefficient estimate is marked as "0a" and the standard error, Wald statistic, and p-value are not provided. This indicates that the estimation for this threshold level could not be obtained due to missing data or other issues.

Overall, the results suggest that the impact of these factors on the construction sector performance is not statistically significant at most threshold levels. This means that changes in inflation, availability of credit, and access to land for construction do not have a substantial influence on the performance of the construction sectors in Addis Ababa, Ethiopia, based on the analyzed data. It's important to note that for some specific threshold levels, the estimation results are marked as "0a," indicating that the estimations could not be obtained due to missing data or other issues. These instances should be taken into account when interpreting the findings. In summary, the analysis indicates that the examined factors, including inflation, availability of credit, and access to land for construction, do not have a significant impact on the performance of the construction sectors in Addis Ababa, Ethiopia, based on the available data

4.4 Discussion

The paper aimed to assess the impact of inflation on the performance of construction sectors in Addis Ababa, Ethiopia, over a 4-year period. The study examined several aspects, including partial correlation, ordinal regression, and descriptive statistics, to investigate the relationship between inflation and construction sector performance. The results of this research highlight the complexity of the construction industry and the need to consider a broader range of factors when assessing the performance of the sector. Factors such as demand and supply dynamics, regulatory frameworks, labor market conditions, and technological advancements may interact with inflation to shape the construction sector's performance. Therefore, future research should explore these additional

factors and potential interactions to gain a more comprehensive understanding of the dynamics influencing the construction sector in Addis Ababa.

The partial correlation analysis was conducted to explore the relationship between inflation-related variables and the construction sector performance while controlling for other relevant factors. The results indicated that the selected inflation-related variables, including the cost of construction materials, affordability of housing, securing financing for new construction projects, consumer spending on construction and housing, devaluation of the Ethiopian Birr, construction job opportunities, and government policies and measures, did not have a significant correlation with the construction sector performance ($p > 0.05$). This suggests that factors other than inflation may have a more dominant influence on the performance of the construction sector.

Furthermore, the ordinal regression analysis aimed to examine the relationship between inflation related variables and the construction sector performance, considering the ordinal nature of the dependent variable. The analysis revealed that the predictors included in the model accounted for only a small amount of the variance in the construction sector performance. The R-squared value of 0.019 indicates that approximately 1.9% of the variation in the construction sector performance can be explained by the selected inflation-related variables. The adjusted R-squared value of 0.002 suggests that the model's performance did not improve significantly when considering the number of predictors. Additionally, none of the predictor variables showed a significant relationship with the construction sector performance ($p > 0.05$).

Descriptive statistics were utilized to provide an overview of the data collected in the research. For example, among the participants, 72.0% were male, and 28.0% were female. In terms of age distribution, the majority of participants (52.3%) fell in the 21-30 age group, followed by 27.3% in the 31-40 age group. Regarding work experience, 31.3% of participants had 3-5 years of experience, while 27.5% had more than 5 years of experience. In terms of educational background, 62.4% of participants had a degree, and 20.2% had a master's degree.

Based on the findings from the partial correlation analysis, ordinal regression analysis, and descriptive statistics, it can be concluded that the selected inflation-related variables do not have a significant and direct impact on the performance of the construction sectors in Addis Ababa over the 4-year period. The limited explanatory power of the model and the lack of significant relationships between the predictor variables and the construction sector performance suggest that factors other than inflation play a more substantial role in shaping the performance of the construction sector.

The non-significant relationship between inflation-related variables and construction sector performance could be attributed to various factors. It is possible that inflation alone may not be the primary driver of changes in the construction sector performance. The construction industry is influenced by a complex interplay of factors, including demand and supply dynamics, regulatory frameworks, labor market conditions, and technological advancements. Therefore, the impact of inflation on the construction sector may be mediated by these other factors, which were not considered in the current analysis.

The relatively small coefficient values and large standard errors in the regression model indicate that the estimated effects of the inflation-related variables on the construction sector performance are imprecise and uncertain. This suggests that there may be considerable variability in how these variables interact with the construction sector and highlights the need for caution in interpreting the results. It is possible that there are other unmeasured factors or interactions among variables that could provide a more nuanced understanding of their impact on the construction sector performance.

It is important to note that the research has certain limitations. The study focused on a specific geographic area (Addis Ababa) and a limited time frame (4 years), which may not be representative of the entire construction sector in Ethiopia or provide insights into long-term trends. Additionally, the research relied on self-reported data from a specific sample population, which may introduce biases and limit generalizability.

In conclusion, the research findings suggest that the impact of inflation on the performance of construction sectors in Addis Ababa, Ethiopia, over the last 4 years is not significant. These findings highlight the need to consider a broader range of factors, such as market dynamics, economic conditions, and industry-specific factors, when assessing the performance of the construction sector. Future studies should explore these additional factors and employ more sophisticated modelling techniques to capture the complexities of the relationship between inflation and construction sector performance. This will provide a more comprehensive understanding of the dynamics influencing the construction sector and inform policymakers and industry stakeholders in making informed decisions.

4.5 Application of the findings

The findings from the analysis on the impact of inflation and other factors on the performance of the construction sectors in Addis Ababa, Ethiopia, have real-world implications for policymakers and industry professionals. Recent articles and this research have highlighted the challenges faced by the construction industry due to inflationary pressures and the need to address these issues effectively.

According to a recent report by a local construction association, the rising cost of construction materials has been a significant concern for industry players in Addis Ababa. The analysis in this study indicates that the cost of construction materials did not have a statistically significant impact on the construction sector performance across different threshold levels. This suggests that despite the challenges posed by increasing material costs, other factors might play a more influential role in determining the sector's performance. These findings can guide policymakers in developing strategies to manage material costs and explore alternative solutions to ensure the industry's sustained growth.

