



# **DETERMINANTS OF MARKET EFFICIENCY OF COMMODITY EXCHANGE: THE CASE OF ETHIOPIAN COMMODITY EXCHANGE**

**Addis Ababa University College of Business and Economics School of  
Commerce Department of Marketing Management Graduate Program Unit**

**BY**

**ANA HUSSIEN**

**ADVISOR:**

**Mesfin Workneh (Ph.D.)**

**September, 2018**

**Addis Ababa**

**Ethiopia**

**Addis Ababa University**  
**College Of Business and Economics**  
**School of Commerce**  
**Marketing Management Graduate Program Unit**

**DETERMINANTES OF MARKET EFFICENCY OF COMMODITY  
EXCHANGE: THE CASE OF ETHIOPIAN COMMODIT EXCHANGE**

**A Thesis Submitted to the School of Graduate Studies of Addis Ababa  
University School of Commerce in Partial Fulfillment for the Award of  
Masters of Arts degree in Marketing Management**

**By**

**Ana Hussien**

**ADVISOR:**

**Mesfin Workneh(Ph.D.)**

**Addis Ababa University**  
**College Of Business and Economics**  
**School of Commerce**

**Marketing Management Graduate Program Unit**

This is to certify that the thesis is prepared by Ana Hussien, entitled; Determinants of Market Efficiency of Commodity exchange: The case of Ethiopian Commodity Exchange, in partial fulfillment of the requirements for the award of the Degree of Master of Arts in Marketing Management with the regulation of the University and the accepted standards with respect to originality.

**Approved by Board of Examiners**

|                |           |      |
|----------------|-----------|------|
|                |           |      |
| Thesis Advisor | Signature | Date |

|                   |           |      |
|-------------------|-----------|------|
|                   |           |      |
| Internal Examiner | Signature | Date |

|                   |           |      |
|-------------------|-----------|------|
|                   |           |      |
| External Examiner | Signature | Date |

## DECLARATION

I, Ana Hussien, hereby declare that this research paper entitled “**Determinants of Market Efficiency of commodity exchange; the case of Ethiopian Commodity Exchange**” is my original work and has not been used by others for any other requirements in any other university and all sources of information in the study have been appropriately acknowledged.

**Advisors name:** Mesfin Workneh (PhD)

**Researcher:** Ana Hussien

Signature .....

Signature .....

Date .....

Date.....

## LETTER OF CERTIFICATION

This is to certify that this study on the topic entitled “**Determinants of Market Efficiency of Commodity exchange: The case of Ethiopian Commodity Exchange**” is a bona fide work of Ana Hussien who carried out under my guidance/supervision and this work is original in nature and is suitable for submission for the award of masters of Marketing Management.

Advisors Name: Mesfin Workneh (PhD)

Signature.....

Date.....

## **ACKNOWLEDGEMENT**

First and foremost I would like to express my deepest gratitude to the Almighty God for his blessing and for making me accomplish this huge achievement .Secondly, With deep gratitude, I also acknowledge and appreciate the kind support, guidance, constructive supervision, insightful comments and suggestions of my academic advisor Dr. Mesfin Workneh from the core of my heart. His constant encouragement throughout the period of this study have been greatest inducement for me and directly contributed to the accomplishment of the task.

My sincere and heartfelt gratitude goes to my beloved families and also my husband Ato Surafel Kebede for their insightful comments and suggestions, invaluable dedication to edit the research paper, advice and motivation with which they handled the work to ensure the high quality is attained throughout the study. Special word of mouth is their credit.

Sincere thanks to the ECX members and officers for their precise time and frank response to the questionnaires and interviews with out which this paper would come to life.

## Contents

|                                                          |      |
|----------------------------------------------------------|------|
| ACKNOWLEDGEMENT .....                                    | i    |
| List of Tables <b>Error! Bookmark not defined.</b> ..... | iv   |
| List of Figures .....                                    | v    |
| List of Acronyms .....                                   | vii  |
| Abstract.....                                            | viii |
| CHAPTER ONE .....                                        | 1    |
| INTRODUCTION .....                                       | 1    |
| 1.1 Background of the study .....                        | 1    |
| 1.2 Statement of problem.....                            | 1    |
| 1.3Research question .....                               | 2    |
| 1.3.1 Main Research Question .....                       | 2    |
| 1.3.2 Sub Research Question .....                        | 2    |
| 1.4 Objectives of the Study .....                        | 3    |
| 1.4.1. General Objective .....                           | 3    |
| 1.4.2. Specific objectives .....                         | 3    |
| 1.5 Significance of the study.....                       | 3    |
| 1.6 Scope and limitation of the study.....               | 3    |
| 1.7 Organization of the Research Report .....            | 4    |
| CHAPTER TWO .....                                        | 5    |
| REVIEW OF RELATED LITERATURE .....                       | 5    |
| 2.1. Theoretical Literature Review .....                 | 5    |
| 2.1.1The Concept of Efficiency .....                     | 5    |
| 2.1.2Defining Market Efficiency .....                    | 5    |
| 2.1.3A Glimpse of Commodity Exchange .....               | 6    |
| 2.1.4 Trading System of Commodity Exchanges.....         | 7    |
| 2.2. Empirical Literature .....                          | 11   |
| 2.3 Conceptual Framework .....                           | 13   |
| 2.3.2 Research Hypothesis .....                          | 15   |
| CHAPTER THREE .....                                      | 17   |
| RESEARCH DESIGN AND METHODOLOGY .....                    | 17   |
| 3.1. Research Design.....                                | 17   |
| 3.2 Research Approach .....                              | 18   |
| 3.3. Data type and source .....                          | 18   |

|                                                         |     |
|---------------------------------------------------------|-----|
| 3.4. Population of The study .....                      | 18  |
| 3.5 Sampling Procedure .....                            | 19  |
| 3.5.1 Sampling Size .....                               | 19  |
| 3.5.2 Sampling Technique .....                          | 20  |
| 3.6 Data collection instruments.....                    | 20  |
| 3.7 Data Analysis Techniques.....                       | 20  |
| 3.8 Reliability Test.....                               | 21  |
| 3.9 Validity Analysis .....                             | 21  |
| 3.10 Test of normality of the Data .....                | 22  |
| 3.11Ethical Considerations .....                        | 23  |
| CHAPTER FOUR.....                                       | 24  |
| ANALYSIS AND DISCUSSION.....                            | 24  |
| 4.1 Data Analysis and interpretation.....               | 24  |
| 4.1.1 Rates of response .....                           | 24  |
| 4.1.3 Market Efficiency Dimensions .....                | 27  |
| 4.1.4 Mean and Standard Deviation.....                  | 32  |
| 4.2 Correlation Analysis .....                          | 37  |
| 4.2.1 Test for Linear Regression Model Assumptions..... | 38  |
| 4.3 Regression analysis.....                            | 39  |
| 4.5 Discussion.....                                     | 43  |
| CHAPTER FIVE .....                                      | 44  |
| SUMMARY, CONCLUSIONS AND RECOMMENDATIONS.....           | 44  |
| 5.1 Summary .....                                       | 44  |
| 5.2 Conclusions.....                                    | 45  |
| 5.3 Recommendations.....                                | 46  |
| 5.4 Areas for Further Research .....                    | 47  |
| APPENDIX.....                                           | I   |
| List of References .....                                | VII |

## List of Tables

|                                                                        |    |
|------------------------------------------------------------------------|----|
| Table 3.1 Reliability Test of the Sample.....                          | 22 |
| Table 3.2 Skwness and Kurtosis Checking for Normality of the Data..... | 23 |
| Table 4.1 Descriptive Statistics of Market Information.....            | 28 |
| Table 4.2 Descriptive Statistics of Grading& Sampling.....             | 29 |
| Table 4.3 Descriptive Statistics of Risk Management .....              | 30 |
| Table 4.4 Descriptive Statistics of Clearing & Settlement.....         | 31 |
| Table 4.5 Descriptive Statistics of Price Discovery.....               | 32 |
| Table 4.6 Descriptive Statistics of Overall Market Efficiency.....     | 33 |
| Table 4.7 Market Information Analysis.....                             | 34 |
| Table 4.8 Grading & Sampling Analysis.....                             | 35 |
| Table 4.9 Risk Management Analysis.....                                | 35 |
| Table 4.10 Clearing & Sampling Analysis.....                           | 36 |
| Table 4.11 Price Discovery Analysis.....                               | 37 |
| Table 4.12 Overall Market Efficiency Analysis.....                     | 37 |
| Table 4.13 Correlation.....                                            | 39 |
| Table 4.14Multicollnearity.....                                        | 40 |
| Table 4.15 Regression analysis.....                                    | 41 |
| Table 4.16Research Hypotheses.....                                     | 43 |

## **List of Figures**

|                                                                    |    |
|--------------------------------------------------------------------|----|
| Figure 2.3: Conceptual Framework of Market Efficiency .....        | 14 |
| Figure 4.1: Response rate of the respondent .....                  | 24 |
| Figure 4.2: Gender description of Respondents.....                 | 25 |
| Figure 4.3: Age description of the respondents.....                | 25 |
| Figure 4.4: Educational level descriptions of the respondents..... | 26 |
| Figure 4.5: Membership description of Respondents.....             | 26 |

## **APPENDIX**

**APPENDIX 1** Questionnaire in English

**APPENDIX 2** Histogram for normality test of the data

**APPENDIX 3** Normal P-Plot to test of the data

**APPENDIX 4** Model Summary

**APPENDIX 5** ANNOVA

## **List of Acronyms**

|        |                                                    |
|--------|----------------------------------------------------|
| ANOVA  | Analysis of Variance                               |
| SPSS   | Statistical Packages for Social Science            |
| ECX    | Ethiopian Commodity Exchange                       |
| UNCTAD | United Nations Conference on Trade and Development |
| UNDP   | United Nations Development Program                 |
| USAID  | United States Agency for International Development |
| WRS    | Warehouse Receipt System                           |

## **Abstract**

*The Ethiopian Commodity Exchange was established to revolutionize Ethiopian agriculture and transform the economy through a dynamic, efficient and transparent marketing system. Properly implemented and regulated, commodity exchanges can contribute greatly to the achievement of country's economic and developmental goals and strengthen the bargaining power of participants. Hence the overall objective of this study is to examine the determinants of market efficiency of Ethiopian commodity exchange. And the variables that examined were market information system, quality grading and sampling, clearing and settlement, risk management, and price discovery. A survey questionnaire were prepared to collect a primary data, secondary data from the books and documents of the ECX and other sources were also used to augment the primary data. The researcher distributed to 186 people personally. Out of the total questionnaires distributed, 176 were considered valid for analysis from Ethiopian commodity exchange participants or members selected through random sampling. And the data was analyzed through descriptive analysis and binary regression model by using of SPSS version 20. The findings show that all the dimensions of Market Efficiency have a positive significant influence on commodity exchange. Therefore, study recommended that ECX should give more attention about market information, quality grading and sampling, clearing and settlement, risk management and also price discovery system of the company.*

**Key words:** *Market information, quality grading and sampling, clearing and settlement, risk management, price discovery, ECX, ECX members.*

# **CHAPTER ONE**

## **INTRODUCTION**

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

In the era of globalization, how the economy and commodity market exchange is organized and coordinated is increasingly became a fundamental concern of all nations across the world. More specifically, linking of buyers and sellers in to commodity market for the effective and efficient accomplishment of transactions among the participants is the most challenging task. In response to this and following market liberalization and increasingly affordable information technology since 1990, commodity exchanges have mushroomed around the world.

Commodity derivative exchanges provide a platform where traders and investors from various parts of the world can participate in the hedging and price discovery of any listed commodity (Bose, 2009). Instruments (contracts) traded on commodity exchanges include futures, options and other derivatives. Trading in these instruments began with floor trading, also called open outcry systems. In open outcry systems, traders assembled in a pit in the exchange and traded commodities by indicating their bids or offers to others in the pits. Commodity futures markets help with price discovery and provide a way to hedge for producers and buyers of commodities (Thomas, 2008).

The Ethiopian commodity exchange (ECX) is a new initiative for Ethiopia and the first of its kind in Africa, the Ethiopian commodity exchange was formed in 2008 to address the problems of market access and market infrastructure primarily for grain farmers, and subsequently became the sole body responsible managing trade.

### **1.2 Statement of problem**

The Ethiopian commodity exchange is established with bright vision and mission to contribute to the economic development of the country in general and to the individual participants at the grass root level. In a country like Ethiopia where a predominantly agrarian society dominates, agriculture is the backbone of the countries development endeavor. Despite this agricultural product marketing were not given much attention and were not getting its real value for the last consecutive decades.

As findings of Tollens, (2006) revealed that market information and commodity exchanges can be powerful instruments to inform participants about market conditions and prices, to find willing buyers, to empower them by making the transactions more equal and fair, to inform

them about the optimal timing of buying and selling, to induce them to store optimally and to plan ahead, making better informed optimal production and marketing decisions. This thus helps to break the vicious poverty trap, inducing resilience and better coping mechanisms, and reducing inequality in the markets. According to Mukhebi( 2004) high contract default, unreliable supply, volatile prices, poor information, unregulated actors, unreliable trading partners are taken as the major initiatives to establish commodity exchange and as interest in commodities has risen the range of available products has developed to meet the needs of new and existing investors.

Rashid, identified constraints for the development of commodity exchange, internet and telecommunications in the ECX are still quite deficient (sometimes non-existent) to disseminate information to the participants. In light of the above conditions and the ECX role to the society in nation building, the researchers find that the need to examine the determinants of market efficiency of Ethiopian commodity exchange.

### **1.3Research question**

#### **1.3.1 Main Research Question**

- ❖ What are the determinants of the market efficiency of Ethiopian commodity exchange?

