



**Addis Ababa University School of Commerce  
Department of Marketing Management**

**Factors Affecting the Market Efficiency of  
Ethiopian Commodity Exchange (ECX)**

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**June, 2018  
Addis Ababa**

**Addis Ababa University School of Commerce  
Department of Marketing Management**

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Ethiopian Commodity Exchange (ECX)**

**A Thesis submitted to the School of Commerce Graduate Studies of Addis  
Ababa University in partial fulfillment of the requirements for the degree of  
Masters of Arts in Marketing Management**

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**June, 2018  
Addis Ababa**

# **Addis Ababa University School of Commerce**

## **Department of Marketing Management**

This is to certify that the thesis entities “Factors Affecting the Market Efficiency of ECX”, Submitted to Addis Ababa University School of Commerce for the award of the Degree of Master of Marketing Management and is a record of valuable research work carried out by Mrs. Meskerem Bekele, under the regulations of the University.

Therefore we hereby declare that no part of this thesis has been submitted to any other university or institutions for the award of any degree of diploma.

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## *Acknowledgements*

*Great honor and grace for the lord God and his son Jesus Christ and for the Holy Spirit above all. I would like to express my gratitude to my advisor Dr. Temesgen Belayneh and for the useful comments, remarks and engagement through the learning process of this master thesis. I would also like to give my great appreciation to all my family members and friend who have participated in writing this thesis work to supporting me from the starting of the research and make it to this very point of my life. My heartily thanks goes to all ECX staffs that have in one way or another helped me to accomplish this study. I would like to extend my acknowledgement to all people who provide me with assistance and advice for their contribution on best findings of this thesis finally specially thanks to Ato Mesele and his wife W/ro Fikirte and Etsegnet.*

*“Thank you!”*

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### ***Abstract***

In marketing, efficiency is one of cost benefits analysis measurement tools that are used to determine by some factors. Among these factors, price discovery, quality grading, risk management, clearing and settlement, market data dissemination, and transaction cost has been used for this study. Today, the attitude of marketing philosophies are changed thus the researcher have tried to find out really these factors of market efficiency affect the market interaction. Efficiency in marketing is the most used measure of market performance. Improved marketing efficiency is a common goal of farmers, marketing organizations, consumers, and society. The research had the objective of identifying and explaining the factors of Market Efficiency of ECX. In order to address its objectives, the research has been generally set conceptual framework. Triangulation of data in the realm of qualitative and quantitative research methods employing interview and questionnaire data analysis have been employed respectively. Four key informants representing other department heads have been purposively selected. In addition, random sampling has been used to analyze data collected through questionnaires of ECX members and 185 market actors have been involved in the study. The finding of the study shows that there is a direct and positive relationship between most of factors of market efficiency. All the factors of market efficiency measures have positive effect on market efficiency, among which clearing and settlement has the highest effect with coefficient followed by market data dissemination, risk management, price discovery, and quality grading respectively. But, transaction cost has a negative effect on the market efficiency. ECX recommended developing a market efficiency strategy and policy in concerning about the strong and lesser performance of each factors of market efficiency and also including others variable which is not in this study. ECX advised that to give them a chance to be active participants in the trading system in the presents of challenging was happened. Especially, Exporters may have determined some factors of market efficiency due to experience sharing with abroad business interaction. In the case of information and transportation infrastructures ECX recommended that in revised and developed system to have a good culture of working together with other governmental organization to enhance the market efficiency and make synergy effect.

***Key words: Market Efficiency, Factors of Market Efficiency and Commodity Exchange***

## ***Acronyms***

CBOT- Chicago Board of Trade  
CCP- Central Counter Party  
ECEA- Ethiopia Commodity Exchange Authority  
ECX- Ethiopian Commodity Exchange  
EMH- Efficient Market Hypothesis  
EQSA- Ethiopia Quality and Standard Authority  
IM- Intermediary Member  
IT- Information Technology  
IVR- Interactive Voice Response  
KACE- Kenyan Agricultural Exchange  
OECD- Organization for Economic Co-operation and  
development  
SMS- Short Messaging Service  
SPSS- Statistical Package for Social Science  
TM- Trade Member  
TV- Television  
UNCTAD- United Nations Conference on Trade and  
Development  
USAID- American Development Agency  
VIF- Variance Inflation Factors  
V-SAT- Very Small Aperture Terminal  
WRS- Warehouse Receipt System

# **CHAPTER ONE**

## **INTRODUCTION**

### **1.1 Background of the Study**

A commodity exchange is a centralized location where buyers and sellers carry out transactions, with or without physical commodities, under a set of clearly defined rules and regulations. In theory, commodity exchanges can contribute to market development by reducing transactions costs, improving price discovery, and reducing price risks. Coordinating through a centralized exchange reduces the costs associated with identifying market outlets, physically inspecting product quality, and finding buyers or sellers. In fact, commodity exchanges have historically evolved through private initiatives to address the high cost of doing business in spot markets (Black, 1986; Garcia and Leuthold, 2004).

A brief history of the development of the Chicago market reveals that, while responding to the initial problem of coordinating exchange in a low-cost manner, the market system itself evolved as the sophistication of the market increased and as economic growth progressed. In other words, the Chicago exchange did not start as the sophisticated market it is today. In the 1840s, as grain production increased in response to technological innovations in the American Midwest, farmers used to come to Chicago to sell their grain to traders, who would ship it all over the country. When farmers came to the market, they came without prior knowledge of market prices and the city had few storage facilities and no established procedures for weighing and grading the grain, leaving the farmer at the mercy of the trader.

In 1848, the Chicago Board of Trade (CBOT) opened as a central place where farmers and traders could meet to exchange cash for immediate delivery of wheat, but with certain established mechanisms by the Board for grading and weighing the wheat, for storing it if no trade occurred, for bidding on its price, and for resolving disputes that occurred. As both producers and buyers experienced the advantages of this system, it was a matter of a few years before farmers and traders evolved the practice of forward contracts in 1851. Thus, a farmer would agree with the trader on a price to deliver a certain quantity of grain at a future time. The deal was advantageous to both parties in that the farmer knew in advance his market price and the trader knew his costs. As these contracts common, they began to be used as collateral against bank loans and began to exchange hands before the physical delivery itself. Thus, a farmer might pass on his obligation to deliver to another farmer, with the price going up or down depending on what was happening in the market. As these “forward contracts” became common over a 15 year

period, CBOT introduced in 1865 a standard contract known as a “futures contract” with a pre-specified delivery date and a margin requirement to act as a performance bond. This innovation reduced the risks and costs associated with negotiating forward contracts on an individual basis (Stiglitz, J.E., 1974).

The Ethiopia Commodity Exchange (ECX) is a new initiative for Ethiopia and the first of its kind in Africa. The ECX has provided farmers with access to real time pricing information, improved profits and productivity, reduced market segmentation and boosted export quality. Regarding this latter point, Addis Ababa continues to innovate with the recent launch of a national traceability system via new electronic tagging technology; international buyers are able to track the entire footprint of Ethiopian coffee. With a wealth of experience in the developed nations and with little practical examples in Africa, Ethiopia Commodity Exchange (ECX) was launched in April, 2008 and joined the pioneers in the continent. ECX has the mission “to connect all buyers and sellers in an efficient, reliable, and transparent market by harnessing innovation and technology and based on continuous learning, fairness, and commitment to excellence” ([www.ecx.com.et](http://www.ecx.com.et)).

ECX has begun its operation by only offering spot trading and with a legal mandate to launch futures contract transactions (ECX, 2008). Gabre-Madhin (2008) strongly argued that the benefit from a fair, orderly and efficient marketing system can better be exploited in spot trading than introducing a futures market that may potentially bring risk by excessive speculation given the existing food price crisis and the country’s development stage. Gabre- Madhin (2007) however, stressed that an organized marketing institution better serve its users by addressing the central function of the market- to address market risk- which can be better achieved by futures exchange than spot trading. Thus, transparency, reliability, and efficiency are the key objectives of a system that aims to modernize Ethiopia’s commodities trade.

The idea of market efficiency initially appeared in the 19th century. It reached its academic maturity in the eighties, however, since then its popularity and empirical validity has declined.<sup>10</sup> Similar thoughts to the random walk theory were first expressed in the 17th–18th centuries. However, the very first ideas of random walk came from other fields than finance: mathematics, botany, physics, logic (Sewell, 2011). In turn, the economic terms of the efficient market theory were found at the end of the 19th century. According to De Moor, Van den Bossche and Verheyden (2013), the founder of the efficient market theory was G. Gibson. In 1889, he published a book on London, Paris and New York stock exchanges, arguing that stock prices

reflect the views of the smartest market participants. Gibson saw stock valuation as a voting process in which the participants vote on in which direction the stock price will change. Smartest participants would eventually gain more votes for their correct guesses which would allow them to accumulate more funds (De Moor, Van den Bossche, Verheyden, 2013). Another pioneer in the efficient market theory was a French mathematician L. Bachelier who published “Speculation theory” in 1900 where he argued that the expected return of an investment is always equal to zero (Sewell, 2011).

Comprehensive understanding of market efficiency is also crucial for corporate executives whose decisions and actions determine perceived value of companies. Allen, Brealey and Myers (2011) defined a market as efficient when it was not possible to earn a return higher than the market return. In other words, the value of shares reflects the fair value of the company and is equal to the future cash flows discounted by an alternative cost of capital. Eakins and Mishkin (2012) argued that an efficient market was a market where asset prices fully reflected all information available. Generally, the essence of an efficient market is built on two pillars: 1) in efficient markets, available information is already incorporated in stock prices; 2) in efficient markets, investors cannot earn a risk-weighted excess return.