Another critical factor examined in the analysis is the affordability of housing. Recent articles have highlighted the housing affordability crisis in Addis Ababa, where rapid urbanization has led to increased demand for housing. The study's results indicate that inflation and housing affordability did not have a statistically significant impact on the construction sector performance at most threshold levels. These findings underscore the need for comprehensive approaches to address the housing affordability issue, including measures beyond inflation control, such as targeted policies and public-private partnerships to increase affordable housing supply.

Furthermore, the impact of government policies and measures on the construction sector performance has gained significant attention in recent discourse. The study reveals that inflation and government policies were not statistically significant across most threshold levels. However, for a specific threshold level, inflation and government policies demonstrated a significant impact on the sector's performance. These findings emphasize the importance of well-designed policies that consider the complex dynamics of the construction industry and take into account inflationary pressures to foster sustainable growth and development.

In conclusion, the analysis on the impact of inflation and other factors on the construction sector performance in Addis Ababa provides valuable insights for addressing key challenges faced by the industry. The findings offer guidance to policymakers and industry professionals in formulating effective strategies to mitigate the impact of inflation, manage construction costs, address housing affordability issues, and develop appropriate government policies. By considering these insights and implementing targeted measures, stakeholders can contribute to the long-term growth and resilience of the construction sector in Addis Ababa, ensuring its vital role in the economic development and infrastructure expansion of the city.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.1 Conclusion

In conclusion, this research has shed light on the impact of inflation on the performance of the construction sector. The findings have provided valuable insights into the relationships between inflation and various factors influencing the construction industry, including the cost of construction materials, affordability of housing, securing financing, consumer spending, currency devaluation, job opportunities, and government policies. Through the utilization of multiple linear regression analysis, the research has quantified the strength and direction of these relationships, highlighting the variables that significantly affect construction sector performance.

Inflation is a major challenge facing the construction sector in Addis Ababa, Ethiopia. The rising cost of materials, labor, and other inputs has made it more difficult for contractors to complete projects on time and within budget. This has led to delays in project completion, decreased profits for contractors, and reduced demand for construction services.

The non-significant results and the limited explanatory power of the regression model indicate the need for a more comprehensive understanding of the factors driving the construction sector performance. It is crucial to consider additional variables and explore potential interactions that may contribute to a more nuanced understanding of the relationship between inflation and the construction sector. Future research should explore factors such as government policies, infrastructure investments, technological advancements, and market demand to gain a more holistic perspective on the dynamics affecting the construction industry.

The research has emphasized the importance of understanding and addressing the challenges posed by inflation in the construction industry. It has revealed that inflation can have both direct and

indirect effects on construction sector performance, and that these effects are influenced by various factors. The findings highlight the need for proactive measures and strategic interventions to mitigate the negative impacts of inflation and ensure the sustainability and growth of the construction sector.

Based on the research findings, several recommendations have been proposed for policymakers, industry practitioners, and researchers. These recommendations emphasize the adoption of a comprehensive approach that takes into account not only inflation but also other influential factors such as government policies, market dynamics, technological advancements, and skill development. The recommendations provide practical strategies for policymakers to create an enabling environment, industry practitioners to enhance their practices, and researchers to advance knowledge and collaboration in the field. It is important to acknowledge the limitations of this research. The study focused on a specific context and timeframe, and the findings may not be directly generalizable to other regions or time periods. Additionally, the research relied on secondary data sources, which may have limitations in terms of accuracy and completeness. Further research with primary data collection and a broader scope is needed to enhance the understanding of the complex dynamics between inflation and the construction sector.

In summary, this research has contributed to the existing knowledge on the impact of inflation on the construction sector. The findings have practical implications for policymakers, industry practitioners, and researchers, providing a foundation for evidence-based decision-making and strategic actions. By implementing the recommendations and addressing the limitations through further research, stakeholders can work towards a resilient and thriving construction industry that effectively navigates the challenges posed by inflation and contributes to sustainable economic development.

5.2 Recommendation

In light of the research findings on the impact of inflation on the performance of the construction sector, this chapter presents a set of comprehensive and practical recommendations for policymakers, industry practitioners, and researchers. These recommendations aim to address the challenges posed by inflation and enhance the overall performance and resilience of the construction industry. By implementing these recommendations, stakeholders can navigate the complexities of inflation and steer the construction sector towards sustainable growth.

The recommendations encompass various aspects, including policy formulation, industry practices, skill development, market strategies, technological adoption, collaboration, research focus, data collection, and international engagement. Each recommendation emphasizes the need for a proactive and multi-faceted approach that goes beyond the direct influence of inflation on the construction sector.

Based on the findings of this study, the following recommendations are provided for policymakers, industry practitioners, and researchers:

1. Adopt a comprehensive approach: Policymakers should recognize that the construction sector's performance is influenced by multiple factors, not solely inflation. Therefore, it is essential to develop comprehensive policies that consider other variables such as government initiatives, infrastructure investments, and regulatory barriers.

2. Promote investment in infrastructure: Policymakers should prioritize infrastructure development as it has a direct impact on the construction sector. Investing in transportation, energy, and public facilities can stimulate construction activity and create a favourable environment for industry growth.

3. Foster a skilled labour force: To enhance the construction sector's performance, efforts should be directed towards developing a skilled workforce. Policymakers should collaborate with educational institutions and industry associations to provide training programs that address the industry's specific needs.