#### **1.3.2 Sub Research Question**

- ❖ How does price discovery influence the market efficiency at Ethiopian commodity exchange?
- ❖ How does risk management influence the market efficiency at Ethiopian commodity exchange?
- ❖ How does clearing and settlement influence the market efficiency at Ethiopian commodity exchange?
- ❖ How does sampling and grading influence the market efficiency at Ethiopian commodity exchange?
- ❖ How does the market information influence the market efficiency at Ethiopian commodity exchange?

## **1.4 Objectives of the Study**

This research has the following general and specific objectives.

### **1.4.1. General Objective**

The general objective of the study is to examine the most important factors that determine the market efficiency of Ethiopian commodity exchange.

### **1.4.2. Specific objectives**

- ❖ To examine the effect of price discovery on the market efficiency of Ethiopian commodity exchange.
- ❖ To examine the effect of risk management on the market efficiency of Ethiopian commodity exchange.
- ❖ To examine the effect of clearing and settlement on the market efficiency of Ethiopian commodity exchange.
- ❖ To examine the effect of sampling and grading on the market efficiency of Ethiopian commodity exchange.
- ❖ To examine the effect of market information system on the market efficiency of Ethiopian commodity exchange.

## **1.5 Significance of the study**

The research will contribute by being used as a reference by other researchers who want to conduct further study on the concept of determinants of market efficiency of Ethiopian commodity exchange. Furthermore, it will give some high lights about the most prominent determinants of the market efficiency of Ethiopian Commodity Exchanges. Hence, all concerned parties of Ethiopian Commodity Exchange may make use of the finding to know what members think of the exchange. Findings of this study will be useful and very important for students and academicians as an input for embarking upon similar researches in the future and also the research findings will be a helpful literature references.

## **1.6 Scope and limitation of the study**

While conducting the study, despite the existence of several instruments, the researcher has used only questionnaire as a data collection instrument. With this method some forms of information like changes of emotions, behaviors and feelings were not understood. To make the study narrow and manageable the scope of the research will be delimited to the Addis Ababa city commodity exchange members.

## **1.7 Organization of the Research Report**

This study is organized into five chapters .The chapters are comprised of: Introduction, Review of related Literature, Research design and Methodology, Results and Discussion and, Summary, conclusions and recommendations.

The first chapter provides a general introduction of the study including background of the study, Statement of the problem, Research questions, Objectives of the study, Scope of the study, Significance of the study, and Limitations of the study, organization of the research report.

Chapter two covers the literature relevant to the study .It includes concepts and theoretical framework, empirical literature as well as discussions on market efficiency of commodity exchange and Hypothesis and conceptual framework.

Chapter three elaborates research design and methodology: the type and design of the study .It includes research method sampling technique, data collection method and method of data analysis that will be used in the study

Chapter four summarizes the findings of the study and discusses them in detail

Finally chapter Five comprises of four sections which include summary findings, conclusions, limitations of the study and recommendation

## CHAPTER TWO

### REVIEW OF RELATED LITERATURE

#### 2.1. Theoretical Literature Review

##### 2.1.1 The Concept of Efficiency

Forwarding a single definition of efficiency is not a simple task. The concept of efficiency has been used in different perspectives. It has been used from consumers' perspective, producers' perspective, market perspective and economic perspective. (Mas-Colellet' al, 1990) stated that the issue of efficiency captured a great deal of the focus of welfare economics. This can generally indicate what is meant by efficiency when it is used in either of the perspectives. It can also be deducted that efficiency has something to do with welfare enhancement. The use of efficiency in consumers' and producers' perspective refers to maximization of consumer and producer surpluses as a measure of welfare gain by the two economic agents

##### 2.1.2 Defining Market Efficiency

It is difficult to get a single definition of market efficiency that may hold for all markets. Even within the same market, different authors use different definitions. Ratchford et' al (1996, p. 168) forwarded a concise definition of market efficiency that they have deducted from the studies they reviewed. They defined it in terms of the “*actual or potential losses to individual consumers, which results from imperfect information about alternatives: An inefficient market is one in which such losses are or can be large.*” This definition seems to focus on the end results than the process in the market. Preston & Collins (1966, p. 155) on the other hand forwarded a definition that emphasizes the process in the market than the end results as “*the facility and effectiveness with which the potential exchanges are accomplished*”. As the authors themselves admit, their definition is divorced from the specific characteristics of the quality and volume of goods and services being traded and the trading prices used in the exchange process. The most widely used definition of an efficient market was given by Fama (1970, p.383) in which he stated that “*A market in which prices always “fully reflect available information is called efficient*”

### **2.1.3A Glimpse of Commodity Exchange**

Organized commodity exchanges have a long history. Grain traders in Japan began experimenting with the idea in 1730, and the Chicago Board of Trade (CBOT) and the London Metal Exchange successfully launched their operations in 1864 and 1877, respectively. For more than a century, commodity exchanges remained largely confined to industrialized nations. However, with market liberalization and increasingly affordable information technology since 1990, commodity exchanges have mushroomed around the world (UNCTAD, 2007).

Rashid, et al (2010) growing interest in commodity exchange from government and donors in Africa is a clear reflection of need for commodity risk management. Because international markets remain volatile and domestic markets are thin and fragmented, risk management is critical for commodity sector development.

There have been many donor-supported initiatives to establish commodity exchanges in developing countries, but very few have succeeded. In Africa, five countries launched agricultural commodity exchanges shortly after market liberalization in the 1990s, but only South Africa succeeded in making its exchange sustainable. Despite the initial stage of success, Zambia and Zimbabwe suspended their operations following unusual price hikes and subsequent government intervention. Other exchanges established in the 1990s include the Kenyan Agricultural Commodity Exchange (KACE) which no longer support actual trades but exist with donor support and the Uganda Commodity Exchange (UCE) which does coordinate trades but not been able to attract sufficient trade volumes to be self-sustaining. Since 2004, more and more countries have been launching exchanges-notable ones include Malawi in 2004, Nigeria in 2006, the Ethiopian Commodity Exchange (ECX) in 2008 and the new Zambian exchange, ZAMACE, established in 2007.

ECX is an institution established by specific legislation and owned by the government. According to Proclamation No. 550/2007, ECX is a wholly State owned market institution, which commenced operation with a government authorized capital of 250 million Birr having its own legal personality. As a government owned entity, it is supervised by the Ministry of Agriculture and Rural Development and regulated by the Ethiopia Commodity Exchange Authority (ECX, 2008). It was funded by a consortium of financing partners including UNDP, the World Bank, American development agency USAID, Canadian Development Agency and the World Food Program (Alemu et al, 2010).

ECX is state owned Public-Private Partnership enterprise. The Government of Ethiopia is the owner of the ECX, while the ECX offers the sale of Membership seats, which are privately owned, permanently and freely transferable rights to the stream of earnings from trading on the Exchange.

It is established as a demutualized corporate entity with clear separation of ownership, membership, and management. Thus, owners cannot have trading stake, members cannot have ownership stake, and the management can be neither drawn from the owners nor from the members. There is a joint Board of Directors drawn from relevant public institutions (state) and ECX members (private) (ECX, 2008).

It is anticipated that ECX will reward quality to producers; reduce transaction costs of market participation thus increasing returns to market activity; enable quick capital turnaround thus increasing market volumes, and reduce risk related to counterparty default and prices, thus increasing market participation; increase information and transparency for all market actors, thus empowering smallholders and other disadvantaged actors (Alemu et al, 2010).

#### **2.1.4 Trading System of Commodity Exchanges**

A movement towards electronic trading has taken place in recent years. This has been driven by technological advances and by the advantages in speed, cost, transparency and functionality that such trade typically offers over the established “open outcry” form of trading, which brings traders together on a trading floor. And in addition Computer technology has the potential to increase the efficiency, transparency, and liquidity of the commodity markets by increasing the speed of transactions and lowering transaction costs.

Electronic trading typically brings a number of other potential advantages. These include limiting informational asymmetries between trading interests, allowing potentially longer trading hours, and increasing access to markets regardless of one’s geographical location (Thomas, 2008).

It was also explained by Gbremedhin et al (2005) that trading on a commodity exchange is like a continuous two-way auction, in which offers to buy are going on simultaneously with offers to sell. This is possible because the graded product needs no description with a standardized contract and because there is sufficient volume of both buy and sell orders.

#### **2.1.4.1 Clearing and Settlement of Services**

A clearing and settlement system that assures payment to sellers as well as minimizes overexposure of counterparties is essential. Financial institutions which are members of the exchange usually offer clearing services. Reliable and timely dissemination of such market information as would ensure informed decisions by various parties, local and regional, who intend to trade. Informed decisions are critical to market efficiency (Gideon, 2003).

Clearing is the process of determination of obligations, after which the obligations are discharged by settlement. Settlement is a two-way process that involves legal transfer of the title to funds and securities/other assets on the settlement date.

The clearing bank services are a highly time critical activity as delays directly impact the members/exchange. Banks can play an important role in settlement of obligations in the overall ecosystem including exchanges, members, clients, custodians, etc. This is highly transactional nature of the business. Dedicated infrastructure, trained manpower, and use of technology are the key parameters to doing this business (Sahadevan, 2002).

And the banking settlement system plays a crucial role in the overall risk management of the exchange mechanism, wherein daily settlement of trades/obligations, ability to manage fund flows in volatile days, coordination with exchanges and members, etc. contribute towards effective functioning of the exchange mechanism.

Apart from clearing services, banks also provide fund and non-fund based facilities to the members of the exchange for managing their working capital requirements and, thus, earn revenues through float funds, interest earned on overdrafts/loans, commission income, etc. All members of an exchange are required to clear their trades through the clearing house at the end of each trading session, and to deposit with the clearing house a sum of money (based on clearinghouse margin requirements) sufficient to cover the member's debit balance (Lerner, 2000).

#### **2.1.4.2 Price Discovery**

Prices of commodity exchange are determined solely by the interaction of supply and demand conditions. If there are more buyers than sellers, prices will be forced up. If there are more sellers than buyers, prices will be forced down. Buy and sell orders, which originate from all sources and are channeled to the exchange trading floor for execution, are actually what determine prices. These orders to buy and sell are translated into actual purchases and sales on

the exchange trading floor, and according to regulation this must be done by public outcry across the trading ring or pit and not by private negotiation. The prices at which transactions are made are recorded and immediately released for distribution over a vast telecommunications network (Lerner, 2000).

As cited in Chicago Mercantile Commodity Exchange trading futures contracts, it is essential that you know how to make a reasonable estimate of what will happen to prices in the future. Of course, no one can know for certain what prices will be, but it pays to have an educated opinion as to whether prices will rise or fall ([www.cme.com](http://www.cme.com).retrived 5<sup>th</sup> April 2011).

#### **2.1.4.3 Market Information System**

According to Gebremedhin and Goggin (2005) the core attribute of an exchange, is to enhance market transparency through generating and disseminating information. Through its own functioning, the exchange creates market information about the underlying supply and demand conditions in the economy. Thus, contrary to popular perception, commodity exchange does not require an external market information system as a pre-requisite to its proper functioning.

A market information system is a service that involves the collection on a regular basis of information on prices and, in some cases, quantities of widely traded agricultural products from rural assembly markets, wholesale and retail markets, as appropriate, and dissemination of this information on a timely and regular basis through various media to farmers, traders, government officials, policy-makers and others including consumers.

Market information helps potential buyers and sellers to make market decisions and gives them the assurance that the market is transparent and can handle their market needs. Once the market is established, market information is disseminated by word of mouth, as market user's travel to and from the market to other locations. As the market evolves, market information is also often carried by newspapers that are distributed within the market's catchment area; today such information can also be disseminated by radio, TV, telephone links and via the web

#### **2.1.4.4 Warehouse and Quality Grading System**

Warehouse can be defined as a place in which goods or merchandise are stored; a storehouse. And the development of warehousing has positive knock-on effects up and down the supply chain. The warehouse receipt system (WRS) provides a platform for the introduction of other institutional innovations, notably grading, contracting and exchange trading. It facilitates public

procurement as national and international agencies can simplify their activities by dealing in paper such as warehouse receipts, rather than trade directly in physical commodities.

WRS is also a valuable instrument for financing agricultural commodity chains, especially in countries where the shortage of alternative forms of collateral constitutes one of the most important obstacles in access to finance. Warehouse receipts are issued by warehouse operators as evidence that specified commodities of stated quantity and quality have been deposited at particular locations by named depositors. The warehouse operator holds the stored commodity by way of safe custody; implying he is legally liable to make good any value lost through theft or damage by fire and other catastrophes but has no legal or beneficial interest in it (Gideon ,2010).

The quality of warehouse and storage management skills tends to be highly variable in most developing countries. Improving professional skills in the warehousing industry is necessary if storage losses are to be kept at a minimum. Similar training and capacity building is required to enable traders and processing companies to utilize the WRS in cost-effectively managing their inventories.

According to Gebremedhin & Goggin (2005) transferable warehouse system is highly complementary to the functions of the exchange. The receipts system goes hand in hand with a commodity exchange in that: Grades and standards are essential to warehouse operations as well as to a commodity exchange with standardized contracts; Price transparency is achieved because receipts indicate a specific grade, which generates price information that can also be used on the exchange; Risk is transferred by selling receipts on the exchange; and, Integrity and order: the legal enforcement of quality and of the transferability of the receipt is vital for both the warehouse receipts system and the functioning of the exchange.