## **1.2 Statement of the Problem**

Africa is latecomer to commodity and derivative markets. However with the recent growth dynamism on the continent, African countries are tapping into new and innovative sources of financing, including exploiting the full potential of the commodity exchange and derivatives markets to facilitate the development of local capital markets. The Ethiopian Commodity Exchange (ECX) is designed to be a marketplace where buyers and sellers meet to trade, assured of quality, quantity, delivery and payment. It will control a system of daily clearing and settling of contracts. It will improve market efficiency by operating a trading system where buyers and sellers use standardized contracts. Market transparency will be accomplished by distributing market information in real time to all market players. However, Commodities exchange play vital role in marketing agricultural outputs and improving the return for the primary producers (Bethlehem Girma, 2009). The study there was those factors of market efficiency price discovery, quality grading, risk management, clearing and settlement, market data dissemination, and transaction cost design to tackle most of the problems that has identified as the major impediments to a fair and efficient market system.

The core objective of a commodity exchange is to create a fair, orderly and efficient system for matching supply and demand in order to enable what is called “price discovery” or the true market price based on the alignment of supply and demand. To achieve this alignment, a commodity exchange can and must regulate market conduct through certain risk management instruments designed to ensure that market conduct follows the principles of a fair, orderly, and efficient marketing system. These instruments involve setting limits on trading positions, adjusting margin and other deposit requirements, and setting price circuit filters to limit price movements, among others (Dessalew zelalem, 2011).

According to Gabre- Madhin (2007) ECX can bring efficiency through use of information technology to automate the End-to-End system from warehousing to trading to clearing and settlement of payments to delivery of commodity, through a centralized trading platform offering low-cost service to all market users of with some factors; member certification and management ; quality standard setting; electronic warehouse receipting and Central Depository; inventory management (and inventory financing facilitation); open-outcry and electronic trading in spot, forwards, futures delivery contracts; clearinghouse; market data dissemination; able to accommodate large and small market actors through small lot sizes and different classes of membership; able to accommodate local specificities in market with internally developed IT system; highly professional grading system; efficient daily trading of hundreds of commodity class-grade combinations ; zero contract, payment, delivery default; clearing of payments within hours to the seller; transmission of market data in seconds around the country and world.

However, there were a challenges on the market efficiency in volatile price; poor quality and poor information uncoordinated markets that will consider as the factors that affect the modern trading platform to be more efficient (Bethlehem Girma, 2009). This implies that the some of the major factors like price discovery, quality grading, risk management, clearing and settlement, market data dissemination and transactional cost most likely affect the market efficiency of ECX. The study, therefore, tries to measure the level of efficiency with different factors exhibit varying degrees of efficiency.

### **1.3 Basic Research Questions**

- ✚ Does price discovery that can affect the market efficiency of ECX?
- ✚ Does quality grading that can affect the market efficiency of ECX?
- ✚ Does risk management can affect the market efficiency of ECX?
- ✚ How does clearing and settlement that can affect the market efficiency of ECX?

✚ Does market data dissemination can affect the market efficiency of ECX?

✚ How does transaction cost can affect the market efficiency of ECX?

## **1.4 Hypotheses**

**H1:** There is a significant relationship between price discovery and market efficiency.

**H2:** There is a significant relationship between quality grading and market efficiency.

**H3:** There is a significant relationship between risk management and market efficiency.

**H4:** There is a significant relationship between clearing and settlement and market efficiency.

**H5:** There is a significant relationship between market data dissemination and market efficiency.

**H6:** There is a significant relationship between transaction cost and market efficiency.

## **1.5 Research Objectives**

### **1.5.1 General Objective**

The main objective of the study is to examine the Factors that affect market efficiency of the Ethiopian Commodity Exchange (ECX).

### **1.5.2 Specific Objective**

Apart from the general objective, the study was displayed on the following specific objectives.

- To evaluate the price discovery that affects the market efficiency of ECX.
- To examine the quality grading that affects the market efficiency of ECX.
- To examine the risk management that affects the market efficiency of ECX.
- To evaluate the clearing and settlement that affects the market efficiency level of the ECX.
- To examine the market data dissemination that affects the market efficiency of the ECX.
- To evaluate the transaction costs affect the market efficiency of ECX.

## **1.6 Significance of the Study**

There is a need to address the issue of market efficiency where buyers and sellers can come together to freely trade and are assured of quality, delivery and payment through efficient manner. This study enrolled the factors that affect market efficiency of Ethiopian commodity exchange (ECX) price discovery, quality grading, risk management, clearing and settlement, market data dissemination and transactional cost.

The efficient marketing system is a birth place of efficient supply chain that can benefit all members along the chain for a product. The country will be benefited from the efficiency and also the country product will be competitive not only price wise but also quality wise. As the policy makers' intention is to create an institution that efficiently performs its duties, this thesis provides inputs to the policy makers in evaluating the institution against the country's need and take corrective action, if any. This study can also be used by the ECX management as an indication of the progress made towards the achievement of the institution's mission as well vision. As it is probably the first attempt to study that aware the level of efficiency through company from its market efficiency perspective to put in the better position; the study can also provoke and motivate further researches.

Therefore, the finding of this study will be useful to help policy makers and Ethiopian commodity exchange to make a sound decision regarding their service deliverance mechanisms for better. Moreover, the study will indicate the road to interested researchers to carry out more extensive studies for further research work in the same and related topics.

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

Even though there are other commodity exchanges in the regional parts of the country, so as to make the study manageable, the scope of the research was delimited in the ECX Head Quarter in Addis Ababa. For the same reason, this study has focused on small but key respondents of ECX members only. At the same time the research was deliberately explore all variable which could affect the market efficiency of ECX. Rather, it was base on the most important variables that are mentioned in the conceptual frame work.

### **1.8 Limitations of the Study**

Though this study has presented a comprehensive theme over the succeeding chapters, it was not free from limitations. Limited number of prior research works regarding commodity exchange in Ethiopia with market efficiency on contemporary issues in the reading shelves. And this study was methodologically limited because researcher did not take all the population which is members of the ECX as well the clients. For the same reason both in sample and area coverage was limited on the first case specific membership only participating and on the second case geographically location also restricted in Addis Ababa. This study was limited to compute the remaining other members such as clients, cooperatives and farmers of ECX market actors. As a result of the study was expected to give value in designing appropriate strategies to reduce market inefficiency of ECX.

## **1.9 Organization of the Paper**

The paper was organized in five chapters. The first chapter is presented the introductory parts that include: back ground of the study, statement of the problem, objective of the study, scope and limitation of the study and significance of the study. Chapter two outlines with related literatures reviews. The third chapter describes the analysis of the data in brief description of the survey area and methodology in data collection and analysis and chapter four explains on the results obtaining are discussing in chapter five finally outlines the major findings, conclusion and recommendation of the study.

# **CHAPTER TWO**

## **REVIEW OF RELATED LITERATURE**

### **2.1 Introduction**

This chapter presents the review of existing literatures in the area of market efficiency in order to familiarize readers with better understanding of the subject matter. It includes definition; factors of market efficiency, efficiency level, as well as the different models are discussed in this chapter. Finally, the chapter presents the conceptual framework of the study together with the hypothesis.

### **2.2 Over View of Market Efficiency and Commodity Exchange**

A **commodity market** is a market that trades in primary economic sector economic rather than manufactured products. Soft commodities are agricultural products such as wheat, coffee, cocoa, fruit and sugar. Hard commodities are mined, such as gold and oil. Investors access about 50 major commodity markets worldwide with purely financial transactions increasingly outnumbering physical trades in which goods are delivered.

**Commodity Exchange** is an exchange where various commodities and derivatives products are traded. Most commodity markets across the world trade in agricultural products and other raw materials (like wheat, barley, sugar, maize, cotton, cocoa, coffee, milk products, pork bellies, oil, metals, etc.) and contracts based on them. These contracts can include spot prices, forwards, futures and options on futures (UNCTAD report, 2009)

Commodity exchanges are highly efficient platforms for buyers and sellers to meet; primarily to manage their price risks better, but also to improve the marketing of their physical products. They have significant, well-documented development benefits, making economies more inclusive, boosting the links between agriculture and finance, and making the commodity sector more efficient and competitive. ECX is a market place to sell or buy commodities. Its operation, however, is well integrated with and substantially dependent on other institutions and sectors. The Exchange promises to replace the unorganized, unreliable, inefficient commodity market with a market that has better efficiency, order, transparency and integrity (Gabre-Madhin, 2009). Beside the poor infrastructural development in the country, the weakly organized agricultural marketing structure is the source of higher transaction cost and unfair distribution of trade benefits (Gabre-Madhin, 2001).

### 2.2.1 The Market 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-Colell et'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 deduced that efficiency has something to do with welfare enhancement.

The most widely used definition of an efficient market was given by Fama (1970) in which he stated that *"The definitional statement that in an efficient market, price "fully reflect" available information is so general that it has no empirically testable implications. To make the model testable, the process of price formation must be specified in more detail. In essence we must define somewhat more exactly what is meant by the term "fully reflect"* Some authors, among others, like Kaminsky & Kumar (1996) and Washburn & Binkley (1990) prefer to call such efficiency as *"informational efficiency"*. In the light of these progresses, it is necessary to identify and analysis all the factors that affect the market efficiency of ECX. Thus, this study tries to answer the question what are the factors affecting the efficiency of commodity market.

An efficient market is one which is capable of moving a product from producers to consumers at lowest cost consistent with the provision of services that consumers demand (Scarborough and Kydd, 1992). It is assumed that an efficient marketing system is a vital means of raising income levels to both farmers and traders engaging in production and trading (Pickney, 1993). If the market is efficient it will increase market surplus, and induce regional and inter-regional trade, which increase the profitability of farming and trading in a short as well as long term period (Amani, 1992).

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 respectively. Unregulated competitive markets, except in the presence of externalities and market failure, always end up with such welfare enhancing efficient outcomes. When consumers' and producers' welfare are aggregated, it gives us economic efficiency (Pindyck & Rubinfeld, 1995). 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) 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*”.