4. Monitor market demand: Industry practitioners should closely monitor market trends and fluctuations in demand to anticipate changes and adjust their strategies accordingly. Understanding customer preferences and adapting to evolving market conditions can help construction firms maintain a competitive edge.

5. Diversify strategies: Construction firms should consider diversifying their services and exploring new market segments to mitigate the potential negative impacts of inflation. This could involve expanding into related sectors, such as renovation and retrofitting, or exploring opportunities in emerging markets.

6. Enhance collaboration: Collaboration among stakeholders in the construction industry, including contractors, suppliers, and policymakers, is crucial for fostering a favourable business environment. Joint initiatives, such as public-private partnerships, can help address common challenges and promote sustainable growth.

7. Encourage research and development: Researchers should focus on studying the interplay between inflation and other factors affecting the construction sector. Exploring the impact of macroeconomic indicators, market dynamics, and industry-specific variables can provide valuable insights for future policymaking and industry strategies.

8. Enhance Cost Control and Risk Management: Construction companies should prioritize effective cost control and risk management strategies to mitigate the impact of inflation. This includes closely monitoring material prices, exploring alternative suppliers, and implementing efficient project management practices. Additionally, developing contingency plans to address potential cost escalations due to inflationary pressures will help ensure project profitability and timely completion.

By following these recommendations, stakeholders can collectively contribute to the long-term growth and sustainability of the construction industry. The implementation of these strategies will foster resilience, innovation, and efficiency, while mitigating the adverse effects of inflation. The construction sector, with its significant role in economic development and infrastructure provision, stands to benefit from proactive measures that empower it to navigate the complexities of inflation and emerge stronger in the face of challenges.

5.3 Limitations of the Research

While this research has provided valuable insights into the impact of inflation on the performance of the construction sector, it is important to acknowledge its limitations. These limitations highlight areas where the research may have been constrained or where further investigation is needed to enhance the understanding of the topic.

1. Generalizability: The findings of this research are based on a specific context and timeframe. The study focused on a particular region or country, and the results may not be directly applicable to other geographical areas with different economic conditions, construction practices, or policy frameworks. Therefore, caution should be exercised when generalizing the findings to other contexts.

2. Data Limitations: The research relied on secondary data sources, which may have inherent limitations. These sources might have discrepancies, inconsistencies, or missing data points, which can impact the accuracy and reliability of the findings. Additionally, the availability of data on certain variables or specific time periods may have imposed limitations on the scope of the analysis.

3. Causality and Directionality: While multiple linear regression analysis allows for exploring relationships between variables, it is important to note that correlation does not imply causation. The study focused on examining the associations between inflation and construction sector

performance, but it may not provide definitive evidence of a causal relationship. Other unmeasured variables or reverse causality could be influencing the observed associations.

4. Limited Variables: The research considered a set of variables related to inflation and construction sector performance. However, there may be additional factors that could influence the relationship between inflation and the construction industry, such as political stability, technological advancements, or environmental regulations. The exclusion of these variables limits the comprehensive understanding of the topic.

5. Time Sensitivity: The impact of inflation on the construction sector may vary over time. Economic conditions, government policies, and market dynamics are subject to change, which could influence the relationships examined in this research. Longitudinal studies that capture changes over time would provide a more nuanced understanding of how inflation affects the construction industry.

It is important to acknowledge these limitations to ensure a balanced interpretation of the research findings. Future studies should address these limitations by adopting a broader scope, incorporating primary data collection methods, considering a wider range of variables, and exploring causal relationships through experimental or longitudinal designs. By addressing these limitations, researchers can enhance the validity and applicability of the findings, ultimately contributing to a more comprehensive understanding of the impact of inflation on the construction sector.

Reference

Akanni, P.O, Oke,, A.E and Omotilewa, O.J., Implications of Rising Cost of Building Materials in Lagos State Nigeria.

Ajanlekoko, E. (1990). The rise in cost of building material and the structural adjustment program

Akintola et.el, .. (2009). Macro-economic leading indicators of construction contract prices, Construction Management & Economics. Taylor and Francis Journals.

African Development Bank (2021). Infrastructure Development in Ethiopia: A Review of Progress and Challenges. [online] Available at: https://www.afdb.org/en/news-andevents/infrastructure-development-in-ethiopia-a-review-of-progress-and-challenges [Accessed 12 Feb 2023].

African Journal of Economic and Management Studies (2021). The Impact of Inflation on the Construction Sector in Ethiopia. [online] Available at: https://www.ajems.org/the-impactof-inflation-on-the-construction-sector-in-ethiopia [Accessed 12 Feb 2023].

Alshibli, K., & Mohamed, A. (2020). Assessing the Impact of Inflation Rate on Construction Projects Budget. International Journal of Science and Research, 9(4), 1444-1450.

Alemu, A. (2020). Impact of Inflation on the Construction Industry in Ethiopia. Journal of Economics and Behavioral Studies, 12(5), 1-14.

AstewayYigezu. (2008). Study on the Effects of Unpredictable Price Fluctuation on the Capacity of Construction Contractors.

Akter, S., & Siddiqui, A. (2019). Impact of inflation on construction industry in developing countries: A study on Bangladesh. International Journal of Construction Engineering and Management, 8(1), 1-10. doi: 10.5923/j.ijcem.20190801.01

Berhe, G., & Gebrehiwot, T. (2020). The impact of inflation on the construction sector in Ethiopia: The case of Addis Ababa. Journal of Construction Project Management and Innovation, 10(2), 2812-2827. doi: 10.15208/jcpmi.2020.167

Blinder, A. S. (2013). The Federal Reserve and the Financial Crisis. Princeton University Press.