#### **2.1.4.5 Risk Management**

ECX risk management systems are designed to support a spot market infrastructure, and manage risk at all times to protect its members, quality of service delivery, image and reputation. ECX risk management strategy does not only focus on risk avoidance but also the identification and management of an acceptable level of risk. ECX accepts risk in almost every activity it undertakes in pursuit of its business objectives, from membership acquisition to final delivery of commodities. The exchange, within its domain, manages different types of risks like: operational risk, credit risk, liquidity risk, and reputation and image risk.

## 2.2. Empirical Literature

Sarkar and Tozzi (1998), suggest that although open outcry systems were more effective to trade highly active contracts, electronic trading has the potential to enhance operational efficiency and reduce costs. In contrary to the above Tse and Zobotina (2001) found that electronic trading systems reduce spreads while open outcry systems have higher market quality due to smaller variance of pricing error and higher information content. Information content is measured by studying the bid-ask spreads in response to trades.

In addition according Robin Thomas (2008) Electronic trading leads to reduced price movement, then it would lead to lower volatility and hence lower risk in the market.

Adebusuyis (2004) finding reveals that communications and transportation infrastructure is critical to a functioning exchange and outstanding constraints, and challenges to the stabilization of commodity prices were identified to include the small scale nature of production and low level of further processing, poor performance of state and public institutions, poor infrastructure which made production uncompetitive and inadequate market information as well as poor access to productive assets. And as per his finding one of the major factors influencing the fluctuation of commodity prices is cyclical income fluctuations in the consuming countries

Shahidur et al (2010) found that Countries with successful exchanges have far more developed communications and/or transportation infrastructure than countries with less successful exchanges and the researchers added that the real challenge in African commodity exchange is not the development of grades but the enforcement of contracts that use those goods.

Celeste Aida (2010) also found inadequate market information, a weak system to enforce contracts, lack of standards and grades and the inexistence of the necessary institutions that support proper market functioning are some of the constraints of coffee market in Ethiopia.

According to Shahidur et al (2010), erratic price behaviors that are inconsistent with transaction costs could undermine a commodity exchange by making risk unacceptably high. Prices can also vary significantly across space due to inadequate infrastructure or information asymmetry, both of which are important sources of market failures. The non-competitive situations resulting from market failures can make it difficult to identify how to structure contracts to be traded on an exchange.

According to Gideon (2010) quality of warehouse and storage management skills tends to be highly variable in most African countries. Improving professional skills in the warehousing industry is necessary if storage losses are to be kept at a minimum. Similar training and capacity building is required to enable traders and processing companies to utilize the WRS in cost-effectively managing their inventories.

According to the study made by Alemu et al (2010) limited availability of international market information in terms of prices and production levels, which is reflected in poor linkage / transmission of price trends with the national market, is expected to be another challenge considerably affecting the competitiveness of the Ethiopian sesame in the international market and this is expected to create disincentives for sesame exporters to engage in the sesame market through ECX.

And the researchers added that exporters in Ethiopia face several quality problems in terms of quality grading and sampling representation commodities and adulteration especially by mixing sesame seed of different origin and the Ethiopian Quality and Standard Authority (EQSA)s“, quality grading and certification which has been reported to take a long time as well as prone to corruption.

In addition Celeste Aida (2010) found that Internet and telecommunications in the ECX are still quite deficient (sometimes non- existent) to disseminate information to the participants. And as it is explained by Francesconi ( 2009) his study “Lack of capital, remoteness, poorly developed roads and telephone lines are only some of the barriers that keep farm households far away from markets, and therefore from the potential benefits of the ECX”.

As the findings of Mukhebi (1998) Kenyan Agricultural Commodity Exchange faces several constraints that impede the KACE from the successful accomplishment are ;first, poor quality of produce that farmers deliver combined with the fact that most small-scale farmers find it difficult to deliver in bulk which is ideal for an exchange; and secondly, most of the commodities in Kenya are heavily regulated by boards and are grown and marketed in an environment of struggling cooperatives, which are inefficient, mismanaged and have cumbersome internal bureaucracies. And the other major factor identified in the study was intervention of Kenyan government, in grain markets distorts prices and discourages increased private sector participation in commodity markets.

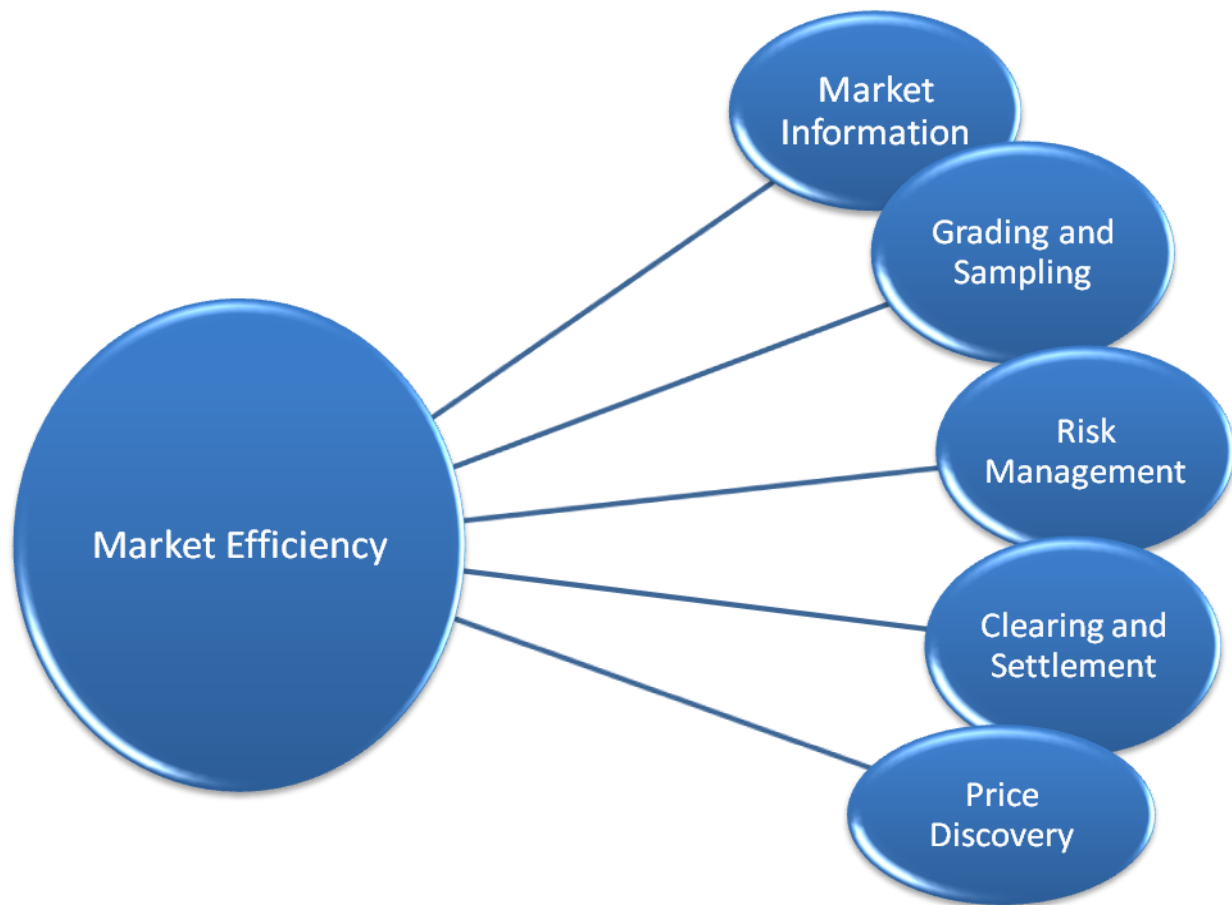
In addition to the above Gabremedhin and Ian Goggin, (2005) before the establishment of the ECX found that the Ethiopian grain markets faced some constraints such as; lack of sufficient market coordination between buyers and sellers, the lack of market information, the lack of trust among market actors, the lack of contract enforcement, and the lack of grades and standards, implies that buyers and sellers operate within narrow market channels, that is, only those channels for which they can obtain information and in which they have a few trusted trading partners .and their concluding showed that establishing of a commodity exchange will eliminate constraints that the Ethiopian commodity market faced.

Tollens (2006) in his study cited that the absence of easily accessible market information for farmers or small traders leads to lack of market transparency, low bargaining power of the buyers and sellers, low and highly variable prices due to market inefficiency, coexistence of surplus and deficit areas due to weak spatial integration of markets, high risks, low produce quality and high losses, high transaction costs and insufficient production to satisfy consumer demand. Another important finding made by Ian Goggin (2007) showed that no perceived need for market transparency in the market ,Lack of credit, Lack of understanding of the exchange concept ,New concept-particularly for small-scale operators, including farmers, resistance to change and non-performance on contracts are considered in the study as the main constraints for the successful accomplishment of commodity exchanges.

Gideon O.E (2010) found that “Liquidity in the agricultural trade can be enhanced if lenders aversion to the provision of inventory finance is addressed through the development of credible warehouse system which allows stored commodities to be used as collateral for loan”.

## 2.3 Conceptual Framework

In an efficient market model the statement that current price “fully reflects” available information is assumed to imply that successive price changes are independent and are identically distributed. These two premises together constitute the random walk model (Fama,1970).As a result conceptual framework is developed using the following parameter those are Market Information, Grading & Sampling, Risk management, Clearing & Settlement and Price discovery.



**Figure 2.3 Conceptual Framework**

Source: Adopted from random walks (Eugene Fama 1970). The Three Forms of Efficient Market Hypothesis: The Weak Form of EMH, The Semi-strong Form of EMH and The Strong Form of EMH by Fama (1970), Model of information mapping developed by (Heeks & Alemayehu, 2009)

### **2.3.2 Research Hypothesis**

#### **Market Information**

According to Gebremedhin and Goggin (2005) the core attribute of an exchange, is to enhance market transparency through generating and disseminating information. Through its own functioning, the exchange creates market information about the underlying supply and demand conditions in the economy. Market information helps potential buyers and sellers to make market decisions and gives them the assurance that the market is transparent and can handle their market needs. Based on the above definition and the suggested relationship of Market Information and Market efficiency in the literature, the researcher has formulated this hypothesis.

**H1.** Market Information has a significant and positive effect on Market efficiency

#### **Grading and Sampling**

According to Gebremedhin & Goggin (2005) transferable warehouse system is highly complementary to the functions of the exchange. The receipts system goes hand in hand with a commodity exchange in that: Grades and standards are essential to warehouse operations as well as to a commodity exchange with standardized contracts; Price transparency is achieved because receipts indicate a specific grade, which generates price information that can also be used on the exchange. Thus, the following hypothesis is posited:

**H2.** Grading and Sampling has a positive and significant effect on Market Efficiency.

#### **Risk Management**

Risk management systems are designed to support a spot market infrastructure, and manage risk at all times to protect its members, quality of service delivery, image and reputation. Risk management strategy does not only focus on risk avoidance but also the identification and management of an acceptable level of risk. ECX accepts risk in almost every activity it undertakes in pursuit of its business objectives, from membership acquisition to final delivery of commodities. The exchange, within its domain, manages different types of risks like: operational risk, credit risk, liquidity risk, and reputation and image risk. Thus, the following hypothesis is posited:

**H3.** Risk Management has a positive and significant effect on Market Efficiency.

## **Clearing and Settlements**

A clearing and settlement system that assures payment to sellers as well as minimizes overexposure of counterparties is essential. Financial institutions which are members of the exchange usually offer clearing services. Clearing is the process of determination of obligations, after which the obligations are discharged by settlement. Settlement is a two-way process that involves legal transfer of the title to funds and securities/other assets on the settlement date. Thus, the following hypothesis is posited:

**H4.** Clearing and Settlement has a positive and significant effect on Market Efficiency.

## **Price Discovery**

Prices of commodity exchange are determined solely by the interaction of supply and demand conditions. If there are more buyers than sellers, prices will be forced up. If there are more sellers than buyers, prices will be forced down. Buy and sell orders, which originate from all sources and are channeled to the exchange trading floor for execution, are actually what determine prices. The researcher has formulated this hypothesis.

**H5.** Price discovery has a positive and significant effect on Market Efficiency.

## **CHAPTER THREE**

### **RESEARCH DESIGN AND METHODOLOGY**

#### **3.1. Research Design**

Based on what a researcher is going to accomplish research can be divided into three those are explore a new topic, describe social phenomena or explain why something occurs. Studies may have multiple purpose (e.g. both to explore and describe) but one purpose usually dominate.

In Exploratory or Formative design you may be exploring a new topic or issue in order to learn about it. If the issue was new or the researcher has written little on it, you began at the beginning. This is called exploratory research. In this type of research the goal of researcher is to formulate more precise question that future researcher can answer. An exploratory research may be the first stage in sequence of studies. Exploratory types of research have the following goals becoming familiar with basic facts, setting and concern, develop well-grounded picture of the situation and developing techniques and sense of direction for future research.

Descriptive design presents the pictures of specific details of a situation, social setting or situation. It seeks to determine the answers to who, what, when, where, and how questions. Descriptive study offers to a researcher a profile of relevant aspect of phenomena of interest and create set of categories.

In explanatory design the desire to know why to explain the purpose of explanatory research. It builds on exploratory or descriptive research and goes on to identify the reason for something that occurs. Explanatory looks for causes and reasons. It explains things not just reporting, determine which of several explanations is best, and determine the accuracy of theory: test a theories prediction or principle. And hence to addresses the research questions, this study has used both descriptive and explanatory research approach. Moreover, this research has followed a cross sectional research approach.

### **3.2 Research Approach**

Research design is a plan and procedure for the researches that span the decision from broad assumption to detail methods of data collection and of three types qualitative, quantitative and mixed methods (Creswell John W, 2009).