According to Raju and Von Oppen (1982), before formulating any policies, it is necessary to find out the degree to which the existing value chain can be “efficient” and also to identify and quantify the impact of relevant factors that determine efficiency of marketing system, so that improvements can be directed towards factors which are crucial in determining efficiency. Increased efficiency is in the best interests of farmers, traders, processors, wholesalers, retailers, consumers and the society as a whole. The efficiency of a marketing system is measured in terms of the level and/or costs of the inputs to the system, to achieve a given level and/or quality of output. Such inputs are generally in the form of land, finance, time, manpower, and materials. Efficient marketing optimize the ratio between inputs and outputs.

Marketing efficiency is considered to be a pre-requisite for prompt delivery of goods. Prompt delivery of good at a reasonable price is possible only if the market works in a competitive way. Competitive mechanism is possible only when the market agents are free to exercise their actions. Increased efficiency is in the best interests of farmer traders, processors, wholesalers, retailers, consumers and the society as a whole. The efficiency of a marketing system is measured in terms of the level and/or costs of the inputs to the system, to achieve a given level and/or quality of output. Such inputs are generally in the form of land, finance, time, manpower, and materials. Efficient marketing optimize the ratio between inputs and outputs.

Efficiency in marketing is the most used measure of market performance. Improved marketing efficiency is a common goal of farmers, marketing organizations, consumers, and society. It is a common place notion that higher efficiency means better performance whereas declining efficiency denotes poor performance. Most of the changes proposed in marketing are justified on the grounds of improved efficiency (Kohls and Uhl, 1985).

Efficiency is an important index of performance of agricultural marketing. The usefulness of a particular method to estimating marketing efficiency mainly depends up on the purpose for which evaluation is being made. There are numerous ways of estimating the performance of agricultural marketing. The characteristics of performance vary based on the measurability and in the implicit weighting given to each society. However, marketing efficiency is usually measured in two ways, operational efficiency and pricing efficiency (Scarborough and Kydd, 1992).

### **2.2.2 Factors that Affect the Market Efficiency**

There are different factors that affect market efficiency. The Ethiopian Commodity Exchange (ECX) is designed to be a marketplace where buyers and sellers meet to trade, assured price discovery, quality grading, risk management, clearing and settlement, market data dissemination and transaction cost. The ECX is a national multi-commodity exchange with the aim of providing market integrity, by guaranteeing the product grade and quantity. It will manage a system of daily clearing and settling of contracts. It will enhance market efficiency by operating a trading system where buyers and sellers use standardized contracts. Market transparency will be achieved by disseminating market information in real time to all market players. Finally, the ECX will facilitate risk management by offering contracts for future delivery, providing sellers and buyers a way to hedge against price risk.

First, the prices available on commodity exchanges provided information on fundamental market conditions, informing future decisions about production and consumption. Moreover, prices quoted on commodity exchanges supplanted prices set by monopolistic producers, which contributed to an increase in the competitiveness of commodity markets. Second, commodity exchanges lowered transaction costs by reducing intermediaries and facilitating the matching of buyers and suppliers. Third, they provided storage facilities and clearing services, thereby further increasing the liquidity and efficiency of commodity cash markets (Piero Cinquegrana , 2008).

#### **Price Discovery**

One of the objectives of ECX is providing a mechanism for price discovery. The Exchange uses an open-outcry system to ensure competitive method of price discovery. To establish fair commodity market prices for both sellers and buyers through a system of competitive and transparent trading on the floor of the Exchange, that is price discovery. An exchange becomes the market information system as it undertakes its function of price discovery based on the public posting of buy and sell orders. When the volumes of trade on the exchange are sufficiently large to justify that price discovery according to true market fundamentals is occurring, then the dissemination of that information of market prices provides a great service to the market, and the wider economy. This fact alone is a compelling reason to justify an exchange (Gebremedhin & Goggin, 2005).

ECX believes that fairness of commodity trading and adequate protection for its members is essential for a quality market and prerequisite for price discovery. The main activities of ECX

market surveillance operations are to preserve the integrity of price discovery process by monitoring the market to detect and deter the following:

- Market manipulation practices- an act by a market participant or a group to deceive in prices or volume of a commodity.
- Insider trading – commodity trading made by ECX employee or affiliate based on insider information.
- Misstatement – Rumors or false information to mislead the public in making a commodity trading decision.

ECX uses software models for generating real time price, volume, alerts for each clearing member's unusual trade activities. The software has the ability to link transaction prices and trades volumes in each commodity traded in real time, and in the past and if there is unusual changes in trading pattern alert the market surveillance team . Market surveillance team investigates all unusual trading patterns and pass on evidence in a report to the ECX compliance department for further action if there was sufficient evidence that the exchange's rules have been bridged ([www.ecx.com.et](http://www.ecx.com.et)).

### **Quality Grading**

The effectiveness of quality grading is heavily dependent on the effectiveness of the sampling process. Service dissemination is almost inevitable if the sample drawn is not representative, although appropriate quality grading system is in place. Quality grading in general and the quest for re-sampling and re-grading to redress grading grievance have been found the major sources of dissatisfaction in all warehouse sites ([www.ecx.com.et](http://www.ecx.com.et)).

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 (Gideon, 2010).

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.

### **Risk Management**

Risk management tools have emerged to battle against commodity price volatility. Although certain primitive forms of forward markets existed in the pre-Christian and Middle Ages, the modern practice of forward contracting slowly emerged in Japan in the 1700s and in the United States in the mid-1800s (Piero Cinquegrana, 2008). Forwards are defined as contracts between two parties to deliver a certain product at a certain date at an agreed price. By selling crops at the time of planting, producers hedged against the risk that the price of the commodity would drop below a threshold under which production became unprofitable. Forward contracts, however, generated new risks for the parties involved in the forms of transportation risk, delivery risk and credit risk. The first category pertains to the deterioration of goods during transportation, unforeseen changes in shipping costs and extraordinary events such as wars, riots or strikes that may prevent the transportation from happening at all. Delivery risk refers to the concern that the quality and the quantity of the good delivered does not correspond to the agreed contract. Credit risk regards the payment of the good delivered ( Piero Cinquegrana, 2008).

Despite the reduction in risk involved in its operation due to the use of spot exchange than a futures exchange, ECX goes beyond risk avoidance to identifying and managing an acceptable level of risk. The exchange, within its domain, manages different types of risks like: operational risk, credit risks, liquidity risks, and reputation and image risks. In order to maintain integrity of the price discovery process and to safeguard the quality of the market, the exchange has a market surveillance team that detects and prevents market manipulation practices, insider trading and misstatements (false information to mislead the public).

### **Risks Faced by an Exchange**

As the business world is dynamic and is uncertain, there are risks that are to be managed by the business participants. As one part of the business exchanges too face different type of risks in their operation these includes: operational risks and market risks. 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, and so senior management periodically defines its risk appetite against key drivers of success.

### **Operational Risks**

In ECX operational risk is the category with the widest diversity in terms of sophistication of practices and risk management effort. These are risk associated with ECX activities, processes and systems, and include deal entry errors, breakdown in trading processes, documentation failures, physical production and delivery of commodities. ECX has a specific approach for operational risk which includes assessing the likelihood and impact of the risk and mitigating.

Operational Risk is risk of loss resulting from inadequate or failed internal processes, systems or people. (ECX, 2001) An operational risk is a risk arising from execution of a company's business functions. As such, it is a very broad concept including e.g. fraud risks, legal risks, physical or environmental risks, etc. The term operational risk is most commonly found in risk management programs of financial institutions that must organize their risk management program according to Basel II. In Basel II, risk management is divided into credit, market and operational risk management. In many cases, credit and market risks are handled through a company's financial department, whereas operational risk management is perhaps coordinated centrally but most commonly implemented in different operational units (e.g. the IT department takes care of information risks, the HR department takes care of personnel risks, etc) More specifically, Basel II defines operational risk as the risk of loss resulting from inadequate or failed internal

processes, people and systems, or from external events. Although the risks apply to any organization in business, this particular way of framing risk management is of particular relevance to the banking regime where regulators are responsible for establishing safeguards to protect against systemic failure of the banking system and the economy([www.ecx.com.et](http://www.ecx.com.et)).

### **Credit Risk**

Credit risk arises when a clearing member fails to meet their payment obligation until a date in the future. ECX has policies requiring members to be approved before they trade; ensuring that they have pre-paid into their trading accounts. Credit risk due to shortfall in members account is mitigated by netting agreements and cash deposits in the form of settlement guarantee fund ([www.ecx.com.et](http://www.ecx.com.et)).

### **Market Risk**

Market Risks are Risks to the integrity of the market due to foul play or negligence by participants or poor market design. ECX Market Risks encompasses Trading Practice Violations, Market Manipulation, Fraud, Contract Design, and Member Settlement Default. The basic market risk identification method in use is Market Surveillance. The specific things done during market surveillance are floor surveillance, trade activity report analysis, video surveillance, price movement monitoring, member audits and market analysis. (ECX, 2001) ECX ensures that clearing members have daily allowable trade limits, and they can only trade within this limit. ECX has software in place to ensure that all clearing member's transactions are assessed against their relevant limit, and reporting processes for limit breaches. ECX operates at a daily price limit to limit losses to investors from significant market movements ([www.ecx.com.et](http://www.ecx.com.et)).

### **Liquidity Risk**

ECX has strategy to measure and monitor the liquidity of settlement guarantee fund and to ensure that there are sufficient funds to meet clearing member's transaction exposures. This is done by preparing scenario analysis over an appropriate timeframe of likely inflows and outflows of funds ([www.ecx.com.et](http://www.ecx.com.et)).

### **Reputation and Image Risk**

ECX has a policy of openness, transparency and fairness to all stakeholders to ensure that its reputation or standing in the community is not diminished. ECX has strong communication and

media team seeing to that. The selection of an appropriate risk management strategy to address each domain of risk is based on sound understanding of the underlying risk after a comprehensive assessment of the risk and a good sense of ECX appetite for risk. ECX risk appetite is periodically reviewed, defined and ratified by senior management.

### **Risk Mitigation**

Risk Mitigation at ECX is through Membership Standards, position limits, daily price limits, rules, Audits System Validations, role Based Application Security, insurance, system/Process Redundancies, training (ECX, 2001).