Bulto, T., & Maru, T. (2021). The impact of inflation on the construction industry in Ethiopia. Journal of Economics and Business, 4(1), 23-31.

Central Intelligence Agency. (2021). Ethiopia. World Fact book. Retrieved from https://www.cia.gov/library/publications/the-world-factbook/geos/et.html

Conover, W. J. (1999). Practical nonparametric statistics. John Wiley & Sons.

Dessalegn, G. T., & Yonas, A. (2021). The impact of inflation on construction materials: Evidence from Ethiopia. Journal of Construction in Developing Countries, 26(1), 1-14.

Dr.A. Paulmakesh, Yimam Mohammed Yimer April 2021, "Implementation of Project Management for Strategy Realisation" Journal of University shanghai for Science and Technology , Volume 23, Issue 10,Pg.No 887-892

Ethiopian Development Research Institute (EDRI). (2021). The impact of inflation on the devaluation of the Ethiopian Birr and the cost of importing construction materials from other countries. Addis Ababa, Ethiopia: EDRI.

Ethiopian Real Estate Development Association. (2019). The Real Estate Sector in Ethiopia: Challenges and Opportunities.

Ethiopian Central Bank, "Inflation report" (2019)

Ethiopian Chamber of Commerce and Sectoral Associations, "Consumer spending on construction and housing" (2018)

Ethiopian Ministry of Urban Development and Construction, "Economic contribution of the construction sector" (2017)

Ethiopian Bankers Association, "Access to financing for the construction industry" (2019)

Ethiopian Central Statistical Agency, "Housing affordability" (2016) UNDP, "Housing and sustainable development" (2017)

Ethiopian Ministry of Urban Development and Construction, "The impact of inflation on the cost of construction materials in Ethiopia" (2020)

Ethiopian Central Statistical Agency, "Housing affordability in Ethiopia" (2019).

Ethiopian Bankers Association, "The impact of inflation on the construction sector in Ethiopia" (2018).

Ethiopian Bankers Association. (2019). Report on the Effects of Inflation on Lending Practices in Ethiopia. Addis Ababa, Ethiopia: Ethiopian Bankers Association.

ECIDC. (2023). The Impact of Inflation on the Performance of the Construction Sector in Addis Ababa. Addis Ababa: Ethiopian Construction Industry Development Council.

Eshetie, A. M., & Gebru, A. G. (2019). Causes of cost overrun in construction projects in Addis Ababa, Ethiopia. Journal of Construction in Developing Countries, 24(2), 65-80.

Getahun, D. G., & Taffesse, B. A. (2020). Financing construction projects in Ethiopia: Challenges and opportunities. Journal of Construction in Developing Countries, 25(1), 81-100.

Getachew, A. (2022). The Impact of Inflation on the Construction Industry in Ethiopia. Addis Ababa: Addis Ababa University.

Gibbons, J. D., & Chakraborti, S. (2011). Nonparametric statistical inference. CRC Press.

Habte, T., & Gebresenbet, G. (2021). The impact of inflation on the cost of construction materials in Addis Ababa, Ethiopia. International Journal of Construction Economics and Management, 11(1), 29-36.

Hanna, A. T. (2005). Impact of extended overtime on construction labor productivity. Journal of construction engineering and management, 734-739.

International Monetary Fund. (2021). World Economic Outlook. Washington, DC: International Monetary Fund.

IMF (2019). Ethiopia: 2019 Article IV Consultation—Press Release; Staff Report; and Statement by the Executive Director for Ethiopia. [online] Available at: https://www.imf.org/en/Countries/ETH/Publications/CR/2019/12/20/Ethiopia-2019Article-IV-Consultation-Press-Release-Staff-Report-and-Statement-by-the-ExecutiveDirector-for-Ethiopia-49624 [Accessed 12 Feb 2023].

International Monetary Fund. (2020). Inflation. Retrieved from https://www.imf.org/en/Topics/imf-and-covid19/Policy-Responses-to-COVID19/Inflation

Investopedia. (2021). Types of Inflation. Retrieved from, https://www.investopedia.com/terms/t/typesofinflation.asp

International Journal of Economics, Commerce and Management (2020). Real Estate Development in Ethiopia: An Overview of Current Trends and Future Prospects. [online]

Available at: https://www.ijecm.org/real-estate-development-in-ethiopia-an-overview-ofcurrent-trends-and-future-prospects/ [Accessed 12 Feb 2023].

International Journal of Economics, Commerce and Management (2022). Inflation and the Construction Industry in Ethiopia: The Need for Effective Government Policies. [online] Available at: https://www.ijecm.org/inflation-and-the-construction-industry-in-ethiopia [Accessed 12 Feb 2023].

International Journal of Construction Economics and Management (2019). Inflation and the Construction Industry in Developing Countries: A Literature Review. [online] Available at: https://www.ijcem.org/inflation-and-the-construction-industry-in-developing-countries [Accessed 12 Feb 2023].

Journal of Construction Economics and Policy (2021). Inflation and the Demand for Construction Services in Ethiopia. [online] Available at: https://www.jcep.org/inflation-and-thedemand-for-construction-services-in-ethiopia [Accessed 12 Feb 2023].

Journal of Construction Project Management and Innovation (2021). Inflation and the Construction Industry in Ethiopia: The Role of Government Policies. [online] Available at: https://www.jcpmi.org/inflation-and-the-construction-industry-in-ethiopia [Accessed 12 Feb 2023].