Qualitative research is a means of exploring and understanding the meaning individual or group ascribe to a social or human problem and those who engage in this form of enquiry support a way of looking at research that honor an individual style, a focus on individual meaning and importance of rendering complexity of a situation (Creswell John w. 2009).

Qualitative research is a means for testing objective theories by examining relationship among variables and this variables can be measured typically on instrument, so that data can be measured using statistical procedure (Creswell John W. 2009) .

Mixed research methods involve the philosophies assumption, the use of qualitative and quantitative approach, and the mixing of both approach in the study. Thus its more than simply collecting and analyzing of both kind data: it also involves the use of both approaches in tandem so that the overall strength of the study is greater than either qualitative or quantitative research (Creswell John W. 2009). Because of the collected data had been measured using statistical procedure this study is grouped under quantitative research method.

### **3.3. Data type and source**

The research has been used both primary and secondary data sources. According to Kothari (2004), primary data are those collected fresh and for the first time and thus happen to be original in character. Secondary data, on the other hand, are those which have already been collected by someone else and which have already been passed through the statistical process. Basing Kothari classification, as a primary data, response of respondents collected through questionnaire was used. In addition to this, Secondary source of data was also used for the study inter alias include data from ECX, published and unpublished materials and electronic sources.

### **3.4. Population of The study**

Population is defined as —the complete set of units of analysis that are under investigation, while element is the unit from which the necessary data is collected (Davis 2000, pp. 220). As stated in the scope of the study, the research has tried to examine the determinants of market efficiency of Ethiopian Commodity Exchange. Therefore, the target population of the research was all members in Ethiopian Commodity Exchange.

### 3.5 Sampling Procedure

Sampling is the selection of a fraction of the total number of units of interest for the ultimate purpose of being able to draw general conclusions about the entire body of unit (Kothari, 2004). There are several decisions to be made in organizing a sample such as identifying target population, selecting sampling technique and determining the sample size.

#### 3.5.1 Sampling Size

From the total study population of 346 ECX members of the Ethiopian commodity exchange, engaged in buying, selling and exporting of commodities in Ethiopian Commodity Exchange, calculating the sample size, formula developed by Taro Yamane (1967) provided a simplified formula to calculate the sample sizes. This formula was also used to calculate the sample size for the study.

$$n = \frac{N}{1+N(e)^2}$$

Where  $n$  = the sample size

$N$  = the size of the population and

$e$  = the error of 5 percentage points

$$n = \frac{346}{1+346(0.05)^2}$$

$$= 186$$

Therefore, samples of one hundred eighty six members from the total members were taken as representative sample as per the formula developed by Taro Yamane.

### **3.5.2 Sampling Technique**

With regards to sampling techniques, random sampling was used to select the sample from the total population of all members who are trading mandating commodities.

### **3.6 Data collection instruments**

In this study, the researcher used questionnaire method of data collection. The questionnaire was used because it has the advantage of participating large respondents over other data gathering techniques; it limits inconsistency and also saves time. The following procedures were pursued to administer questionnaire to respondents. First, the researcher approached potential respondents to ask their corporation in filling the questionnaire and explained the purpose of collecting data, how the questionnaire will be filled and the confidentiality of to be obtained information. Then, the questionnaire was distributed and respondents were asked to furnish information honestly and return the filled up questionnaire.

The semi structured questionnaire had two parts. The first part of the questionnaire was about demographic characteristics of respondents such as sex, age, educational background and membership type. Part two contains the main parts of the questionnaire which determines the market efficiency of Ethiopian commodity exchange. Here some questions were asked to express their agreement/disagreement in five point likert scale, where 1=strongly disagree, 2=disagree, 3=indifferent, 4=agree, 5=strongly agree.

The data collection was held according to the time table and 186 questionnaires were distributed to the potential respondents. Out of the total questionnaire, 177 questionnaires were returned and considered for analysis.

### **3.7 Data Analysis Techniques**

The researcher used both descriptive statistics and multiple linear regression analysis method to analyze the data obtained from primary sources. The result of Descriptive statistics (mean standard deviation, maximum, and minimum) is useful in providing information and detecting normality of the collected data. The researcher used multiple linear regression analysis to examine the relationship between dependent and independent variables and also Correlation analysis was used to measure linear association relationship between variables, their coefficient indicates the strength of linear association between two variables and SPSS version 20 was used to analyze the data.

### 3.8 Reliability Test

Reliability is the degree to which the measure of a construct is consistent or dependable (Bhattacharjeend, 2012, p.57). The reliability test was executed by Cronbach's alpha coefficient and items which scored above the acceptable value were retained. Out of the 186 copies of questionnaires sent out 177 questionnaires were completed and returned. As per Tavakol&Dennick (2011) if a test has more than one concept or construct, it may not make sense to report alpha for the test as a whole as the larger number of questions will inevitable inflate the value of alpha. In principle therefore, alpha should be calculated for each of the concepts rather than for the entire test or scale.

According to Zikmund et al., (2010) scales with coefficient alpha between 0.6 and 0.7 indicate fair reliability, a Cronbach's alpha score of .70 or higher are considered as adequate to determine reliability. An alpha coefficient of = 0.929 was obtained. Thus, the data generation was reliable and free of random errors.

**Table 3.1 Reliability Analysis of the Variables**

| Variables            | Cronbach's Alpha |
|----------------------|------------------|
| Market Information   | .965             |
| Grading & Sampling   | .945             |
| Risk Management      | .936             |
| Clearing& Settlement | .929             |
| Price Discovery      | .946             |
| Market Efficiency    | .929             |

### 3.9 Validity Analysis

Validity is the extent to which differences found with a measuring instrument reflect true differences among those being tested, (Kothari, 2004). In other words, Validity is the most critical criterion and indicates the degree to which an instrument measures what it is supposed to measure. In order to ensure the quality of the research design content and construct validity of the research will be checked. According to Kothari (2004) Content validity is the extent to which a measuring instrument provides adequate coverage of the topic under study. If the instrument contains a representative sample of the universe, the content validity is good. Its determination is

primarily judgmental and intuitive. It can also be determined by using a panel of persons who shall judge how well the measuring instrument meets the standards, but there is no numerical way to express it. Based on this the content validity was verified by the professionals.

### 3.10 Test of normality of the Data

Among the others, one of the assumptions was normality of the data should be tested before running the analysis of the data using skewness and Kurtosis.

According to Fieled (2005), normally distributed data assumed that the data are from one or more normally distributed populations. The rationale behind hypothesis testing relies on having normally distributed populations and so if these assumptions are not met then the logic behind hypothesis testing is flawed.

Therefore, value of S (Skewness) and K (Kurtosis) and their respective standard errors were computed. An absolute value between -2 and +2 score for Skewness and Kurtosis is expected to be significant at  $p < 0.05$ . Large sample will give rise to small standard errors and so when sample sizes are big, significant values arise from even small deviations from normality for both skewness and Kurtosis (Fieled, 2005).

**Table 3.2 skewness and Kutosis for normality of Data**

|                           | N   | Skwness   |            | Kurtosis  |            |
|---------------------------|-----|-----------|------------|-----------|------------|
|                           |     | Statistic | Std. Error | Statistic | Std. Error |
| Market Information        | 177 | -.786     | .124       | .393      | .304       |
| Grading & Sampling        | 177 | -.764     | .124       | -.318     | .304       |
| Risk Management           | 177 | -.611     | .124       | .845      | .304       |
| Clearing & Settlement     | 177 | -.815     | .124       | -.796     | .304       |
| Price Discovery           | 177 | -.914     | .124       | -.323     | .304       |
| Overall Market efficiency | 177 | -.928     |            |           |            |
| Valid N (list wise)       | 177 |           |            |           |            |

(Source: Researcher's Survey, 2018)

As we can see from table 3.2 above all the absolute values of skwness and the kurtosis are between -2 and +2.

### **3.11 Ethical Considerations**

The Researcher had considered some ethical issues. This are the respondent has the right to respond or not, the respondent has the right to participate or not, the Researcher had inform respondents the purpose of the questioner and the study considers the confidentiality of the response by not asking to state name. While conducting the study, emerging ethical issues were considered and attention had been given.

For this purpose the introduction part of the questionnaire stated the purpose and importance of the study, confidentiality. Respondent were informed their full right to fill the questions or to withdraw from the study at any time without any unfavorable consequences, and they are not harmed as a result of their participation or non-participation.

In order to collect primary data, structured questionnaire were distributed. Up on distributing to ECX members, only general information was written in the paragraph of the questionnaire to protect their response from predisposition. The confidentiality of respondents was protected and respondents' identities were not disclosed.

Finally all research finding has not been obscured and is free from any plagiarism by acknowledging every reference used. In addition to this, the study was done in an open minded manner and attitudes were expressed as they are. Nothing was modified and changed. Hence information going to be collected is presented as they are and all the literatures gathered for the purpose of this study were appreciated in the reference.

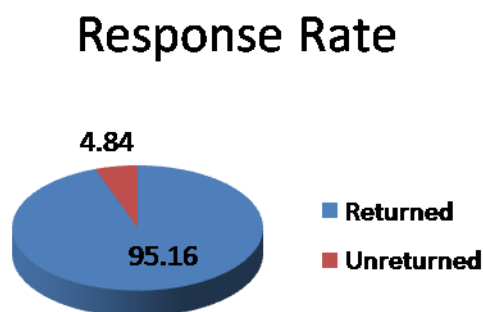
## CHAPTER FOUR

### ANALYSIS AND DISCUSSION

#### 4.1 Data Analysis and interpretation

##### 4.1.1 Rates of response

The study had initially targeted 186 respondents, 177 respondents filled and returned their questionnaires thus constituting 95.16% response rate, while 9 of the respondents didn't respond and never returned the questionnaires and constituted 4.84% non-response rate. This collaborate *Zikmund (2003)* assertion that a response rate of 50% is adequate, while a response rate greater than 70% is very good. This implies that based on this assertion; the response rate in this case of 95.16% was very good and facilitated collection of data on variability perspective of the different respondents of the Ethiopian Commodity Exchange members.

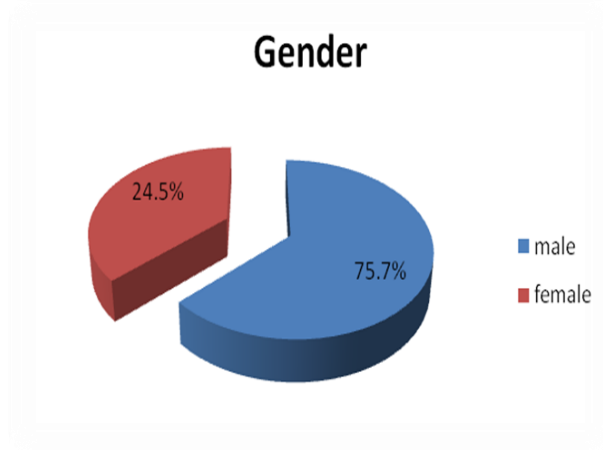


**Figure 4.1 Response rate of the respondent**

Source: own survey (2018)

##### 4.1.2 Demographic profile of Respondents

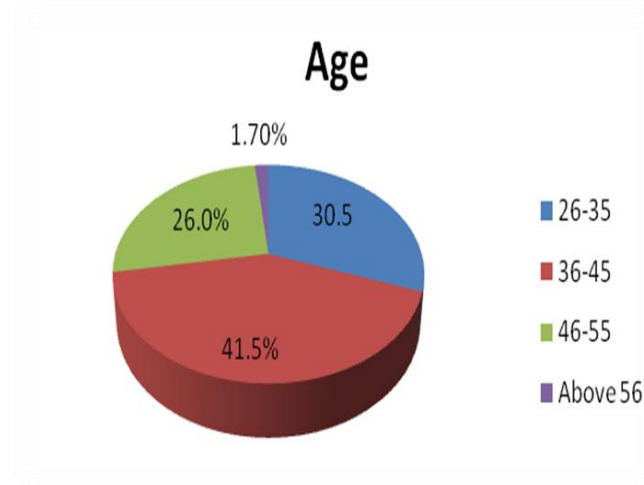
(Gender, age, educational level, and membership type of respondents) a total of 186 responses were distributed for Ethiopian Commodity Exchange, out of which 9 were ignored as they were not collected correctly. So, a total of 177 responses have been taken into consideration for the analysis. Concerning the Gender position of respondents (75.7%) of them are males and the rest (24.5%) are females. This shows that the major participation in the Ethiopian commodity exchange was dominated by male participants. Hence in the company the number of male members is greater than female.



**Figure 4.2: Gender description of Respondents**

Source: own survey (2018)

Majority of respondents belong to age group (36-45) years with 41.8% followed by (26-35) years which is 30.5%, (46-55) years having 26.0% , and the minimum representation at 1.7% is for age group of above 56 years old. This confirms that majority of Ethiopian Commodity Exchange members are between the age group of 36-45 implies that dominated by adult group.

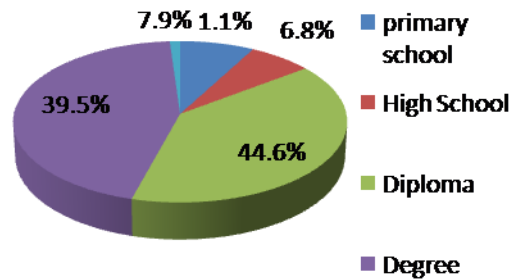


**Figure 4.3: Age description of the respondents**

Source: Own survey, 2018

Regarding the educational background of the respondents (44.6%) of the respondents were degree holders followed by the second largest respondents who have completed their diploma (39.5%) and the rest were educated in the level of primary school (7.9%), high school (6.8%) and MA/MSc and above (1.1%). This result shows that more degree holders participate in Ethiopian Commodity Exchange and this will help the companies efficient market.