### **Clearing and Settlement**

ECX's zero default, fast and efficient Clearing and Settlement department assumes Central Counter Party (CCP) risk for all members trades. It establishes the net obligations of each member, informs the members of their daily net obligations and transfers cash funds and commodity ownership among members.

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).

### **Market Data Dissemination**

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. An exchange becomes the market information system as it undertakes its function of price discovery based on the public posting of buy and sells orders. When the volumes of trade on the exchange are sufficiently large to justify that price discovery according to true market fundamentals is occurring, then the dissemination of that information of market prices provides a great service to the market, and the wider economy. This fact alone is a compelling reason to justify an exchange (Gebremedhin and Goggin , 2005).

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 ([www.ecx.com.et](http://www.ecx.com.et)).

As the market evolves, uses the might of modern information and communication technologies to create access to market information to all its actors including the general public. The Exchange uses rural based Market Information Tickers, mobile phone Short Messaging Service (SMS), Interactive Voice Response (IVR) service, Mass media (TV, Radio, and Newspaper) and Website to disseminate market information. Market information on commodity prices in different markets and commodity offer to sell and bids to buy, and others are collected, processed, updated and disseminated to market actors. Price information on Electronic Tickers is updated in less than 4 seconds and market information through mass media is disseminated on daily basis ([www.ecx.com.et](http://www.ecx.com.et)).

## **Transactional Cost**

Transaction costs are considerably reduced in commodity exchanges by “facilitating contact between buyers and sellers; enabling centralized grading of products; ensuring that contracts are enforceable; providing a mechanism for price discovery; simplifying transactions with standard contracts; and, transmitting information volumes. Further an Exchange increases market liquidity, enables the transfer of price risks, and enhances trust, order, and integrity in the market” (Gabre Madhin, 2006).

A commodity exchange reduces transaction costs by offering services at lower cost than that which participants in the commodity sectors would incur if they were acting outside an institutional framework. These can include – but are not limited to – the costs associated with finding a suitable buyer or seller, negotiating the terms and conditions of a contract, securing finance to fund the transaction, managing credit, cash and product transfers, and arbitrating disputes between contractual counterparties. Therefore, by reducing the costs incurred by the parties to a potential transaction, a commodity exchange can stimulate trade.

Moreover, properly functioning commodity exchanges can promote more efficient production, storage, marketing and agro-processing operations, and improved overall agriculture sector performance. It is precisely because of these benefits that transition and developing economies with large agricultural sectors have embraced commodity exchanges in recent years.

Transaction costs are also an important issue, when considering the role of commodity exchanges in the policy debate. UNCTAD argues that the “utility of a commodity exchange lies in its institutional capacity to remove or reduce the high transaction costs faced by entities along commodity supply chains in developing countries” (UNCTAD, 2007: 4). It is shown that a significant number of incremental, nonproduction costs would be incurred by the parties to a commodity-linked transaction.

Taken together, these costs would arguably amount to a considerable expense, consuming substantial funds, time and goodwill. Moreover, transaction costs tend to be significantly higher in developing economies than in developed ones a consequence of imperfect market formation and weak or absent infrastructure and sector support institutions. It will be argued in this study that commodity exchanges can facilitate trade by significantly reducing many of the transaction costs outlined above (UNCTAD, 2009).

### **2.2.3 Measurement of Marketing Efficiency**

Generally marketing efficiency is measured in three ways: a) Operational efficiency b) Pricing efficiency and c) Technical efficiency.

#### **I) Operational efficiency**

Operational efficiency is measured in terms of marketing costs and marketing margins. An improved operational efficiency is evident where marketing costs are reduced but outputs are either maintained or actually increased. Technological innovations are not the only avenue leading to higher levels of operational efficiency. An organization that improves its raw material procurement practices, by say centralizing purchases, buying in larger quantities or taking advantage of unit freight rates, is likely to increase operating efficiency (FAO, 1999). Therefore, the higher the losses incurred during the operation the lower the level of operational efficiency.

#### **II) Pricing efficiency**

This is measured in terms of correlation of price movements of the same product between pairs of markets to test market integration. Such correlation gives an indication of the degree of integration between markets. Pricing efficiency is concerned with the ability of the marketing system to allocate resources and coordinate the entire agricultural/food production and marketing process in accordance with consumer directives.

Pricing efficiency is evidenced in terms of efficient resource allocation and maximum economic customers' willingness to pay in the marketplace for the produce, commodity or product in question. It is generally accepted that the higher the correlation of prices between pairs of markets for a particular product, the better integrated the markets are for that crop and hence the higher the efficiency they are operating in terms of price. Competition plays an important role in determining pricing efficiency, and at the same time adding more utility to the products in order to get more market share (FAO, 1999).

#### **III) Technical efficiency**

Technical efficiency refers to the way with which resources are used in marketing, in terms of physical input and output ratios. It should however be noted that these measures do not provide an absolute measure of an overall market efficiency. In a production unit technical efficiency

refers to the achievement of the maximum potential output from given amounts of factor inputs, taking into account physical production relationships (Zabaleta *et al.*, 2003).

So, are our markets really efficient and how do we measure the level of efficiency? One way to do so is to determine the time it takes for a trading activity to affect the price of the security, i.e., the time the information is made available and then time when the security's price actually reflects it. In foreign exchange market, which is considered very efficient, this time lag may be less than a minute. If the time lag is high, then a trader who has this information will have sufficient time to use this information to make a profit. Another important point is that if markets are efficient, the security's price should not be affected by any information that was well anticipated by the investors. Only information that was not fully anticipated by the investors will have an impact on the price (<https://financetrain.com/market-efficiency-and-its-three-forms/>).

In a highly efficient market, the investors can expect the security's market value to reflect its intrinsic value. In inefficient markets the securities can be overvalued or undervalued, that is their fundamental values can be above or below the prices at which they are trading. The traders can buy undervalued stocks and sell overvalued stocks to make a profit.

In reality the markets are not efficient. We can also not say that they are totally inefficient. Depending on a combination of factors markets exhibit varying degrees of efficiency. One such factor is the number of market participants. The more the number of participants such as investors, traders, and other participants, the more efficient is the market. This is simply because the more the number of participants actively involved in the market, the faster any price anomalies will be identified and the faster they will disappear.

The second factor affecting market efficiency is the availability of information. A higher availability of information will lead to higher market efficiency. For example, the information is more easily available in larger exchanges, that makes them more efficient compared to smaller exchanges where the information may not be disseminated that easily. The type of transactions also affects the market efficiency. For example, in over-the-counter markets, the information will not be available easily which makes them inefficient. The information should also be equally available to everyone. That's why companies are required to disclose the same information to everyone (<https://financetrain.com/market-efficiency-and-its-three-forms/>).

## **2.2.4 Challenges of Market Efficiency**

The challenges that exchanges face include: strong reluctance to support transparent market, lack of understanding of the exchange concept, moves to undermine the exchange and its operations, lack of support from donor agencies and government, immature and underdeveloped marketing environment.

The most attention seeking problem that most developing countries commodity exchanges are facing is lack of liquidity. This problem relates to the inefficiencies in different operational areas of the exchanges including trading and contracts, settlements, spot price discovery, risk management and nature and structure of the exchange itself. Besides, there are certain set of challenges where commodity exchanges require regulatory amendments to make this market vibrant and some other set of challenges, where commodity exchanges have to take up the initiatives. These kinds of challenges include: warehouse receipt issues like in fungible nature of warehouse receipts, not serving as collateral and means of financing, not used for settlements, quality of the warehouse and of course the credibility of the goods valuation. (Bethlehem Girma, 2009)

### **Trading practice**

ECX is currently using an open outcry system. Despite regulations that prohibit prearranged deals in the trading pit, members (traders) could fix prices outside of the trading floor with the buyers (mainly exporters) and beat the system. Thus, transparency and market integrity cannot be guaranteed. If the bidding were done anonymously, there would be less opportunity for corruption. The online trading platform that ECX is developing could close such loopholes.

### **Traceability**

By law, the ECX has become the key institution for coffee trading. Yet one of the main challenges the exchange is facing is guaranteeing traceability for specialty, fair trade, and organic coffees a smaller but vital part of the coffee market. To solve this problem, ECX is working with various agencies such as USAID, Starbucks, and Geo Certify to create a barcode system that allows beans to be traced to the farm level (or at least to the washing station level).

### **Delays**

The warehouse management system is not running as smoothly as it should in part because of poor infrastructure, such as limited internet connectivity and inadequate road access. Exporters

confront delays sometimes days in duration and exhausting streams of paperwork. One way ECX is working to address the connectivity problem is through the use of V-SAT technology.

### **Shortfall and Spillage**

Another challenge is weight decreases owing to moisture loss and to spillage that occurs during the loading and unloading of commodities. ECX needs to improve its dispute system to ensure transparency. In addition, an increased effort is needed to educate users of the system to help mitigate disputes.

### **Market Information system**

Despite the spread of ECX market information, many small-scale farmers still do not have the power to use that knowledge to their advantage. They may know what the prices are on the exchange, but often the local traders through whom they deal continue to offer lower prices (ECX-brochure-Oxfam-Rockefeller-2013).

Since recently, the Ethiopian government tried to address one of these challenges by creating a national agricultural commodity exchange system. In line with the trend in many other African countries, Ethiopia has recently set up a national commodity exchange known as Ethiopian Commodity Exchange (ECX). A commodities exchange is a system where various commodities and derivatives, and contracts based on them are traded. The contracts include spot prices, forwards, futures and options on futures. Commodities exchange play vital role in marketing agricultural outputs and improving the return for the primary producers (ECX-brochure-Oxfam-Rockefeller-2013).