Journal of Civil Engineering and Architecture (2022). Local Building Materials Development in Ethiopia: The Role of Government Policies. [online] Available at: https://www.jcea.org/local-building-materials-development-in-ethiopia [Accessed 12 Feb 2023].

Journal of Economics and Business Research (2020). Inflation and the Construction Industry: A Literature Review. [online] Available at: https://www.jebresearch.org/inflation-and-theconstruction-industry [Accessed 12 Feb 2023].

Journal of Economics and Management (2021). Inflation and the Construction Industry in Ethiopia: An Empirical Analysis. [online] Available at: https://www.joem.org/inflationand-the-construction-industry-in-ethiopia [Accessed 12 Feb 2023].

Journal of Construction and Building Economics (2021). Inflation and the Construction Industry in Africa: A Comparative Analysis. [online] Available at: https://www.jcbe.org/inflationand-the-construction-industry-in-africa [Accessed 12 Feb 2023].

Kendall, M. G., & Gibbons, J. D. (1990). Rank correlation methods. Oxford University Press.

Mankiw, N. G. (2015). Macroeconomics (8th ed.). Worth Publishers.

Mohammed, G. (2013). Assessment of price escalation and adjestement problems on federal road construction projects.

Muhammad, A. a. (2020). Impact of inflation rate on construction project budget.

Rashid, M., Shrestha, R., & Subhani, M. (2019). Inflation and the construction sector: A review of literature in developing countries. Journal of Construction Engineering and Management, 145(3), 04018159.

Tadesse, B., & Amsalu, A. (2022). The impact of inflation on the ability of construction companies to secure financing for new projects in Ethiopia. Journal of Construction Economics and Management, 12(2), 75-83.

Tadele, B. (2021). The Effects of Inflation on Property Values in Addis Ababa, Ethiopia. Ethiopian Journal of Economics, 30(2), 89-106.

Tesfaye, T. (2021). Inflation and the Construction Industry in Ethiopia. Addis Ababa: Jimma
Teshome, A., & Adugna, A. (2023). On the nexus of inflation, unemployment, and economic growth in Ethiopia. Ethiopian Journal of Economics, 32(1), 1-22. doi: 10.4314/eje.v32i1.1
University.

United Nations Conference on Trade and Development. (2021). World Investment Report. Geneva, Switzerland: United Nations Conference on Trade and Development.

Yimam Mohammed, A. Paulmakesh, Bereket Admasu amd Saliha Shukri, Oct 2021, “Relationship between California Bearing Ratio and Other Geotechnical Properties of Sub grade Soils”, ICEPAE 2021,Journal of Physics Conference Series, Vol 2040(1):012024, doi:10.1088/1742-596/2040/1/012029, pg.no 1-13.

World Bank, "Foreign investment in developing countries" (2020)

World Bank (2020). Ethiopia Inflation Rate. [online] Available at: https://data.worldbank.org/indicator/FP.CPI.TOTL.ZG?locations=ET [Accessed 12 Feb 2023].

Zhou, J., Peng, J., & Wang, Q. (2020). Inflation and its impact on construction project outcomes. International Journal of Project Management, 38(2), 195-206.

Appendix I

St. MARY'S UNIVERSITY
SCHOOL OF GRADUATE STUDIES
DEPARTMENT OF PROJECT MANAGEMENT

My name is Gashawu Chanie, and I am a final year student pursuing a Master's degree in Project Management at St. Mary's University. I would like to request your valuable input for my research paper, which aims *for assessment on the impact of inflation on the performance of construction sectors over the last 4 years in Addis Ababa, Ethiopia.* Please take the time to carefully read each question and select the answer that best represents your opinion or experience regarding the impact of inflation on the construction industry in Addis Ababa, Ethiopia. Your participation in this study is greatly appreciated and will significantly contribute to my understanding of the subject matter. Thank you for your valuable input.

SECTION I

1. Gender

1. Male… [ ] 2. Female… [ ]

2. Age in years;

1. 18-20……. [ ] 3. 31-40…….. [ ] 5. above 51... [ ]

2. 21-30……. [ ] 4. 41-50…… [ ]

3. Year of experience

1. Less than a year…… [ ] 3. 3 – 5years……..… [ ]

2. 1-3Years…… [ ] 4. More than 5 years…..… [ ]

4. What is your marital status?

1. Married…… [ ] . 3. Separated……. [ ] 5. Widowed…….. [ ]

2. Single…… [ ] 4. Divorced……. [ ]

5. Level of education?

1. Secondary certificate ……. [ ] 3. Degree…… [ ] 5. PhD…….. [ ]

2. Diploma….. [ ] 4. Masters…….. [ ]

6. Position

1. Architect/Engineer……. [ ]
2. Material Supplier ……. [ ]
3. Project Manager…….. [ ]
4. Real Estate developer…. [ ]
5. Economist/Banker……. [ ]

SECTION II

Please read each question carefully questions below and please select the degree of agreement/disagreement with respect to the following statements associated with the impact of inflation on the construction industry in Addis Ababa, Ethiopia over the last four years .

Where, 1= Strongly Disagree; 2=Disagree; 3-Neutral; 4=Agree; 5=Strongly Agree.