## Level of Education

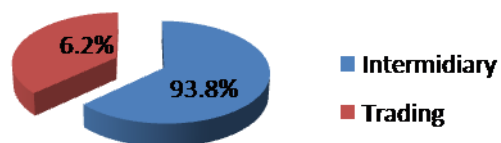


**Figure 4.4: Educational level descriptions of the respondents**

Source: Own survey, 2018

Majority of the respondent's membership type of a relatively higher percent of the respondents replied as they are intermediary members and trading members 93.8% and 6.2% respectively.

## Membership



**Figure 4.5: Membership description of Respondents**

Source: Own survey, 2018

### 4.1.3 Market Efficiency Dimensions

As a measurement of Market Efficiency dimension, table 4.1 to table 4.6 presents the items from market information, grading and sampling, risk management, clearing and settlement, price discovery and overall market efficiency. All parts of the dimensions were processed, analyzed and interpreted in order to achieve the desired result.

**Table 4.1 Descriptive statistics of market information system**

|                                                | <b>Strongly Disagree</b> | <b>Disagree</b> | <b>indifferent</b> | <b>Agree</b> | <b>Strongly Agree</b> | <b>Total</b> |
|------------------------------------------------|--------------------------|-----------------|--------------------|--------------|-----------------------|--------------|
| <b>Timelines of market information</b>         | 0%                       | 4.0 %           | 9.6%               | 58.8%        | 27.6%                 | 100%         |
| <b>Relevancy of market information</b>         | 0%                       | 4.5%            | 7.3%               | 46.3%        | 41.9%                 | 100%         |
| <b>Accuracy of market information</b>          | 0%                       | 0%              | 1.1%               | 48%          | 50.9%                 | 100%         |
| <b>Understandability of market information</b> | 0%                       | 0%              | 1.1%               | 37.9%        | 61%                   | 100%         |

(Source: Researcher's survey, 2018)

As can be seen from the table above, for the first item, timelines of market information, 58.8% and 27.6% of the respondents agree and strongly agree with the statement respectively. 9.6% of the respondents are neutral. And 4.0% of them disagree with the statement —Timelines of market information system and this result implies the information of ECX is delivered on time.

For the second item relevance of market information, 46.3% and 41.9% agree and strongly agree with the statement respectively. Respondents claiming to be indifferent amount to 7.3%. Those stating "disagreement" make up 4.5% of the respondents. This also implies the information is relevant.

With regards to the third item, those saying "agree" and "strongly agree" amount to 48% and 50.9% respectively. 1.1% of the respondents are indifferent. No respondent was found for a strong disagreement and disagreement for the third item of market information. This implies the market information provided by Ethiopian Commodity Exchange is accurate.

When looking at the fourth item, 37.9% and 61% of the respondents agree and strongly agree with the statement —understandability of the market information provided by ECX through different market data dissemination tool and imply the information is understandable.

**Table 4.2 Descriptive statistics of Grading and Sampling**

|                                                                                                              | <b>Strongly Disagree</b> | <b>Disagree</b> | <b>Neutral</b> | <b>Agree</b> | <b>Strongly Agree</b> | <b>Total</b> |
|--------------------------------------------------------------------------------------------------------------|--------------------------|-----------------|----------------|--------------|-----------------------|--------------|
| ECX is operating with well-equipped grading laboratory                                                       | 1.1%                     | 7.3%            | 17.5%          | 52%          | 22.1%                 | 100%         |
| The warehouse of ECX is operating with well-equipped quality control specialist.                             | 0%                       | 1.1%            | 0%             | 29.4%        | 69.5%                 | 100%         |
| At ECX commodities are graded and sampled using state-of-the-art technology grading and weighting equipment. | 3.4%                     | 14.7%           | 15.8%          | 42.9%        | 23.2%                 | 100%         |

(Source: Researcher's survey, 2018)

According to the above table, 4.2 the respondents who agree and strongly agree with the first item of grading and sampling is 52% and 22.1% respectively. Those who are indifferent make up 17.5%. The rest which are 7.3% and 1.1% represent those respondents who disagree and strongly disagree with the statement respectively.

For the second item, those who agree and strongly agree with the statement sum up to 29.4% and 69.5% respectively. Those who disagree add up to 1.1%.

In the case of the third item, 42.9% goes to those respondents who agree and 23.2% to those who strongly agree with the statement. Those who disagree and strongly disagree make up 14.7% and 3.4% respectively while those claiming to be neutral add up to 15.8%.

**Table 4.3 Descriptive statistics of Risk Management**

|                                                          | <b>Strongly Disagree</b> | <b>Disagree</b> | <b>Neutral</b> | <b>Agree</b> | <b>Strongly Agree</b> | <b>Total</b> |
|----------------------------------------------------------|--------------------------|-----------------|----------------|--------------|-----------------------|--------------|
| I am satisfied with ECX Market risk management system    | 13%                      | 11.3%           | 2.3%           | 33.9%        | 39.5%                 | 100%         |
| I am satisfied with ECX Credit risk management system    | 2.3%                     | 1.1%            | 27.1%          | 35.0%        | 34.5%                 | 100%         |
| I am satisfied with ECX Liquidity risk management system | 3.4%                     | 11.9%           | 44.6%          | 30.5%        | 9.6%                  | 100%         |

(Source: Researcher's survey, 2018)

According to the above table, respondent who agree and strongly agree with the first item of risk management is 33.9% and 39.5% respectively. Those who are indifferent make up 2.3%. The rest which are 11.3% and 13% represent those respondents who disagree and strongly disagree with the statement respectively this also imply that more than half of the respondents are satisfied with ECX market risk management system.

For the second item, those who agree and strongly agree with the statement sum up to 35.0% and 34.5% respectively. Those who are indifferent make up 27.1%. The rest which are 1.1% and 2.3% represent those respondents who disagree and strongly disagree with the statement respectively. The result implies that the ECX credit risk management system is good.

In the case of the third item, 30.5% goes to those respondents who agree and 9.6% to those who strongly agree with the statement. Those who disagree and strongly disagree make up 11.9% and 3.4% respectively while those claiming to be neutral add up to 44.6%.

**Table 4.4 Descriptive statistics of Clearing and Settlement**

|                                   | <b>Strongly Disagree</b> | <b>Disagree</b> | <b>Neutral</b> | <b>Agree</b> | <b>Strongly Agree</b> | <b>Total</b> |
|-----------------------------------|--------------------------|-----------------|----------------|--------------|-----------------------|--------------|
| Well-equipped by infrastructure   | <b>0%</b>                | <b>4.0%</b>     | <b>9.6%</b>    | <b>58.8%</b> | <b>27.6%</b>          | <b>100%</b>  |
| Well-equipped by trained manpower | <b>11.9%</b>             | <b>12.4%</b>    | <b>3.4%</b>    | <b>44.6%</b> | <b>27.7%</b>          | <b>100%</b>  |
| Well-equipped by technology       | <b>10.2%</b>             | <b>11.9%</b>    | <b>5.6%</b>    | <b>42.9%</b> | <b>29.4%</b>          | <b>100%</b>  |

(Source: Researcher's survey, 2018)

According to the above Table, 58.8% and 27.6% of the respondents agree and strongly agree that ECX clearing and settlement system is well equipped by infrastructure. Those who strongly disagree and disagree represent 0% and 4.0% of the respondents respectively. 9.6% of the total respondents are neutral with the statement. The result implies that ECX clearing and settlement department is well equipped by infrastructure.

For the second item, those who agree and strongly agree with the statement sum up to 44.6% and 27.7% respectively. Those who are indifferent make up 3.4%. The rest which are 12.4% and 11.9% represent those respondents who disagree and strongly disagree with the statement respectively.

In the case of the third item, 42.9% goes to those respondents who agree and 29% to those who strongly agree with the statement. Those who disagree and strongly disagree make up 11.9% and 10.2% respectively while those claiming to be neutral add up to 5.6%.

**Table 4.5 Descriptive statistics of Price Discovery**

|                                                                      | <b>Strongly Disagree</b> | <b>Disagree</b> | <b>Neutral</b> | <b>Agree</b> | <b>Strongly Agree</b> | <b>Total</b> |
|----------------------------------------------------------------------|--------------------------|-----------------|----------------|--------------|-----------------------|--------------|
| There are sufficient buyers and sellers at ECX floor based markets   | <b>24.3%</b>             | <b>5.1%</b>     | <b>7.9%</b>    | <b>42.4%</b> | <b>20.3%</b>          | <b>100%</b>  |
| There is competitive bid and offer for price discovery               | <b>23.7%</b>             | <b>4.0%</b>     | <b>4.5%</b>    | <b>40.1%</b> | <b>27.7%</b>          | <b>100%</b>  |
| ECX market information and dissemination facilitates price discovery | <b>5.6%</b>              | <b>10.7%</b>    | <b>11.3%</b>   | <b>44.1%</b> | <b>28.3%</b>          | <b>100%</b>  |

(Source: Researcher's survey, 2018)

According to the above Table, 42.4% and 20.3% of the respondents agree and strongly agree with that there are sufficient buyers and sellers at ECX floor based market. Those who strongly disagree and disagree represent 24.3% and 5.1% of the respondents respectively. 7.9% of the total respondents are neutral with the statement.

For the second item, those who agree and strongly agree with the statement sum up to 40.1% and 27.7% respectively. Those who are indifferent make up 4.5%. The rest which are 4.0% and 23.7% represent those respondents who disagree and strongly disagree with the statement respectively.

In the case of the third item, 44.1% goes to those respondents who agree and 28.3% to those who strongly agree with the statement. Those who disagree and strongly disagree make up 10.7% and 5.6% respectively while those claiming to be neutral add up to 11.3%.

**Table 4.6 Descriptive statistics of overall Market Efficiency**

|                                                           | <b>Strongly Disagree</b> | <b>Disagree</b> | <b>Neutral</b> | <b>Agree</b> | <b>Strongly Agree</b> | <b>Total</b> |
|-----------------------------------------------------------|--------------------------|-----------------|----------------|--------------|-----------------------|--------------|
| Overall I am satisfied with ECX market information system | <b>9.0%</b>              | <b>12.4%</b>    | <b>6.2%</b>    | <b>36.2%</b> | <b>36.2%</b>          | <b>100%</b>  |
| Overall the membership seat fee of ECX is fair            | <b>8.5%</b>              | <b>14.7%</b>    | <b>4.5%</b>    | <b>52.5%</b> | <b>19.8%</b>          | <b>100%</b>  |
| Generally trading in ECX helps to reduce transaction cost | <b>0%</b>                | <b>4.5%</b>     | <b>7.3%</b>    | <b>46.3%</b> | <b>41.8%</b>          | <b>100%</b>  |

(Source: Researcher's survey, 2018)

As shown in the table above, respondents who agree with the first item amount to 36.2% and those who strongly agree add up to 36.2%. Those who replied "neutral" make 6.2%. From this it can be said that more than half of the respondents are satisfied with ECX market information system.

For the second item, 72.3 %( adding 52.5% and 19.8%) of the respondents believe that membership seat fee of Ethiopian Commodity Exchange is fair. A total of 23.2% of the respondents do not accept the fee is fair. The rest (4.5%) goes to those who are neutral in their responses.

For the last item, 88.1 %( adding 46.3% and 41.8%) replied that trading in ECX helps to reduce transaction cost. 4.5% of the respondents said that trading in ECX does not help to reduce transaction cost and the rest 7.3% of respondents replied —neutrall to the statement.

#### **4.1.4 Mean and Standard Deviation**

In order to analyze the respondents overall Market Efficiency of commodity exchange, a total of 19 questions were grouped into the five dimensions of Market efficiency which are: ***Market information, Grading and sampling, Risk Management, Clearing and Settlement and Price Discovery.***

In order to compare the respondents Market efficiency, descriptive statistics of mean and standard deviation are used. The mean indicates to what extent the sample group averagely

agrees or disagrees with the different statements. The higher the mean the more the respondents agree with the statement while the lower the mean the more the respondents disagree with the statement. In addition, standard deviation shows the variability of an observed response. Below the results are discussed on by one.

#### 4.1.4.1 Market Information

According to Mokotjo and Kalusoa, the characteristics of quality information involve relevance, accuracy, timeliness and understandability. Market Information is hence is formed to judge the overall quality of information. Therefore, 4 items related to market information system was put to the respondents and the results of the analysis are displayed in table 4.7 below.

**Table 4.7 Market Information System**

| <b>Variables</b>                                                                                         | <b>Mean</b> | <b>Standard Deviation</b> |
|----------------------------------------------------------------------------------------------------------|-------------|---------------------------|
| The market provided by ECX is disseminating in real time to all market players.                          | 4.10        | .724                      |
| The market information provided by ECX is Relevant                                                       | 4.25        | .782                      |
| The market information provided by ECX is <b>Accurate.</b>                                               | 4.49        | .524                      |
| The market information provided by ECX displayed on different data dissemination tool is understandable? | 4.59        | .514                      |
| Market Information System                                                                                | 4.36        | .636                      |

(Source: Researcher's survey, 2018)

As illustrated on Table 4.7 all of the variables of Market Efficiency scored relatively high with an overall mean score of 4.36. The respondents also gave the highest mean score to The market information provided by ECX displayed on different data dissemination tool is understandable with a mean score of 4.59 while they gave a low mean score of 4.10 to the item " The market provided by ECX is disseminating in real time to all market players.." The result s implies that the respondents have a high level of Market Information System towards their commodity exchange.

#### 4.1.4.2 Grading and Sampling

At the ECX warehouse, commodities are sampled, weighed and graded and Table 4.8 presents respondents result of Grading and Sampling system with mean and standard deviation of values for each variable.