## **2.3 Theoretical Review**

We introduce a mathematical theory called market connectivity that gives concrete ways to both measure the efficiency of markets and find inefficiencies in large markets. The theory leads to new methods for testing the famous efficient markets hypothesis that do not suffer from the joint-hypothesis problem that has plagued past work. Our theory suggests metrics that can be used to compare the efficiency of one market with another, to find inefficiencies that may be profitable to exploit, and to evaluate the impact of policy and regulations on market efficiency. A market's efficiency is tied to its ability to communicate information relevant to market participants. Market connectivity calculates the speed and reliability with which this communication is carried out via trade in the market. We model the market by a network called the trade network, which can be computed by recording transactions in the market over a fixed interval of time. The nodes of the network correspond to participants in the market. Every pair of

nodes that trades in the market is connected by an edge that is weighted by the rate of trade, and associated with a vector that represents the type of item that is bought or sold. We evaluate the ability of the market to communicate by considering how it deals with shocks. A shock is a change in the beliefs of market participants about the value of the products that they trade (anuprao@cs.washington.edu).

We introduce a new mathematical theory of efficiency that we call market connectivity. Market efficiency is closely tied to a market's ability to communicate economic information via trade. So, market connectivity measures the speed and reliability with which the market is able to carry out this communication. Market participants do learn information from sources external to the market, but the theory focuses on the ability of the market itself to communicate information by trade; the advantage is that this can be measured with data. In our theory, a market that is able to disseminate information quickly and reliably is deemed efficient, and conversely, a market that cannot disseminate information quickly and reliably is deemed inefficient. Our concepts maintain the spirit of Definition 1, but avoid the joint-hypothesis problem, because we measure the ability of the market to communicate, rather than the accuracy of prices (anuprao@cs.washington.edu).

A different line of past work has tested a consequence of the efficient markets hypothesis: no trader should expect to make unusually large returns from trading in the financial market. Again, this is a vast area that we cannot hope to summarize here, so we refer the reader to the survey [Mal03]. This work is also extremely useful in practice, but the fact that traders cannot expect positive returns is not conclusive evidence of market efficiency. Traders may have difficulty generating positive returns even in an inefficient market due to high transaction costs, the difficulty of finding inefficiencies that they are capable of exploiting before they disappear, the lack of capital to compete with an entrenched system, or compliance with regulations (anuprao@cs.washington.edu).

One of the major goals of our work is to develop tools that can be used to detect structural problems like bottlenecks before a crisis occurs. Economists and regulators could use the theory to identify bottlenecks in the trade network and investigate methods to tackle them before they lead to a crisis. Market connectivity can also be used to assess financial solutions that mitigate the effects of bottlenecks. For instance, consider the role of futures in the commodities market. Futures contracts guarantee delivery of a commodity at a date in the future. Perhaps surprisingly, it is often the case that only a small proportion of contracts that are traded are settled by actual

delivery. Our model suggests an explanation for this counterintuitive fact: futures contracts serve as a mechanism to break bottlenecks in the trade network, and they are most effective when the trade in the futures exceeds trade in the actual item (anuprao@cs.washington.edu).

Discussion and Future Work the principal contribution of this work is the definition of the trade network and the concepts of tension, energy and bottlenecks, which allow for a theory of market efficiency that does not suffer from the joint-hypothesis problem. The trade network provides a bridge from observable data to concepts like market efficiency, without making any assumptions about the evolution or correctness of prices. The trade network encodes data about the information that is visible to market participants and the information participants are able to act on. Market efficiency relies on who knows what, rather than what everyone knows, and the concept of the trade network provides metrics about who knows what. We believe that the mathematics in our theory is useful to measure efficiency because the single item case is similar to equations used to model analogous concepts in physics. Experiments have confirmed that these equations accurately describe electrical networks, networks of springs, and the diffusion of heat. That said, one can only know if the choices we have made in the formulas for 27 tension, energy and bottlenecks are well-founded by experimenting with real data. Experiments can help to validate the model, or find issues that suggest refinements to the model (anuprao@cs.washington.edu).

Gathering data to approximate the trade network would be extremely useful. It would be very useful to find sampling based techniques to estimate the energy/tension of the network, and use them to compute the statistics we have defined in this work. Can we sample small amounts of data about the trade network and use it to compute the tension and energy, and find bottlenecks? There are several ways to extend our model that we believe could be fruitful: One could study the evolution of the trade network over time. An efficient market should have a rapidly evolving trade network, with traders switching trading partners to take advantage of new information and better prices. If nodes do not switch trading partners in response to shocks, that is inefficiency. One could look for a model that rigorously captures this kind of market efficiency using data. • One could study the relationship between the rates of trade and prices. If nodes do not often trade with partners offering them the best price, the market is likely to be inefficient. Again, it remains open to rigorously define this kind of efficiency (anuprao@cs.washington.edu).

## 2.4 Empirical Review

This section aims at reviewing and presenting research done by others. It intends to show evidence of what other researchers have done on factors influencing development. Some researchers have recognized the broader role of Commodity exchanges. Most notably,

Lester Telser & Harlow Higginbotham (1977), argue persuasively that Commodity exchange facilitates trade by standardizing transactions in two important dimensions. First, they devise rules to improve contractual performance. Second, they adopt standardized grading systems for commodities. These systems eliminate the need for repeated measurement at each trade and transform commodity claims into homogeneous, fungible securities. Similarly, the important article of Mulherin et al. (1991), notes that the property rights aspects of financial exchanges have been the most misunderstood, both historically and at present. They emphasize the role of financial exchanges (including commodity exchanges) in establishing property rights over price quotes.

According to Adebuisi's (2004), finding reveals that communications and transportation infrastructure is critical to a functioning commodity 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 (as cited in G/kiros, 2011).

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 Zabolina (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. 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 (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 nonperformance 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”.

## **2.5 Market Efficiency Models**

### **The Efficient Market Hypothesis (EMH)**

Fama’s definition of an efficient market to represent what is known in literatures as the “Efficient Market Hypothesis”. Eugene Fama himself admitted that his definitional statement needs to specify in more detail the process of price formation in order to make the too general definitional statements a testable model. Beaver (1981) belittled the difficulty to make the definitional statement a testable model as “*a pervasive phenomenon not unique to the efficient market literature*”. Beaver argued that the fact that empirical investigations preceded the development of theories of market efficiency “*make the widely cited definitions of market efficiency conceptually incomplete and deficient in a fundamental sense*”.

The efficient market framework is also criticized for inconsistency with some forecasting techniques usually used in economics and the validity of the hypothesis, thus, can only stand on the cost of the effectiveness of these techniques (Laffer & Ranson, 1978). In addition to this, after recognizing Fama’s work to be influential Malkiel (2003) documented a challenge to the hypothesis from economist who stress behavioral and psychological elements especially in the capital market. Answering all these critics induces the need to discuss the concept of market efficiency from its grass root.

### **The Expected Return or “Fair Game” Models**

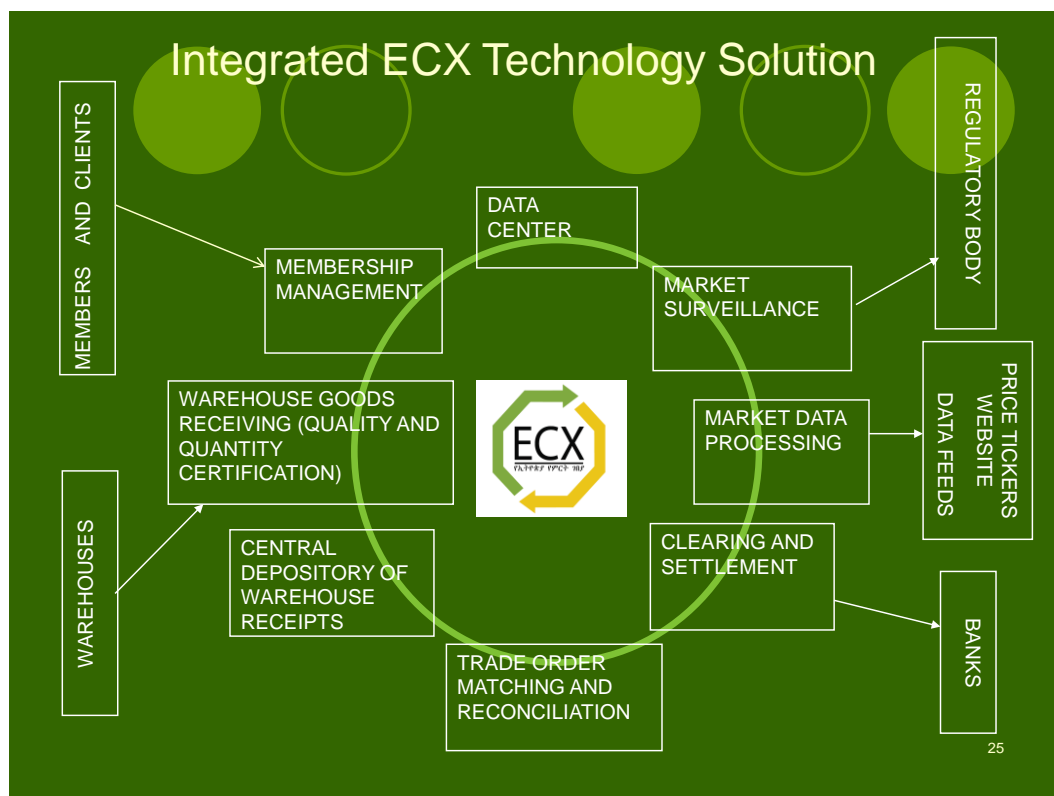
As discussed earlier, the definitional statement lacks empirical testability due to the too general wordings used to portray an efficient market. In an attempt to make a testable model and explain what is meant to “fully reflect” available information on market prices, there is a need to specify the price formation process. The first attempt to use the expected return or “Fair Game” models in market efficiency theory was rigorously studied by Mandelbrot (1966) and Samuelson (1965) both cited in Fama, 1970). Such theories would posit that conditional on some relevant information set, the equilibrium expected return is a function of its “risk”. And different theories would then differ primarily on how “risk” is defined. The model summarized by as the “fair game” model, are implications of the assumptions that:

I. The conditions of market equilibrium can be stated in terms of expected returns, and

II. The information is fully utilized by the market in forming equilibrium expected returns and thus current prices

These two assumptions have a major empirical implication i.e. they rule out the possibility of trading system that have expected returns in excess of equilibrium expected returns.