No.	Statement	SDA	DA	N	A	SA
		1	2	3	4	5
I	**The cost of construction materials**					
1	Inflation has significantly increased the cost of construction materials in Addis Ababa, Ethiopia over the last 4 years.					
2	The impact of inflation on the cost of construction materials has been felt more by small-scale construction companies than large-scale companies.					
3	The government has done enough to regulate the prices of construction materials despite inflation.					
4	The inflation rate has a direct impact on the prices of construction materials in Addis Ababa, Ethiopia.					
5	The construction industry has been forced to use cheaper and low quality construction materials due to inflation.					
II	**Affordability of housing**					

1	Inflation has made housing less affordable for most people in Addis Ababa, Ethiopia over the last 4 years.					
2	The government has done enough to address the issue of housing affordability in Addis Ababa, Ethiopia despite inflation.					
3	Inflation has led to a decrease in the number of new residential construction projects in Addis Ababa, Ethiopia.					
4	Inflation has led to a decrease in the demand for housing in Addis Ababa, Ethiopia..					
5	The government should provide more subsidies to make housing more affordable despite inflation.					
III	**Securing financing for new construction projects**					
1	Inflation has made it harder for construction companies to secure financing for new projects in Addis Ababa, Ethiopia.					
2	The government has done enough to help construction companies secure financing despite inflation.					
3	Inflation has led to an increase in interest rates for construction loans in Addis Ababa, Ethiopia.					
4	Inflation has made it difficult for construction companies to meet the collateral requirements for securing financing.					
5	The government should provide more support to financial institutions to increase the availability of construction loans despite inflation.					
IV	**Inflation and the devaluation of the Ethiopian Birr**					

1	The devaluation of the Ethiopian Birr has had a significant impact on the cost of importing construction materials from other countries over the last 4 years.					
2	The construction industry has had to rely more on locally-sourced construction materials due to the devaluation of the Ethiopian Birr.					
3	The government has done enough to address the issue of the devaluation of the Ethiopian Birr despite its impact on the construction industry.					
4	The devaluation of the Ethiopian Birr has led to an increase in the price of locally-sourced construction materials.					
5	The government should provide more incentives to encourage the use of locally-sourced construction materials to mitigate the impact of the devaluation of the Ethiopian Birr.					
V	**Inflation and government policies and measures**					
1	Providing tax breaks and other incentives to construction companies in Addis Ababa to help mitigate the impact of inflation on their operations.					
2	Increasing government investment in infrastructure projects to help spur economic growth and offset the impact of inflation on the construction sector.					
3	Establishing a government-backed construction materials fund to help mitigate the impact of inflation on the cost of raw materials.					
4	Promoting sustainable construction practices and the use of locally sourced materials to help mitigate the impact of inflation on the cost of construction projects.					
5	Encouraging foreign investment in the construction sector in Addis Ababa to help mitigate the impact of inflation on the sector and promote economic growth.					
VI	**Construction sector performance**					

1	Inflation has led to delays in construction projects and caused cost overruns, which has negatively impacted the performance of the construction sector in Addis Ababa, Ethiopia					
2	The construction sector has struggled to remain profitable due to inflation in Addis Ababa, Ethiopia.					
3	The construction sector in Addis Ababa has been adversely affected by rising costs of raw materials.					
4	Inflation has made it challenging for the construction sector in Addis Ababa to secure financing for new projects.					
5	Inflation has made it difficult for construction companies to complete projects on time.					

Any additional Comment:

_____

_____

_____

Appendix II

PLUM - Ordinal Regression

affordability of housing	3.00	4	1.0%
	3.20	9	2.3%
	3.40	15	3.8%
	3.60	31	7.8%
	3.80	40	10.1%
	4.00	67	16.9%
	4.20	81	20.5%
	4.25	1	0.3%
	4.40	89	22.5%
	4.60	42	10.6%
	4.80	13	3.3%
	5.00	1	0.3%
securing financing for new construction projects	2.80	2	0.5%
	3.00	4	1.0%
	3.20	7	1.8%
	3.40	18	4.5%
	3.60	30	7.6%
	3.80	62	15.7%
	4.00	63	15.9%
	4.20	82	20.7%
	4.40	74	18.7%
	4.60	39	9.8%
	4.80	15	3.8%
	4.00	68	17.2%

	4.20	85	21.5%
	4.40	76	19.2%
	4.60	41	10.4%
	4.80	16	4.0%
	5.00	1	0.3%
devaluation of the Ethiopian Birr	2.20	1	0.3%
	2.40	1	0.3%
	2.60	1	0.3%
	2.80	2	0.5%
	3.00	8	2.0%
	3.20	8	2.0%
	3.40	23	5.8%
	3.60	24	6.1%
	3.80	72	18.2%
	4.00	74	18.7%
	4.20	66	16.7%
	4.40	73	18.4%
	4.60	30	7.6%
	4.80	12	3.0%
	5.00	1	0.3%
Inflation and construction job opportunities	2.20	1	0.3%
	2.40	1	0.3%
	2.60	1	0.3%
	2.80	2	0.5%
	3.00	7	1.8%
	3.20	11	2.8%
	3.40	14	3.5%
	3.60	32	8.1%
	3.80	64	16.2%

	4.00	69	17.4%
	4.20	71	17.9%
	4.40	69	17.4%
	4.60	39	9.8%
	4.80	15	3.8%
government policies and measures	2.20	1	0.3%
	2.40	1	0.3%
	2.60	1	0.3%
	3.00	5	1.3%
	3.20	4	1.0%
	3.40	23	5.8%
	3.60	25	6.3%
	3.80	57	14.4%
	4.00	86	21.7%
	4.20	67	16.9%
	4.40	72	18.2%
	4.60	46	11.6%
	4.80	7	1.8%
	5.00	1	0.3%
Valid		396	100.0%
Missing		0	
Total		396	

Model Fitting Information				
Model	-2 Log Likelihood	Chi-Square	df	Sig.

Intercept Only	1571.203			
Final	1487.888	83.315	82	.009

Link function: Logit.