**Table 4.8 Grading and Sampling**

| <b>Variables</b>                                                                                            | <b>Mean</b> | <b>Standard Deviation</b> |
|-------------------------------------------------------------------------------------------------------------|-------------|---------------------------|
| ECX is operating with well-equipped grading laboratory                                                      | 3.86        | .881                      |
| The warehouse of ECX is operating with well-equipped quality control specialist.                            | 4.67        | .538                      |
| At ECX commodities are graded and sampled using state-of-the-art technology grading and weighting equipment | 3.68        | 1.08                      |
| Grading and Sampling                                                                                        | 4.07        | .833                      |

(Source: Researcher's survey, 2018)

As per table 4.8.the list of items comprising of Grading and Sampling, the mean score for the item —Among competing companies, The warehouse of ECX is operating with well-equipped quality control specialist scored the highest with a mean score of 4.67 While the item At ECX commodities are graded and sampled using state-of-the-art technology grading and weighting equipment " scored the lowest with a mean score of 3.68%. The overall mean score for the Market efficiency dimension is 4.0 7%which indicate that the respondents have a good feeling towards the Grading and Sampling system.

#### 4.1.4.3 Risk management

ECX risk management systems are designed to support market infrastructure.

**Table 4.9 Risk Management Analysis**

| <b>Variables</b>                                         | <b>Mean</b> | <b>Standard Deviation</b> |
|----------------------------------------------------------|-------------|---------------------------|
| I am satisfied with ECX Market risk management t system  | 3.75        | 1.411                     |
| I am satisfied with ECX Credit risk management system    | 3.98        | .932                      |
| I am satisfied with ECX Liquidity risk management system | 3.31        | .922                      |
| Risk management                                          | 3.68        | 1.088                     |

(Source: Researcher's survey, 2018)

Table 4.9 shows that — I am satisfied with ECX Credit risk management system scored the highest among the list of items related to risk management with a mean score of 3.98 while the respondents gave the least score of 3.31 to the item — I am satisfied with ECX Liquidity risk management system. This clearly implies that even though the respondents are satisfied with some type of risk management, they are also somehow dissatisfied to liquidity risk.

#### 4.1.4.4 Clearing and Settlement

ECX clearing and settlement establishes the net obligations of each member, informs the members of their daily net obligations and transfers cash funds and commodity ownership among members, 3 items related to clearing and settlement were put to the respondents...

**Table 4.10 Clearing and Settlement Analysis**

| <b>Variables</b>                  | <b>Mean</b> | <b>Standard<br/>Deviation</b> |
|-----------------------------------|-------------|-------------------------------|
| Well-equipped by infrastructure   | 4.10        | .723                          |
| Well-equipped by trained manpower | 3.63        | 1.324                         |
| Well-equipped by technology       | 3.69        | 1.29                          |
| Clearing and Settlement           | 3.80        | 1.112                         |

(Source: Researcher's survey, 2018)

As per table 4.10, the list of items comprising of clearing and settlement, the mean score for the item statement, well-equipped by infrastructure scored the highest with a mean score of 4.10. While the item Well-equipped by trained manpower “scored the lowest with a mean score of 3.63%. The overall mean score for the Market Efficiency dimension is 3.80% which indicates that the respondents have a good feeling towards the clearing and settlement system.

#### 4.1.4.5 Price Discovery

ECX aims to provide price discovery functions. Table 4.11, 3 items related to price discovery were put to the respondents...

**Table 4.11 Price Discovery**

| <b>Variables</b>                                                     | <b>Mean</b> | <b>Standard Deviation</b> |
|----------------------------------------------------------------------|-------------|---------------------------|
| There are sufficient buyers and sellers at ECX floor based markets   | 3.29        | 1.478                     |
| There is competitive bid and offer for price discovery               | 3.44        | 1.522                     |
| ECX market information and dissemination facilitates price discovery | 3.79        | 1.137                     |
| Price Discovery                                                      | 3.50        | 1.379                     |

(Source: Researcher's survey, 2018)

Table 4.11 revealed that respondents believe that there ECX market information and dissemination facilitates price discovery with a maximum mean score of 3.79 and a minimum mean score is scored with item there are sufficient buyers and sellers at ECX market which scored a mean of 3.29

#### **4.1.4.6 Overall Market Efficiency**

In order to test the respondents overall market efficiency, three items were given for the respondents to answer. Table 4.12 shows the analysis regarding the overall market efficiency of the respondents

**Table 4.12 overall Market Efficiency**

| <b>Variables</b>                                          | <b>Mean</b> | <b>Standard Deviation</b> |
|-----------------------------------------------------------|-------------|---------------------------|
| Overall I am satisfied with ECX market information system | 3.77        | 1.302                     |
| Overall the membership seat fee of ECX is fair            | 3.60        | 1.202                     |
| Generally trading in ECX helps to reduce transaction cost | 4.25        | .781                      |
| Market Efficiency                                         | 3.87        | 1.095                     |

(Source: Researcher's survey, 2018)

As can be seen from Table 4.12, the respondents gave a low mean score of 3.60 to the item of Overall the membership seat fee of ECX is fair. From the above table it can be said that majority of the respondents —implying that they are satisfied with market service ECX.

## 4.2 Correlation Analysis

The correlation between dependent and independent variables along with the causal effect was analyzed using Statistical Package for Social Science (SPSS). The below correlation matrix shows correlation between variables in the questionnaire with a Pearson Correlation coefficient to show the strength of relationship among the variables considered in the questionnaire. This study employs correlation analysis, which investigates the strength of the relationships between the studied variables. Pearson correlation analysis was used to provide evidence of convergent validity and Pearson correlation coefficients reveal magnitude and direction of relationships (either positive or negative) and the intensity of the relationship (-1.0 + 1.0). Correlations are perhaps the most basic and most useful measure of association between two or more variables (Marczyk, Dematteo and Festinger, 2005).

General guidelines of correlations of .01 to .03 are considered small, correlations of 0.3 to 0.7 are considered moderate, correlations of 0.7 to 0.9 are considered large and correlations of 0.9 to 1.00 are considered to be very large (Marczyk, Dematteo and Festinger, 2005).

As per table Below, the coefficient show that all independent variables were positively related with dependent variable (market efficiency) within the range of 0.748-0.922, were all are significant at  $p < 0.01$  level.

The independent variables clearing, risk and prices how highest and strong positive relation (0.900, 0.896 and .922 respectively). While one independent grading show a moderate level of positive relation (i.e. 0.864) with market efficiency. Among all variables only market information indicates low but positive relation with market efficiency (i.e. 0.748). And the Table also shows that the correlation of the independent variables within themselves. It can be noted that all variables are positively correlated with each other where the strongest correlation goes between clearing and price at (i.e.0927) and clearing and risk 0.903 while the moderate correlation goes between risk and price with the value of 0.881 and clearing and grading with the value of .849. But the correlation is very weak between price and market information with the value of .569 and clearing and market information with the value of .619.

**Table 4.13****Correlations**

|             |                 | Market<br>info | grading | clearing | risk   | price  | Market<br>Efficiency |
|-------------|-----------------|----------------|---------|----------|--------|--------|----------------------|
| Market info | Pearson         | 1              | .644**  | .619**   | .671** | .569** | .748**               |
|             | Correlation     |                |         |          |        |        |                      |
|             | Sig. (2-tailed) |                |         |          |        |        |                      |
| Grading     | N               | 177            | 177     | 177      | 177    | 177    | 177                  |
|             | Pearson         | .644**         | 1       | .849**   | .836** | .844** | .864**               |
|             | Correlation     |                |         |          |        |        |                      |
| Clearing    | Sig. (2-tailed) |                |         |          |        |        |                      |
|             | N               | 177            | 177     | 177      | 177    | 177    | 177                  |
| Risk        | Pearson         | .619**         | .849**  | 1        | .903** | .927** | .900**               |
|             | Correlation     |                |         |          |        |        |                      |
|             | Sig. (2-tailed) |                |         |          |        |        |                      |
| Price       | N               | 177            | 177     | 177      | 177    | 177    | 177                  |
|             | Pearson         | .671**         | .836**  | .903**   | 1      | .881** | .896**               |
|             | Correlation     |                |         |          |        |        |                      |
| Market      | Sig. (2-tailed) |                |         |          |        |        |                      |
|             | N               | 177            | 177     | 177      | 177    | 177    | 177                  |
| Efficiency  | Pearson         | .569**         | .844**  | .927**   | .881** | 1      | .922**               |
|             | Correlation     |                |         |          |        |        |                      |
|             | Sig. (2-tailed) |                |         |          |        |        |                      |
| Market      | N               | 177            | 177     | 177      | 177    | 177    | 177                  |
|             | Pearson         | .748**         | .864**  | .900**   | .896** | .922** | 1                    |
|             | Correlation     |                |         |          |        |        |                      |
| Efficiency  | Sig. (2-tailed) |                |         |          |        |        |                      |
|             | N               | 177            | 177     | 177      | 177    | 177    | 177                  |

\*\* . Correlation is significant at the 0.01 level (2-tailed).

## 4.2.1 Test for Linear Regression Model Assumptions

### 4.2.1.1 Multicollinearity Test Assumption

In regression, multicollinearity occurs when independent variables in the regression model are more highly correlated with each other than with the dependent variable. When the independent variables in the regression model are highly correlated with one another; they are basically measuring the same thing. In other words, when two variables are highly correlated, they both communicate essentially similar information. One way to assess multicollinearity is to examine correlations among the independent variables. If a correlation matrix demonstrates correlations of 0.90 or higher among the independent variables, they may be a problem with

multicollinearity. Hair et al. (2006) argued that correlation coefficient below 0.90 may not cause serious multicollinearity problem, cited by Muhammed (2012). Multicollinearity can also be detected using tolerance value and variance inflator factor (VIF) value. An insignificant tolerance value point to the variable under discussion is almost a perfect liner combination of the independent variables already in the equation and that it should be dropped out from to the equation. Multicollinearity does not exist among all the independent variables provided that the tolerance value of all the independent variables was greater than 0.1 and the VIF values of all the independent variables are also less than 10. As you can see from table 4.14 below all independent variables are greater than 0.1 and the VIF value of all the independent variables are also less than 10.

**Table 4.14**

| Model              | Collinearity Statistics |       |
|--------------------|-------------------------|-------|
|                    | Tolerance               | VIF   |
| Market Information | .388                    | 2.578 |
| Grading            | .232                    | 4.306 |
| Risk               | .157                    | 6.368 |
| Clearing           | .505                    | 3.128 |
| Price              | .320                    | 5.757 |

(Source: Researcher's survey, 2018)

### 4.3 Regression analysis

Regressions fit a predictive model to data and use that model to predict the values of dependent variable from one or more independent variables. Linear multiple regression estimates the coefficients of the linear equation, involving one or more independent variables that best predict the value of the dependent variable.

#### Model Summary

| Mode | R                 | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin-Watson |
|------|-------------------|----------|-------------------|----------------------------|---------------|
| 1    | .969 <sup>a</sup> | .938     | .937              | .25509                     | 1.809         |

a. Predictors: (Constant), market information, grading, risk, clearing, price

b. Dependent Variable: market efficiency

The adjusted  $R^2$  is called the coefficient of determination. This value tells us how market efficiency is varied with effects of Market information System, Grading & Sampling, Risk management, Clearing & Settlement, Price Discovery. Again adjusted  $R^2$  is 0.937. This implies that, there was a variation of 93.7 % of effects on Market Efficiency at Ethiopian Commodity Exchange due to Market information System, Grading & Sampling, Risk management, Clearing

& Settlement, Price Discovery. For this study, liner multiple regression analysis was employed. Market efficiency was used as the dependent variable while the underlying Determinants of market efficiency were used as the independent variables. Table 4.15 provides the results of the linear multiple regression analysis as follows.

**Table 4.15 Coefficient of Determination**

| Model |             | Unstandardized Coefficients |            | Standardized Coefficients | t      | Sig. |
|-------|-------------|-----------------------------|------------|---------------------------|--------|------|
|       |             | B                           | Std. Error | Beta                      |        |      |
| 1     | (Constant)  | -.922                       | .205       |                           | -4.492 | .000 |
|       | Market Info | .419                        | .063       | .204                      | 6.685  | .000 |
|       | Grading     | .127                        | .058       | .087                      | 2.213  | .001 |
|       | Risk        | .067                        | .054       | .060                      | 1.246  | .000 |
|       | Clearing    | .311                        | .066       | .318                      | 4.682  | .000 |
|       | Price       | .292                        | .045       | .385                      | 6.417  | .000 |

a. Dependent Variable: Market Efficiency

b. Predictors: (Constant), Market Information, Grading , Risk, Clearing, and Price  
(Source: SPSS data (2018))

Similarly, the regression table shows the overall significance/ acceptability of the model from a statistical perspective. As the significance value of F statistics shows a value of (.000), which is less than  $p < 0.05$ . Thus, the model is significant which indicates that the variation explained by the model is not due to chance.

As stated earlier, this study aims to identify the most contributing independent variable in the prediction of the dependent variable. Thus, the strength of each predictor (independent influencing the criterion (dependent variable)) can be investigated via standardized Beta Coefficient. The regression coefficient explains the average amount of change in the dependent variable that is caused by a unit change in the independent variable. The larger value of Beta coefficient an independent variable has, brings the more support to the independent variable as the more important determinant in predicting the dependent variable. price, market information, grading, risk, clearing were found to be a determinant of Market Efficiency in their ascending order referring to Price Discovery as the most important underlying factor of Market Efficiency of Ethiopian Commodity Exchange.