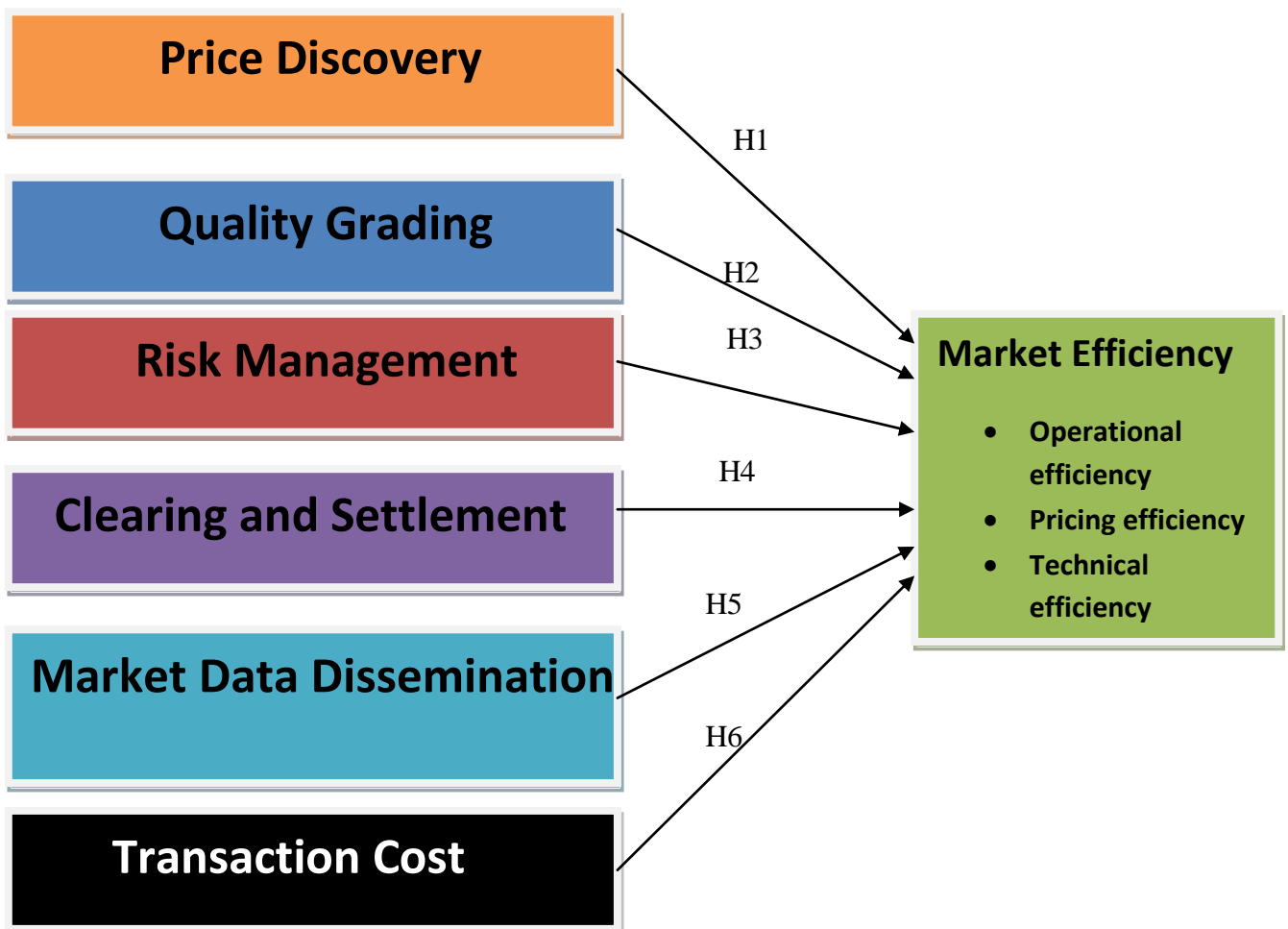
## 2.6 The ECX Model



Source: Ethiopian Commodity Exchange

## 2.7 Conceptual Framework

On the basis of the researcher concept, a research model was formulated as follows. So, the conceptual framework is shown in Fig. 2.7. Several components were considered in the analysis of ECX market efficiency. The ECX market efficiency was examined in terms of independent variables such as prices discovery, quality grading, risk management, clearing and settlement, market data dissemination and transaction cost. The relationship among these factors was based on the fact that structural characteristics tend to influence behavioral characteristics of the market actors. This implies which in turn increase their market power and eventually affect the performance as well as efficiency of a competitive market.



Source: - Researcher own concept

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

The research methodology is used to achieve the objectives of this study was discussing in this chapter. The population and sample of the study, the type of data collection and the instruments used, methods of data analysis, and finally, ethical issues related to the study were explained and justified.

#### **3.2 Description of the Study Area**

The Ethiopian Commodity Exchange (ECX) is a public-private partnership initiative firm; establishment was founded on Proclamation No. 550/2007 as one of the basic ingredients to transform the country's agriculture to market oriented production system. This proclamation mandates ECX to develop its own rules for the governance of its various operations. Further, the Ethiopia Commodity Exchange Authority (ECEA) a regulatory body of the ECX was established by Proclamation 551/2007, launched in Addis Ababa, Ethiopia, on April 24, 2007. As per its establishing proclamation, the Exchange is created to accomplish different purposes: to create an efficient, transparent, and orderly marketing system that serves the needs of sellers, buyers and intermediaries, and that promotes increased market participation of Ethiopian small scale producers; to give a centralized trading mechanism in which offers to sell and bids to buy are coordinated through a physical trading floor with open outcry bidding or an electronic order matching system or both and some others. Since its establishment, ECX has set up a trading floor at the Mexico sub-city how Grounds in Addis Ababa, where trading of commodities is conducted. The floor is open for trading limited types of agricultural commodities: crops such as coffee, oilseeds and grains.

ECX has an impact on the economy of agricultural products as a result of the factors of market efficiency. The awareness of these determinant factors may help the company to identify the level market efficiency and it makes have a better competition with the rest of the world. Market efficiency consists of maximizing the level of production that can be obtained from a given combination of factors. The concept of market efficiency indicates the degree of success in the utilization of productive resources. Therefore, inefficiency is simply the difference between the observed values of production and the maximum values attainable given the technology used.

### **3.3 Research Design**

A research design provides basic framework for the collection and analysis of data to generate reliable findings. As stated by Claire et al. (2002) a research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure.

This research has employed mixed method, where both qualitative and quantitative data gathering method is used. Mixed methods research is an approach to inquiry that combines or associates both qualitative and quantitative forms. It involves philosophical assumptions, the use of qualitative and quantitative approaches, and the mixing of both approaches in a study. Thus, it is more than simply collecting and analyzing both kinds of data; it also involves the use of both approaches in tandem so that the overall strength of a study is greater than either qualitative or quantitative research (Creswell & Plano Clark. 2007).

As the research topic deals with factors that affecting the market efficiency of ECX, special emphasis is given to determine those factors of market efficiency. In order to achieve this purpose, the researcher has tried to indicate what the factors that determine the market efficiency in the experience of the existing practice in ECX.

Therefore, a descriptive research design was used to describe the factors that affecting the market efficiency of ECX. In the effort of identifying those factors; semi structured personal interview was employed with intention of getting information from the key informants from ECX department heads. Moreover, department heads were interviewed with the guidelines focused on the major factors of market efficiency and challenges. At the same time structured questionnaires were distributed to randomly selected ECX members. So, the research topic, which collected data through mixed design, was employed qualitative as well as quantitative measures so as to compromise the market efficiency factors from both sides.

### **3.4 Population and Sample**

The total population of the study consists of 343 ECX members, which are categorized as full members and limited members of the Ethiopian commodity exchange for each type of member, there are two classes of membership Trading Member (TM) trades only his or her own account and Intermediary Member (IM) trades either on his or her own account or on behalf of Clients, engaged in selling, processor, and wholesaler and exporting of commodities in Addis Ababa with in ECX. Therefore, from the total population of the study the researcher draws sample frames

only those who are members in the head office (<http://www.ecx.com.et/Membership.aspx#INTRO>).

A two-stage sampling procedure was used in this study. The first stage involved a purposive selection of five department heads out of nine departments. This is as a result of significance of the factors in the market efficiency. The second stage involved the use of Simple random sampling to select 85 suppliers, 58 exporters, 12 processors and 30 other categories. This made up a total of 185 respondents in all.

The above mentioned sample size is determined by using the following statistical formula developed by Yemane Taro, 1967 as cited by Glenn D. Israel, 2009:

$$n = \frac{N}{1+Ne^2} = \frac{343}{1+343*(0.05)^2} = \underline{\underline{184.66 \approx 185}}$$

Where n= Sample Size

N= population

e = Sampling error/ level of precision e= 5%

Ethiopian Commodity Exchange site map disclaimer

Accordingly, 185 samples were taken from the population. The samples taken were representative of target population in which the study was undertaken.

### **3.5 Data Sources and Type**

To generate valuable and relevant data, the researcher was depending on both primary and secondary sources of data. The primary source of data was collected through a questionnaire for ECX members: clients, suppliers, processor, wholesalers and exporters who are engaged in the production or trading of coffee, oilseeds and grains. An interview was conducted to ECX department heads to identify and explore critical determinants of the market efficiency. In addition to this, for background discussion and theoretical explanation, the researcher has depended on secondary source of data. The secondary data source was extensive document review and analysis.

### **3.6 Data Collection Procedures**

The researcher was able to select appropriate research instruments for data collection by using personal interview with semi- structured guidance and questionnaire with Likert scale, which was developed by researcher own. The interview schedule was designed to conduct semi-structured interview with the heads of departments within ECX. The questionnaire was used because it had the advantage of participating large respondents over other data gathering techniques; it has limited inconsistency and also saves time.