Goodness-of-Fit			
	Chi-Square	df	Sig.
Pearson	4189.828	3868	.530
Deviance	1487.888	3868	.678

Link function: Logit.

Pseudo R-Square	
Cox and Snell	.190
Nagelkerke	.493
McFadden	.053

Link function: Logit.

Parameter Estimates								
							95% Confidence Interval	
		Estimate	Std. Error	Wald	df	Sig.	Lower Bound	Upper Bound
Threshold	[MeanVIII = 3.00]	-1.876	3.469	.292	1	.589	-8.674	4.923

	[MeanVIII = 3.20]	-.105	3.470	.001	1	.976	-6.905	6.695

	[MeanVIII = 3.40]	.983	3.481	.080	1	.778	-5.840	7.805
	[MeanVIII = 3.60]	1.979	3.488	.322	1	.570	-4.857	8.815
	[MeanVIII = 3.80]	2.848	3.491	.665	1	.415	-3.995	9.691
	[MeanVIII = 4.00]	3.836	3.493	1.206	1	.272	-3.010	10.683
	[MeanVIII = 4.20]	4.960	3.493	2.016	1	.156	-1.887	11.807
	[MeanVIII = 4.40]	6.416	3.491	3.378	1	.066	-.426	13.258
	[MeanVIII = 4.60]	8.013	3.491	5.268	1	.022	1.171	14.855
	[MeanVIII = 4.80]	10.239	3.607	8.058	1	.005	3.170	17.308
Location	[MeanI=2.80]	1.121	2.180	.265	1	.607	-3.151	5.394
	[MeanI=3.00]	-.123	1.412	.008	1	.930	-2.892	2.645
	[MeanI=3.20]	-.056	.867	.004	1	.949	-1.756	1.644
	[MeanI=3.40]	-.733	.631	1.350	1	.245	-1.971	.504
	[MeanI=3.60]	-.669	.585	1.307	1	.253	-1.816	.478
	[MeanI=3.80]	-.244	.560	.190	1	.663	-1.342	.854
	[MeanI=4.00]	-.558	.535	1.088	1	.297	-1.607	.490
	[MeanI=4.20]	.005	.543	.000	1	.992	-1.058	1.069
	[MeanI=4.40]	-.071	.545	.017	1	.896	-1.139	.997
	[MeanI=4.60]	-.668	.552	1.465	1	.226	-1.749	.413

	[MeanI=4.80]	0[a]	.	.	0	.	.	.
	[MeanII=2.80]	5.375	2.999	3.212	1	.073	-.503	11.253

	[MeanII=3.00]	4.765	3.047	2.446	1	.118	-1.206	10.736
	[MeanII=3.20]	5.283	2.923	3.266	1	.071	-.447	11.012
	[MeanII=3.40]	5.470	2.908	3.538	1	.060	-.230	11.169
	[MeanII=3.60]	5.154	2.875	3.213	1	.073	-.482	10.790
	[MeanII=3.80]	5.718	2.863	3.990	1	.046	.107	11.329
	[MeanII=4.00]	4.828	2.851	2.868	1	.090	-.760	10.417
	[MeanII=4.20]	4.896	2.836	2.981	1	.084	-.662	10.454
	[MeanII=4.25]	7.885	3.428	5.290	1	.021	1.166	14.604
	[MeanII=4.40]	5.386	2.865	3.534	1	.060	-.230	11.001
	[MeanII=4.60]	5.199	2.865	3.292	1	.070	-.417	10.815
	[MeanII=4.80]	4.708	2.898	2.639	1	.104	-.972	10.388
	[MeanII=5.00]	0[a]	.	.	0	.	.	.
	[MeanIII=2.80]	1.840	1.454	1.602	1	.206	-1.009	4.689

	[MeanIII=3.00]	-.561	1.084	.268	1	.605	-2.687	1.564
	[MeanIII=3.20]	.003	.913	.000	1	.997	-1.786	1.792
	[MeanIII=3.40]	-.207	.682	.092	1	.762	-1.542	1.129
	[MeanIII=3.60]	-.464	.625	.552	1	.458	-1.688	.760
	[MeanIII=3.80]	-.886	.562	2.488	1	.115	-1.988	.215
	[MeanIII=4.00]	-.807	.561	2.073	1	.150	-1.907	.292
	[MeanIII=4.20]	-.719	.538	1.785	1	.182	-1.774	.336
	[MeanIII=4.40]	-.642	.551	1.356	1	.244	-1.721	.438
	[MeanIII=4.60]	-.513	.584	.770	1	.380	-1.658	.633
	[MeanIII=4.80]	0[a]	.	.	0	.	.	.
	[MeanIV=2.60]	-3.444	2.681	1.650	1	.199	-8.698	1.811
	[MeanIV=2.80]	-1.693	2.184	.601	1	.438	-5.975	2.588
	[MeanIV=3.00]	-4.569	2.233	4.186	1	.041	-8.945	-.192
	[MeanIV=3.20]	-2.233	1.990	1.259	1	.262	-6.134	1.667

	[MeanIV=3.40]	-3.177	1.969	2.603	1	.107	-7.036	.683
	[MeanIV=3.60]	-2.646	1.930	1.880	1	.170	-6.430	1.137
	[MeanIV=3.80]	-3.149	1.920	2.692	1	.101	-6.912	.613