As one can see the Model Summary from the appendix 4 the adjusted R Square statistic tells us the proportion of variance in the dependent variable that is accounted for by the independent variables. In this case the co-efficient of determination adjusted ( $R^2$ ) was 0.937. This implies that about 93.7% of the dependent variable (i.e. Market Efficiency) can be explained by the independent variables (i.e. Market Information, Grading , Risk, Clearing, and Price), leaving about 6.3% to be explained by other exogenous factors. Adjusted  $R^2$  values also indicate the overall effect size of all the independent variables on the dependent variable.

According to Table 4.15, the standardized coefficients for the four independent variables Market Information, Grading , Risk, Clearing, and Price 0.204, 0.087, 0.060, 0.318, 0.385 and their significance levels are .000, .001, .000, .000 respectively which are all less than 0.05. This indicates a significant relationship between the independent variables and the dependent one. Since, coefficients of the predictor variables are statistically significant at less than five percent; alternative hypotheses related to all five dimensions of market efficiency were accepted.

From the above table we can have the following general formula for the study. The regression equation was

$$\text{OME} = \alpha + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \Sigma \dots \dots \dots (1)$$

$$\text{OME} = \alpha + \beta_1 \text{MI} + \beta_2 \text{GS} + \beta_3 \text{RM} + \beta_4 \text{CS} + \beta_5 \text{PD} + \Sigma \dots \dots \dots (2)$$

$$\text{OME} = -0.922 + 0.204 \text{MI} + 0.087 \text{GS} + 0.060 \text{RM} + 0.318 \text{CS} + 0.385 \text{PD} + \Sigma \dots \dots \dots (3)$$

The regression model from table 4.15 above result shows that keeping other variables constant 0.204 unit increase in Market Information will bring a unit increase in the market Efficiency of Ethiopian Commodity Exchange.

0.087 unit increase in Grading & Soloing will have a unit increase impact on market Efficiency of Ethiopian Commodity Exchange.

0.060 unit increase of Risk Management will have a unit increase impact on market Efficiency of Ethiopian Commodity Exchange.

0.318 unit increase of Clearing & Settlement will have a unit increase of market Efficiency of Ethiopian Commodity Exchange.

0.385 unit increase in Price Discovery will have a unit increase impact on market Efficiency of Ethiopian Commodity Exchange.

#### 4.4 Hypothesis Testing and Interpretation of Results

**Table 4.16 Summary of the overall outcome of the Research Hypotheses**

| Hypotheses                                                                                                                                                                                                               | Result                                   | Reason                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|---------------------------|
| <p>Ho: Market information does not have a significant and positive effect on market efficiency of ECX</p> <p>H1: Market information has a significant and positive effect On market efficiency of ECX.</p>               | <p>Ho: Rejected</p> <p>H1: Supported</p> | $\beta = 0.204, p < 0.05$ |
| <p>Ho: Grading &amp; sampling does not have a significant and positive direct effect on market efficiency of ECX</p> <p>H1: Grading &amp; sampling has a significant and positive effect on market efficiency of ECX</p> | <p>Ho: Rejected</p> <p>H1: Supported</p> | $\beta = 0.087, p < 0.05$ |
| <p>Ho: Risk management does not have a significant and positive direct effect on market efficiency of ECX</p> <p>H1: Risk management has a significant and positive direct effect on market efficiency of ECX</p>        | <p>Ho: Rejected</p> <p>H1: Supported</p> | $\beta = 0.060, p < 0.05$ |
| <p>Ho: Clearing &amp; settlement does not have a significant and positive effect on market efficiency of ECX</p> <p>H1: Clearing &amp; settlement has a significant and positive effect on market efficiency of ECX</p>  | <p>Ho: Rejected</p> <p>H1: Supported</p> | $\beta = 0.318, p < 0.05$ |
| <p>Ho: Price Discovery does not have a significant and positive effect on market efficiency of ECX</p> <p>H1: Price Discovery has a significant and positive effect on market efficiency of ECX</p>                      | <p>Ho: Rejected</p> <p>H1: Supported</p> | $\beta = 0.385, p < 0.05$ |

## 4.5 Discussion

In this section, the major findings will be summarized and the results of this research will be further elaborated.

By Looking at the demographic profile of the respondents, the consumption of Ethiopian Commodity Exchange members are highly dominated by male. When looking into the gender profile of the respondents, it was found that male customers outnumbered their female counterparts.

The second parameter of the demographic profile of respondents in this survey reveals that Ethiopian Commodity Exchange members are also concentrated within the adult age category population between the age categories of 36-45.

With regards to the membership type more than half of the respondents (93.8%) stated that they are intermediary members. The remaining small proportions of respondents are trading members 6.2%.

When having a look into what the respondents replied on the questionnaires, although they gave a more or less positive feedback for all the Market Efficiency dimensions, questions relating to Market Information and Grading & Sampling received the highest mean scores while the lowest went to Price Discovery.

The five independent variables had a positive correlation with market efficiency as revealed from the Pearson's Correlation Coefficient. The coefficients of the variables indicated that the variables have different magnitudes of correlation with the dependent variable. Accordingly, Grading & Sampling and Risk Management had the highest correlation; Market Information got a moderate correlation.

This study is designed and carried out in order to identify and measure the underlying dimensions of Market Efficiency of Ethiopian Commodity Exchange.

According to the study's findings, all the five dimensions: Market Information, grading& Sampling, Risk Management, clearing& Settlement and Price Discovery were identified as having an influence on the Market Efficiency of Ethiopian commodity Exchange respondents.

## **CHAPTER FIVE**

### **SUMMARY, CONCLUSIONS AND RECOMMENDATIONS**

This chapter winds up the study undertaken so far by giving insights about summary, conclusions, recommendations and highlighting future research areas.

#### **5.1 Summary**

The primary objective of this study was to examine determinates of market efficiency of commodity exchange in the case of Ethiopian Commodity Exchange. In order to do this, five determinants of market efficiency variables are used. These are Market Information, grading& Sampling, Risk Management, Clearing& Settlement and Price Discovery. Hence, this study has attempted to identify which determinant has the highest influence on the market efficiency of Ethiopian Commodity Exchange.

In addition, this study has also tried to answer the research questions stated on the introduction part. Descriptive analysis revealed that the majority of the participants in the ECX members were male and the majority of the respondents fall within 36-45 years means adult age group. Concerning with their membership, majority of the ECX members are intermediary members.

## 5.2 Conclusions

- ❖ The findings support the market efficiency determinants. Thus, the initially proposed market efficiency sources - are Market Information, Grading& Sampling, Risk Management, Clearing& Settlement and Price Discovery show a significant and positive influence on the Market Efficiency of Ethiopian Commodity Exchange.
- ❖ One of the objectives of this study was to find out which dimension has the most significant impact in determining the market efficiency in Ethiopian Commodity Exchange and the results revealed that Price discovery was the most significant variable affecting market efficiency. However, the other dimensions also have influenced market efficiency but their intensity was less than the dimension of Price Discovery.
- ❖ The independent variables in this study have positive and significant correlation with the overall Market efficiency, which implies that the independent variables had effect on Market efficiency.
- ❖ At the beginning of the study it was hypothesized that all the five determinants of Market efficiency had a positive and significant impact on the overall market efficiency of Ethiopian Commodity Exchange. After the analysis was done, the findings showed that the major dimension which affects the market efficiency of Ethiopian Commodity Exchange was price discovery. Even though the other four variables did not strongly influence the overall market efficiency as that of price discovery, the hypotheses drawn were accepted because they had a significant and positive effect on the market efficiency of Ethiopian Commodity Exchange.

### 5.3 Recommendations

Based on the findings, the researchers advance the following recommendations to address

- ❖ ECX should share experiences and best practices with other successful commodity exchanges in other countries: from South Africa, India, Brazil and China to continue the market efficiently and benefit of commodity exchange to its members.
- ❖ The government and stakeholders should build the elements of physical infrastructure that support the commodity exchange and market efficiency development-including information and communications technology and transport facility. In addition, the ECX should collaborate with other supportive institution like ethio-telecom to solve the networking problem which often occurred during dissemination of marketing information.
- ❖ ECX should provide complete marketing information about price, the quality and the quantity of the commodity to the ECX members by providing other countries commodity market prices.
- ❖ ECX should provide accurate and understandable marketing information by providing on time information through different communication tools to the members.
- ❖ ECX should have trained man power in the area of warehouse operation; it should give training and capacity building to the quality grading specialists of the exchange in order to upgrade their knowledge and skill.
- ❖ ECX should facilitate price discovery mechanisms like sufficient buyers and sellers in the trading floor.
- ❖ ECX should have trained manpower and build infrastructure to provide efficient service in clearing and settlement system of the exchange.

## **5.4 Areas for Further Research**

This study has mainly focused on examining determinates of market efficiency of Ethiopian commodity exchange. Nevertheless, the findings should be interpreted carefully, as there were a number of drawbacks which also represent the market efficiency for further research. Market Efficiency determinants include market information, grading & sampling, risk management, clearing & settlement and price discovery if there are other determinates that the researchers did not take in to account in this study, thus the future researcher could conduct a study on the same title by considering other determinant factors. Moreover, future research may investigate determinates of market efficiency of Ethiopian commodity exchange.

## **APPENDIX 1**

### **Questionnaire in English**

Addis Ababa University

College of Business and Economics School of Commerce

Marketing Management Graduate Program

Dear respondents,

I am attending a post graduate program in Marketing Management at Addis Ababa University College of Business and Economics School of Commerce. I am doing my dissertation in title **“determinates of market efficiency of commodity exchange: the case study of Ethiopian commodity exchange”** in partial fulfillment of a post graduate degree (MA) in Marketing Management.

This questionnaire is intended to gather data on the topic selected for the study. To make this research successful your contribution through attempting the entire question will have a paramount importance. Therefore the researcher would like to appreciate your contribution from the outset.

The information you provide is confidential and for the sole purpose of academic reason. Hence, you are kindly requested to respond to the statements in the following questionnaire. Your response has a great impact for this survey study. The main objective of the study is to identify the determinants of market efficiency of commodity exchange and recommend solutions for problems related to the subject matter.

Thank you in advance for your agreement to take part on the study.

## Part I General Information

Please, provide your responses by putting ‘√’ mark in the space provided.

1. Gender

1 ☐ Male    2 ☐ female

2. Age ...

1 ☐ 18–25 year                      2 ☐ 26–35 year

3 ☐ 36–45 year                      4 ☐ 46–55 year

5 ☐ Over 56 year

3. Level of Education

...    1 ☐ Primary Education ( $\leq$  Grade 8)                      2 ☐ High School (9 – 12th Grade)

...    3 ☐ Diploma/Vocational Education                      4 ☐ Degree

5 ☐ Master’s Degree or Above

4. Membership Type

1 ☐ Trading membership

2 ☐ Intermediary membership

**PARTII Questions on market information system. Please use  $\surd$  mark**

Mk1. Market information provided by ECX is disseminating in **Real Time** to all market players.

- 1 ☐ Strongly Disagree
- 2 ☐ Disagree
- 3 ☐ Indifferent
- 4 ☐ Agree
- 5 ☐ Strongly Agree

MK2. The market information provided by ECX is **Relevant**.

- 1 ☐ Strongly Disagree
- 2 ☐ Disagree
- 3 ☐ Indifferent
- 4 ☐ Agree
- 5 ☐ Strongly Agree

MK3. The market information provided by ECX is **Accurate**.

- 1 ☐ Strongly Disagree
- 2 ☐ Disagree
- 3 ☐ Indifferent
- 4 ☐ Agree
- 5 ☐ Strongly Agree

MK4. The market information provided by ECX displayed on different data dissemination tool is **Understandable**?

- 1 ☐ Strongly Disagree
- 2 ☐ Disagree
- 3 ☐ Indifferent
- 4 ☐ Agree
- 5 ☐ Strongly Agree

**PART III Market efficiency dimensions. Please use  $\surd$  mark**

**Rating Scale**

1. Strongly Disagree    2. Disagree    3. indifferent    4. Agree    5. Strongly Agree

| <b>A Grading and Sampling</b>                                                                                   | 1 | 2 | 3 | 4 | 5 |
|-----------------------------------------------------------------------------------------------------------------|---|---|---|---|---|
| 1. ECX is operating with well-equipped grading laboratory.                                                      |   |   |   |   |   |
| 2. The warehouse of ECX is operating with well-equipped quality control specialist.                             |   |   |   |   |   |
| 3. At ECX commodities are graded and sampled using state-of-the-art technology grading and weighting equipment. |   |   |   |   |   |