### **3.7 Methods of Data Analysis**

The data that were collected from data sources organized and statistical computations were made to describe the inherent relationships between the variables. In meeting the objectives stated in the above section, the raw data gathered from primary sources were first checked for completeness, reliability and consistency which were done through analysis of internal reliability and internal consistency then processed (edited, classified, coded, tabulated) and finally analyzed using statistical techniques and simple quantitative analysis techniques such as percentage and frequency were employed. Pearson correlation and linear regression to analyze the relationships among dependent and independent variables were used to explain and to determine the significant differences between and among respondent's views on factors of market efficiency with respect to market efficiency. All the above mentioned quantitative techniques were computed using the Statistical Package for Social Science (SPSS statistics) version 20.

Accordingly, descriptive statistics were used to describe and interpret the results of the study. Correlation analysis was used to measure the degree of association between the organizational determinant factors price discovery, quality grading, risk management, clearing and settlement, market data dissemination and transactional cost are significantly associated with marketing efficiency. From inferential statistics, multiple regression analysis was used to test the hypothesis of the study.

### **3.8 Reliability and Validity**

Quality and significance of the research was judged by logical tests including constructing validity and reliability. Validity and reliability are two fundamental elements in the evaluation of a measurement instrument. Validity is concerned with the extent to which an instrument

measures what it is intended to measure. Reliability is concerned with the ability of an instrument to measure consistently. It should be noted that the reliability of an instrument is closely associated with its validity. It is possible to objectively measure the reliability of an instrument and in this paper was explain the meaning of Cronbach's alpha; the most widely used objective measure of reliability. Alpha was developed by Lee Cronbach in 1951 to provide a measure of the internal consistency of a test or scale; it is expressed as a number between 0 and 1. The constructs, dimensions and variables that will take into consideration in this study will based on instruments with adequate level of reliability and validity in market efficiency. In order to ensure face validity and content validity, the data collection instruments will be evaluated by the alpha coefficient  $\geq 0.9$  is believed to be excellent;  $\geq 0.8$  being good;  $\geq 0.7$  as acceptable;  $\geq 0.6$  as questionable;  $\geq 0.5$  being poor; and below that unacceptable.

### **3.9 Ethical Consideration**

In the context of research, ethics is defined as the appropriateness of the researcher's behavior in relation to the rights of the participants or subjects of the research work (Saunders, Lewis, and Thornhill, 2009). This study was governed by the general rules of research ethics in such a way that respondents were requested to provide information on voluntary basis, there was prior communication about the purpose of the study, and confidentiality of the information was guaranteed. Moreover, the researcher was abided by the rules and regulations of the University and has conducted the study on the basis of objective judgment.

The following procedure was pursued to administer questionnaire to respondents. First, the researcher was approached potential respondents to ask their cooperation in filling the questionnaire and explained the purpose of collecting data, how the questionnaire was filled and the confidentiality of to be obtained information. Then, the questionnaire was distributed and respondents are asked to furnish information honestly and return the filled up questionnaire.

The interview schedule was designed to conduct semi - structured interview with five heads of departments within ECX. Before starting interviewing, the researcher introduces himself and explains the purpose of the study to the interviewees. During interview session, the researcher jot downs all important points on notepad and organizes them for analysis purpose.

## **CHAPTER FOUR**

### **DATA PRESENTATION, ANALYSIS AND INTERPRETATION**

#### **4.1 Introduction**

In this chapter, the data collected through survey are analyzed using statistical tool of SPSS Version 20. First, the survey response rate and the reliability of the scales used are discussed followed by discussion on the respondent's profile, and market efficiency factors that determine by price discovery, quality grading, risk management, clearing and settlement market data dissemination, and transactional cost analyzed by descriptive statistical tools. Finally, the results of the principal component analysis and regression analysis are presented.

The main purpose of the study was to describe the factors affecting the Market Efficiency of ECX. In order to meet the objective and to address research questions of the study, the researcher has obtained necessary primary data. This chapter, data analysis and discussion, presents the results of different methods employed in the study for the sake of analyzing data. This chapter contains three sections. In the first section, the descriptive statistics analysis of the dependent and independent variables with discussion of its output were undertaken by the researchers under the study. Under the second section, correlation analysis and its discussion of correlation coefficient were carried out.

#### **4.2 Quantitative and Qualitative Data Analysis**

##### **4.2.1 Survey Response Rate and Reliability Test**

This section records data gathered and provides specific information about Factors Affecting the Market Efficiency of ECX. The 185 questionnaires were administered in the month of March 2018 and targeted sample respondents of members of ECX. However, a total of 143 questionnaires were collected, of which 10 were found to be incomplete, 42 questionnaires were not returned. Thus, 133 questionnaires were found to be usable and ready for analysis, which is 71.89 % response rate.

The researcher is used mixed type of data analysis that is quantitative and qualitative. The researcher gathering qualitative data through semi structure interview of four department heads one is absence, to assess the factors of market efficiency on the time interval of half an hour for each. The department's heads were given nominal coded name as A, B, C, and D respectively in order to secure privacy. The researcher was intended to conduct interviewees with department head on issues of the selected market efficiency practices of the organization. Accordingly,

thirteen semi-structured interview questions were forwarded and response are summarized and illustrated briefly. At the same time the qualitative analysis done by its own processes that is data was cleaned it was entered in to SPSS version 20 manually. Univariate and multivariate analysis of variables was done. To see association of variables P value was set at 5%, and confidence interval was set at 95%. The study focused on descriptive aspect of responses. After coding and entry of data into SPSS version 20, the first analysis conducted was to check the reliabilities of the scales used in the data collection instrument.

According to Malhotra & Birks (2007), reliability is the extent to which a measurement reproduces consistent results if the process of measurement were to be repeated. Cronbach-alpha, a widely used measure of internal consistency, was run using SPSS 20 version and all of the scales used for this study are found to be reliable as their respective alpha values are higher than 0.5, and for most closer to 1. The Cronbach - Alpha of each scale is presented in the following table.

**Table 4.1 Reliability of Scale**

S.N	Scale	Cronbach's Alpha	No. of Items
1	Price Discovery	0.778	6
2	Quality Grading	0.862	7
3	Risk Management	0.854	6
4	Clearing and Settlement	0.823	7
5	Market Data Dissemination	0.755	7
6	Transaction Cost	0.828	5
7	Market Efficiency	0.913	8

*Source: own survey, 2018*

### **4.3 Demographic characteristics and others of Respondents**

The descriptive statistics was employed to investigate and present an overview of both dependent (market efficiency) and independent variables (price discovery, quality grading, risk management, clearing and settlement, market data dissemination, and transaction cost) used in the study. Table's shows below the descriptive statistics output of the variables.

**Table 4.2 Ages and Gender Category**

<b>Gender</b>	<b>Column1</b>	<b>Column2</b>	<b>Column3</b>
<b>Items</b>	<b>Frequency</b>	<b>Percent</b>	<b>Cumulative Percent</b>
Male	97	73.2	73.2
Female	36	26.8	100
<b>Total</b>	<b>133</b>	<b>100</b>	
<b>Age</b>			
<b>Items</b>	<b>Frequency</b>	<b>Percent</b>	<b>Cumulative Percent</b>
< 25	25	18.9	18.9
25-35	61	46.2	65.2
36-40	39	29.5	94.7
>50	8	5.3	100
<b>Total</b>	<b>133</b>	<b>100</b>	

*Source: own survey, 2018*

A total of 133 ECX members were participated in this study. Of this, 73.2% were male and 26.8% were female. This data shows that the male participants are higher than the female in this study. ECX could give for all customers equal attention female customers included in special package of awareness creation and motivation to participating in the trade. Categorization based on age showed age below 25 years 18.9%, 25 to 35 accounted for 46.2%, 36 to 50 years old responded accounted for 29.5% and respondents of aged more than 50 years were 5.3%. This shows that ECX market is more dominated by younger people than other categories and also they are the back bone of the business sectors and has a very good awareness about the factors of market efficiency.

**Table 4.3 Education Category**

<b>Education</b>			
<b>Items</b>	<b>Frequency</b>	<b>Percent</b>	<b>Cumulative Percent</b>
Below grade 12	1	0.8	0.8
12 grades complete	4	3	3.8
Certificate	5	3.8	7.6
College diploma	32	24.2	31.8
First degree	72	54.5	86.3
Second degree and above	19	13.7	100
<b>Total</b>	<b>133</b>	<b>100</b>	

*Source: own survey, 2018*

On description of educational status of respondents, only one respondent had educational status below grade 12, 3% have completed grade 12, 3.8% have certificate, 24.2% have college diploma, 54.5% achieved educational status of 1<sup>st</sup> degree level, 11.4% achieved an additional 2<sup>nd</sup> degree, and the remaining 2.3% have additional other educational achievements. The study claims that those who are working with the ECX are more educated and advanced to make higher the organization proficiency with the interaction of the trading system in providing a better business ideas and other.

**Table 4.4 Membership Duration**

<b>Membership duration</b>			
<b>Items</b>	<b>Frequency</b>	<b>Percent</b>	<b>Cumulative Percent</b>
>1 year	19	14.3	14.3
1 year - 2 years	26	19.5	33.8
2 years - 4 years	29	21.8	55.6
4 years - 6 years	24	18	73.7
> 6 years	35	26.3	100
<b>Total</b>	<b>133</b>	<b>100</b>	

*Source: own survey, 2018*

Classification based on duration of stay as ECX member indicated 14.3% stayed below 1 year, 19.5% stayed 1 to 2 year, 21.8% stayed 2 to 4 year, 18% stayed 4 to 6 year, and the remaining 26.3% have stayed more than 6 years. It implies that the customers who are working with the organization with the longer period are more that the other given classifications, customers stay with the organization as its performance grow up as the research indicates that the organization has been working for the last 10 years only.