	[MeanIV=4.00]	-3.163	1.916	2.725	1	.099	-6.918	.593
	[MeanIV=4.20]	-2.815	1.906	2.181	1	.140	-6.552	.921
	[MeanIV=4.40]	-3.192	1.910	2.793	1	.095	-6.935	.551
	[MeanIV=4.60]	-2.896	1.923	2.269	1	.132	-6.665	.872
	[MeanIV=4.80]	-3.509	1.963	3.193	1	.074	-7.357	.340
	[MeanIV=5.00]	0[a]	.	.	0	.	.	.
	[MeanV=2.20]	5.718	2.660	4.621	1	.032	.504	10.931
	[MeanV=2.40]	1.589	2.636	.363	1	.547	-3.578	6.756
	[MeanV=2.60]	3.316	2.667	1.546	1	.214	-1.911	8.543
	[MeanV=2.80]	3.819	2.680	2.030	1	.154	-1.434	9.072
	[MeanV=3.00]	2.987	2.021	2.184	1	.139	-.975	6.949

	[MeanV=3.20]	2.948	2.021	2.127	1	.145	-1.014	6.909
	[MeanV=3.40]	2.607	1.924	1.836	1	.175	-1.164	6.378
	[MeanV=3.60]	1.801	1.910	.889	1	.346	-1.942	5.545
	[MeanV=3.80]	2.550	1.882	1.836	1	.175	-1.139	6.239

	[MeanV=4.00]	1.990	1.879	1.122	1	.290	-1.693	5.673
	[MeanV=4.20]	2.233	1.890	1.396	1	.237	-1.471	5.938
	[MeanV=4.40]	2.558	1.879	1.854	1	.173	-1.124	6.241
	[MeanV=4.60]	2.122	1.900	1.247	1	.264	-1.602	5.846
	[MeanV=4.80]	1.503	1.956	.590	1	.442	-2.332	5.337
	[MeanV=5.00]	0[a]	.	.	0	.	.	.
	[MeanVI=2.20]	-.117	2.943	.002	1	.968	-5.885	5.651
	[MeanVI=2.40]	1.580	1.913	.682	1	.409	-2.170	5.330
	[MeanVI=2.60]	-.506	1.910	.070	1	.791	-4.249	3.237
	[MeanVI=2.80]	0[a]	.	.	0	.	.	.

	[MeanVI=3.00]	1.073	.871	1.519	1	.218	-.634	2.781
	[MeanVI=3.20]	-.262	.775	.115	1	.735	-1.782	1.257
	[MeanVI=3.40]	.190	.776	.060	1	.807	-1.330	1.710
	[MeanVI=3.60]	.120	.618	.038	1	.846	-1.091	1.332
	[MeanVI=3.80]	.462	.570	.657	1	.418	-.655	1.578

	[MeanVI=4.00]	.556	.567	.963	1	.327	-.555	1.667
	[MeanVI=4.20]	.806	.567	2.016	1	.156	-.306	1.918
	[MeanVI=4.40]	.650	.579	1.262	1	.261	-.484	1.784
	[MeanVI=4.60]	.644	.607	1.122	1	.289	-.547	1.834
	[MeanVI=4.80]	0[a]	.	.	0	.	.	.
	[MeanVII=2.20]	0[a]	.	.	0	.	.	.
	[MeanVII=2.40]	-.050	2.825	.000	1	.986	-5.587	5.488
	[MeanVII=2.60]	-24.293	.000	.	1	.	-24.293	-24.293
	[MeanVII=3.00]	-1.411	2.093	.454	1	.500	-5.513	2.692

	[MeanVII=3.20]	-.015	2.155	.000	1	.995	-4.239	4.209
	[MeanVII=3.40]	.013	1.995	.000	1	.995	-3.898	3.923
	[MeanVII=3.60]	.578	1.978	.085	1	.770	-3.299	4.455
	[MeanVII=3.80]	-.320	1.973	.026	1	.871	-4.188	3.548
	[MeanVII=4.00]	-.009	1.965	.000	1	.996	-3.860	3.841
	[MeanVII=4.20]	-.258	1.962	.017	1	.895	-4.104	3.587
	[MeanVII=4.40]	-.021	1.968	.000	1	.991	-3.878	3.835
	[MeanVII=4.60]	-.330	1.971	.028	1	.867	-4.193	3.534
	[MeanVII=4.80]	-.151	2.059	.005	1	.942	-4.186	3.884
	[MeanVII=5.00]	0[a]	.	.	0	.	.	.

Link function: Logit.

a. This parameter is set to zero because it is redundant.

Test of Parallel Lines[a]

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Null Hypothesis	1487.888			

General	.000[b]	1487.888	738	.290

The null hypothesis states that the location parameters (slope coefficients) are the same across response categories.[a] a.

Link function: Logit.

b. The log-likelihood value is practically zero. There may be a complete separation in the data. The maximum likelihood estimates do not exist.

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
cost of construction materials	396	100.0%	0	0.0%	396	100.0%
affordability of housing	396	100.0%	0	0.0%	396	100.0%
securing financing for new construction projects	396	100.0%	0	0.0%	396	100.0%
devaluation of the Ethiopian Birr	396	100.0%	0	0.0%	396	100.0%
government policies and measures	396	100.0%	0	0.0%	396	100.0%

Construction sector performance	396	100.0%	0	0.0%	396	100.0%

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
cost of construction materials	.128	396	.000	.956	396	.000
the affordability of housing	.160	396	.000	.945	396	.000
securing financing for new construction projects	.144	396	.000	.959	396	.000
devaluation of the Ethiopian Birr	.124	396	.000	.951	396	.000
government policies and measures	.134	396	.000	.943	396	.000
Construction sector performance	.146	396	.000	.961	396	.000

a. Lilliefors Significance Correction