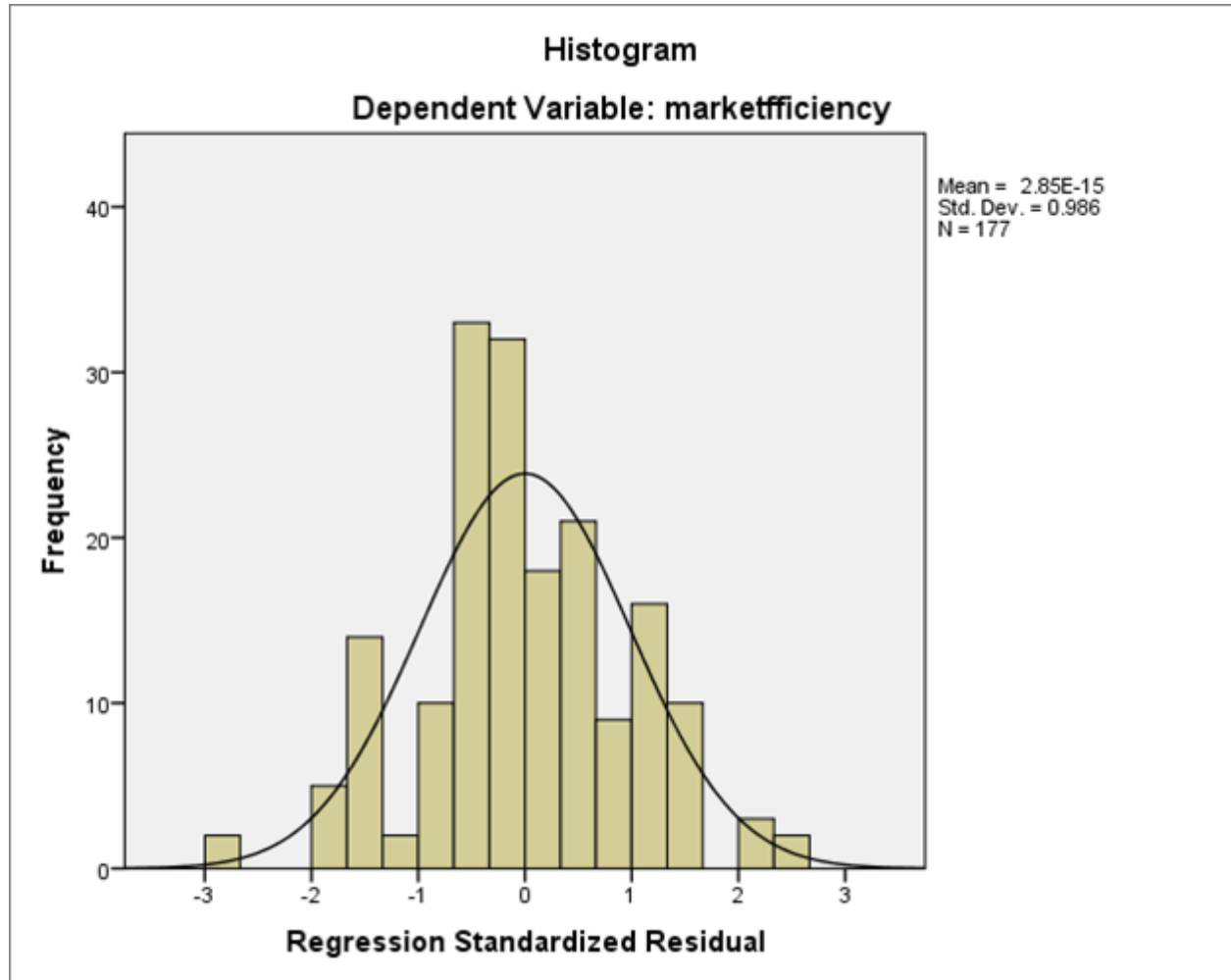
| <b>B Clearing and Settlement</b>     | 1 | 2 | 3 | 4 | 5 |
|--------------------------------------|---|---|---|---|---|
| 1. Well-equipped by infrastructure   |   |   |   |   |   |
| 2. Well-equipped by trained manpower |   |   |   |   |   |
| 3. Well-equipped by technology       |   |   |   |   |   |

| <b>C Price Discovery</b>                                                | 1 | 2 | 3 | 4 | 5 |
|-------------------------------------------------------------------------|---|---|---|---|---|
| 1. There are sufficient buyers and sellers at ECX floor based markets   |   |   |   |   |   |
| 2. There is competitive bid and offer for price discovery               |   |   |   |   |   |
| 3. ECX market information and dissemination facilitates price discovery |   |   |   |   |   |

| <b>D. Risk Management</b>                                   | 1 | 2 | 3 | 4 | 5 |
|-------------------------------------------------------------|---|---|---|---|---|
| 1. I am satisfied with ECX Market risk management system    |   |   |   |   |   |
| 2. I am satisfied with ECX Credit risk management system    |   |   |   |   |   |
| 3. I am satisfied with ECX Liquidity risk management system |   |   |   |   |   |

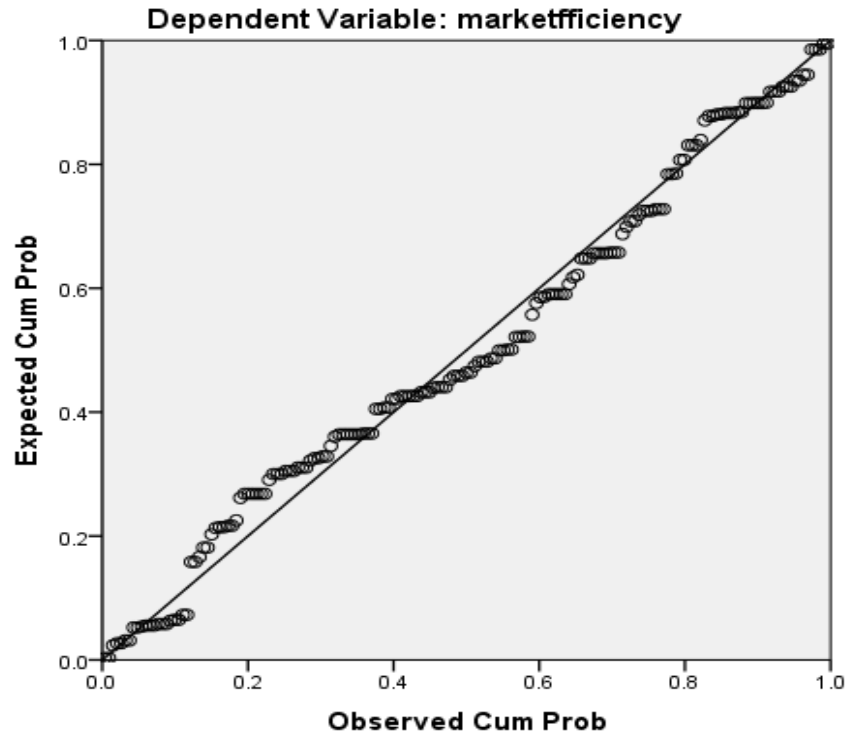
| <b>E. Market efficiency</b>                                  | 1 | 2 | 3 | 4 | 5 |
|--------------------------------------------------------------|---|---|---|---|---|
| 1. Overall I am satisfied with ECX market information system |   |   |   |   |   |
| 2. Overall the membership seat fee of ECX is fair            |   |   |   |   |   |
| 3. Generally trading in ECX helps to reduce transaction cost |   |   |   |   |   |

## APPENDIX 2: Histogram for Normality Test of the Data



### APPENDIX 3: Normal P- P Plot to Test Normality of the Data

#### Normal P-P Plot of Regression Standardized Residual



### APPENDIX 4 Model Summary

| Model Summary |                   |          |                   |                            |               |
|---------------|-------------------|----------|-------------------|----------------------------|---------------|
| Model         | R                 | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin-Watson |
| 1             | .969 <sup>a</sup> | .938     | .937              | .25509                     | 1.809         |

a. Predictors: (Constant), price, Market Information , Grading, Risk, clearing

b. Dependent Variable: Market Efficiency

### APPENDIX 5 ANOVA

#### ANOVA<sup>a</sup>

| Model |            | Sum of Squares | df  | Mean Square | F       | Sig.              |
|-------|------------|----------------|-----|-------------|---------|-------------------|
| 1     | Regression | 169.412        | 5   | 33.882      | 520.683 | .000 <sup>b</sup> |
|       | Residual   | 11.127         | 171 | .065        |         |                   |
|       | Total      | 180.540        | 176 |             |         |                   |

a. Dependent Variable: market efficiency

b. Predictors: (Constant), market information, grading, risk, clearing

## **List of References**

Adebusuyi, B.S (2004). *Stabilization of Commodity Market of Interest to Africa*: Paper Presented at the Workshop on Constraints to Growth in Sub-Saharan Africa, Organized by the Intergovernmental Group of Twenty-Four in Pretoria, South Africa,

Alemu D. & M. Gerdien, (2010). *The Ethiopian Commodity Exchange an Over View*, Working Paper, 3. Wageningen University, joint publication of Ethiopian Pulses, Oil seeds, & Spices Processors Exporters Association (EPOSPEA) and Public Private

Bhattacharjee, A. (2012), *Social Science Research: Principles, Methods, and Practices*, Florida, USA: University Of South Florida

Bose, S. (2009). *Commodity Futures Market in India: A Study of Trends in the Notional Multi-Commodity Indices* Money & Finance, ICRA Bulletin, Vol. 3, No. 3

Celeste Aida M. F. (2010). *Trading Coffee through the Ethiopia Commodity Exchange*: Social Embeddedness and Performativity of markets; Partial Fulfillment of the Requirements for the Masters of Arts in Development Study, Netherlands, 2010.

Creswell.W. (2009), *'Research design; Qualitative, Quantitative and Mixed methods Approaches*, 3<sup>rd</sup>, California: Sage.

Davis, D., (2000), *Business Research for Decision Making*, Canada Brooks/Cole: Thomson.

Francesconi G.N., (2009). *Cooperation for Competition: Linking Ethiopian Farmers to Markets* .PhD thesis Wageningen University, Netherland.

FamaF.Eugene, (1970), *Efficient Capital Market: A Review of Theory and Empirical Work*. *Journal of Finance*, Vol 25, Issue 2, 383-417

Gebremedhin, E. Z.andGoggin I. (2005). *Does Ethiopia Need a Commodity Exchange?An Integrate Approach to Market Development*, EDRI-ESSP Policy

Gideon O.E (2003). *Promoting Agricultural Commodity Exchanges in Ghana and Nigeria: A Review Report to UNCTAD*

Gideon O.E. (2010, September 6-7). *Implementing Warehouse Receipt Systems in Africa: Potential and Challenges*: Paper prepared for the Fourth African Agricultural Markets Program Policy Symposium, organized by the Alliance for Commodity Trade in Eastern and Southern Africa (ACTESA) of the Common Market for Eastern and Southern Africa (COMESA), Lilongwe, Malawi

Kothari, C., 2004, *Research Methodology: Methods and Techniques*, New Age International New Delhi

Lerner L.R. (2000), *The Mechanics of The Commodity Features Markets: What They Are and How They Function*, Future Investment Series, Special report no.2.

Marczyk, DeMatteo, D; & Festinger, D, (2005). *Essentials of Research design and Methodology*, 1<sup>st</sup>ed John Wiley & Sons, Inc; Hoboken, New Jersey.

Mas-ColellAndreu, Whinston D.Michael., &Green R.Jarry. (1995). *Microeconomic Theory*, Oxford University Press, New York, USA

Mheen-Sluijer, J.Van.Der. (2010). *Ethiopian Commodity Exchange and Contract Farming Arrangements: Complementing Institutions*, Development Cooperation Ministry of Foreign Affairs, Wageningen University

Mheen-Sluijer, J.Van.Der. (2010). *Ethiopian Commodity Exchange and Contract Farming Arrangements: Complementing Institutions*, Development Cooperation Ministry of Foreign Affairs, Wageningen University Field, A., 2005, *Discovering Statistics using SPSS*, 2<sup>nd</sup> ed., Sage publication, Alden group, London

Mukhebi A. W. (1998). *The Challenges and Opportunities of a Young Commodity Exchange in an Emerging Market Economy: The Experience of the Kenya Agriculture Commodity Exchange*, a Paper Prepared for the First Summit of Partners for Development Organized by

the UNCTAD

Muhammed, N., (2012). *Determinants of Dividend Policy of Insurance Companies in Ethiopia*  
Unpublished Master Thesis, Addis Ababa University, Addis Ababa, Ethiopia

Preston E. Lee and Collins R. Norman, (1966). The Analysis of Market Efficiency.  
*Journal of Marketing Research*, Vol. 3, No. 2, pp. 154-162

Rashid S, Winter-Nelson .A and Garcia P.(2010). *Purpose and Potential of Commodity Exchanges in African Economies*, IFPRI, Washington DC. Partnership on oilseeds (PPP)

Ratchford T. Brian, Agrawal Jagdish, Grimm E. Pamela, & Srinivasan Narasimhan, (1996).  
Towards Understanding the Measurement of Market Efficiency. *Journal of Public Policy & Marketing*, Vol. 15, No. 2, pp. 167-184

Sahadevan, K. G. (2002). *Sagging Agricultural Commodity Exchanges: Growth Constraints and Revival Policy Options*, Economic and Political Weekly vol.37No.30 Pp53–60.

Sarkar, Asani, M. Tozzi. (1998). *Electronic Trading on Futures Exchanges*, Current Issues; Economics and Finance vol. 4 No1

Tavakol, M. & Dennick, R.(2011). Making sense of Cronbach's alpha,  
*International Journal of Medical Education*. 2. p.53-55

Thomas, Robin. (2008). *The Impact of Electronic Trading on the Basis at Winnipeg Commodity Exchange*. In Partial Fulfillment of the Requirements for the Degree of Master of Science. University of Minnesota (2008)

Tollens, E. F. (2006). *Market Information Systems in sub-Sahara Africa Challenges and Opportunities*, Paper prepared for presentation at the International Association of Agricultural Economists Conference, Gold Coast, Australia August 12-18

Tse, Yiuman, Tatyana V. Zabolina, (2001). Transaction Costs and Market Quality: Open Outcry versus Electronic Trading; *Journal of Futures Markets*, , vol.8, p23-46

UNCTAD, (2007) .*Development Impacts of Commodity Futures Exchanges in Emerging Markets*. Expert meeting on Trade and Development Implications of Commodity Exchanges working paper – UNCTAD

Yamane, T. (1967). *Statistics, An Introductory Analysis*. (2<sup>nd</sup>ed), New York. Harper -row

Zikmund, 2000, *Business Research Methods*, 6th Ed., Dryden (Harcourt) Fort Worth, Orlando

Zikmund, W.G. (2003) *Business Research Method*, 7<sup>th</sup> edition, New York: The Dryden press.