**Table 4.5 Membership Type and Trade Type**

<b>Membership type</b>			
<b>Items</b>	<b>Frequency</b>	<b>Percent</b>	<b>Cumulative Percent</b>
Trading members	70	52.6	52.6
Intermediary members	63	47.4	100
<b>Total</b>	<b>133</b>	<b>100</b>	
<b>Trade type</b>			
<b>Items</b>	<b>Frequency</b>	<b>Percent</b>	<b>Cumulative Percent</b>
Exporter	51	38.6	38.6
Supplier	52	39.4	78
Domestic trade	10	7.6	85.6
Processor	6	4.5	90.2
Farmers	3	2.3	92.4
Cooperative & others	11	7.6	100
<b>Total</b>	<b>133</b>	<b>100</b>	

*Source: own survey, 2018*

Table 4.5 showed that 52.6% of respondents were traders and 47.4% were intermediaries. This figure shows that the traders are more in number than the intermediaries, this shows that the traders have full (unlimited) right on their accounts. Exporters consisted 38.6% of the respondents, suppliers were 39.4%, 7.6% were domestic trader, 4.5% were processor, and the remained percentage distributed among farmers, cooperation, and others. It indicates that suppliers are higher percentage rate rather than the other options in the trading floor to encourage the export with the more supply of the products.

#### **4.4 Factors of Market Efficiency**

In this category the focus of the descriptive statistics is to elaborate those determinant factors of ECX vis-à-vis market efficiency. And also it described that which factors were highly affecting the market efficiency other than the rest of the factors and so on. Triangulation of data in the realm of quantitative and qualitative research methods employing and questionnaire and data analysis have been employed in a mixed form.

**Table 4.6 Price discovery**

Items	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	%
ECX has an integrated authentic price discovery to buyers and sellers	3(2.3%)	21(15.8%)	37(27.8%)	62(46.6%)	10(7.5%)	100
ECX improve their earning through effective price discovery platform	6(4.5%)	18(13.5%)	33(24.8%)	65(48.9%)	11(8.3%)	100
ECX ensures local and transparent price-discovery mechanism	4(3%)	27(20.3%)	43(32.3%)	46(34.6%)	13(9.8%)	100
ECX perform market surveillance to ensure the integrity of the members and price discovery	7(5.3%)	20(15%)	45(33.8%)	56(42.1%)	5(3.8%)	100
ECX promotes online trading to ensure better price discovery.	6(4.5%)	17(12.8%)	39(29.3%)	54(40.6%)	17(12.8%)	100
ECX uses price discovery for wider supply and more accurate market information.	8(6%)	24(18%)	46(34.6%)	42(31.6%)	13(9.8%)	100

*Source: own survey, 2018*

There were six different questions conducted to the members of ECX with the regarding of price discovery under the sub title the factor of market efficiency of these questions were comprised in table 4.6. It shows that of the price discovery in regarding performance of price discovery of ECX in an integrated authentic price discovery to buyers and sellers of the first question 54.1% of members had responded strongly agree and agree, 27.8% of members had responded neutral and 18.1% of members had responded strongly disagree and disagree,. On the other hand the second question deals with ECX improve their earning through effective price discovery platform the respondents are 57.2% had responded strongly agree and agree, 24.8% neutral and 18% had responded that strongly disagree and disagree. It implies that the higher percentage of the respondents attitudes are strongly agree and agree with the ECX price discovery and making the trade platform, it

helps putting together the buyers and suppliers to discover new price on the market system to facilitate competitive and transparent trading on the floor of the Exchange. An exchange becomes the market information system as it undertakes its function of price discovery based on the public posting of buy and sells orders. The result reveals that the market efficiency has direct relationship with price discovery.

Moreover, ECX ensures local and transparent price-discovery mechanism with this question the respondents, 44.4% strongly agree and agree, 32.3% neutral and 23.3% had strongly disagree and disagree with the same fashion the respondents were answered this question ECX perform market surveillance to ensure the integrity of the members and price discovery 45.9% strongly agree and agree, 33.8% had kept neutral, and 20.3% strongly disagree and disagree, this shows that there is a greater percentage of agreement on price discovery mechanism and market surveillance was done for customers in ECX.

According to the respondents replay regarding ECX promotes online trading to ensure better price discovery respondents had 53% strongly agree and agree, 29.3% kept neutral and 17.3% strongly disagree and disagree with the same as regarding the question of ECX uses price discovery for wider supply and more accurate market information the respondents 41.4% strongly agree and agree, 34.6% indifferent, and 24% strongly disagree and disagreed, this implies that the higher rate of the percentage lies on the agreed part and have encouraging on line trading and wider supply.

From the above analysis the price discovery had an impact on market efficiency about more than 50% respondents had replied strongly agree and agree towards authentic price, price discovery platform and online trading promotes better price discovery. Thus ECX advised to work out on the opportunities of price discovery that highly affect the market efficiency.

On the other hand the Challenges in the formation of price discovery and to measure market efficiency. Department head A showed that the fairness of the commodity trading, adequate protection for members and the information availabilities are the main challenges that encounter. The efficiency of price discovery evidenced in terms of efficient resource allocation and maximum economic members' willingness to pay in the market place for the produce, commodity or product in question (*Personal Interview, Mar, 2018*).

An exchange becomes the market information system as it undertakes its function of price discovery based on the public posting of buy and sells orders. When the volumes of trade on the exchange are sufficiently large to justify that price discovery according to true market fundamentals is occurring, then the dissemination of that information of market prices provides a great service to the market, and the wider economy. This fact alone is a compelling reason to justify an exchange (Gebremedhin & Goggin, 2005).

Improving price discovery that buyers and sellers can bid to determine prices based on transparent market information. In a developing country, this implies that smallholders can negotiate better prices for what they produce and that no particular actors in the value chain can influence prices. Better market integration, on the other hand, implies that prices get transmitted efficiently across space and stages of the value chain. For instance, if the world market price of exportable commodity goes up, the information will get quickly transmitted to the value chain actors in exporting countries. In other words, the benefits of price increases cannot be reaped by any particular market agent due of superior information. The price difference between two market locations would be equal to the transaction costs (transportation, storage, and other trade costs) (Rashid, 2010).

**Table 4.7 Quality grading**

Items	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	%
ECX provide quality grading and sampling system.	12(9%)	32(24.1%)	39(29.3%)	40(30.1%)	10(7.5%)	100
ECX quality grading professionals have the required skills in enhancing market efficiency	8(6%)	32(24.1%)	44(33.1%)	43(32.3%)	6(4.5%)	100
ECX can use quality grading equipment to increase market efficiency.	7(5.3%)	30(22.6%)	49(36.8%)	38(28.6%)	9(6.8%)	100
ECX quality professional determine grade consistently	8(6%)	26(19.5%)	47(35.3%)	46(34.6%)	6(4.5%)	100
ECX uses weighing equipment for accurate measurement of commodities.	7(5.3%)	37(27.8%)	42(31.6%)	43(32.3%)	4(3%)	100
ECX ensures that the functionalities of sampling instruments (clean, dry and free from other constraints)	10(7.5%)	20(15%)	51(38.3%)	46(34.6%)	6(4.5%)	100
ECX satisfies buyers and sellers with the commodity grade it delivers	13(9.8%)	30(22.6%)	39(29.3%)	43(32.3%)	8(6%)	100

*Source: own survey, 2018*

There were around seven questions raised on the topic of quality grading and analyzed with different perspective and compiled with one table as shown in the above. Table 4.7 displays with the regards of this question Member's response on quality grading aspect of ECX provide quality grading and sampling system indicated that, 37.6% had strongly agree and agree, 29.3% had neutral and 33.1% had responded strongly disagree and disagree . At the same time the question ECX quality grading professionals have the required skills in enhancing market efficiency the customers' were answered with 36.8% strongly agree and agree and 33.1% kept neutral and 30.1% strongly disagree and disagree the study analysis indicates that the higher rate of percentage has the result of strongly agree and agree with quality grading indicators of market efficiency. It comprised with the quality product providing and quality grading instruments used while ECX took the parameters of measuring quality. In general quality grading and the quest for re-sampling and re-grading to redress grading grievance in order to increase market efficiency.

For this question ECX can use quality grading equipment to increase market efficiency respondents were answered that 35.4% strongly agree and agree, 36.8% neutral and 27.9% strongly agree and disagree with this request ECX quality professional determine grade consistently clients were responded 39.1% strongly agree and agree, 35.3% neutral, and 25.5% strongly disagree and disagree. This implies that the respondents had greater percentage of strongly agree and agreed towards the quality grading that the factor of market efficiency.

Question whether ECX uses weighing equipment for accurate measurement of commodities respondents were replied that 35.3% strongly agree and agree, 31.6% neutral and 33.1% strongly disagree and disagree. Another question that claimed to the members was ECX ensures that the functionalities of sampling instruments (clean, dry and free from other constraints) the question is answered 39.1% strongly agree and agree, 38.3% neutral and 22.5% strongly disagree and disagree. This question is conducted to the customer of ECX `satisfies buyers and sellers with the commodity grade it delivers 38.3% strongly agree and agree, 29.3% neutral and 32.4% strongly disagree and disagree. Thus it shows that customers responding at raised rate that have strongly agree and agree to quality grading system and satisfies with commodity grade it delivered in the organization with related to quality concepts.

Thus it implies that quality grading in the organization is implemented at higher rate of respondents of strongly agreed and agreed and as it is compared with the neutral respondents they have almost similar percentage of respondents with grade consistency, functionality of sampling instruments, and satisfy the grade which is delivered were strongly agreed and agreed from the respondents. In addition to that respondents were neutral on the issues of quality grade equipments, grade consistency, and functionality of sampling equipments. It shows that the quality grading system application in the organization is questionable.

In the issue of evaluate the quality grading system in the ECX. Department head D replied that quality grading is one of base line to compete the rest of the world by providing commodities by maintaining the standard of the products. The quality of the products is tested by the expertise in every warehouse shades in the country with 3-4 qualified professionals and as well as equipments but it is not as such remarkable as they said that (*Personal Interview, Mar, 2018*).

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 (Gideon, 2010).

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).

Similarly Mulugeta G/Medhin (2015), argued that Members and clients revealed that their quest for re-sampling and re-grading are often disappointing due to the slow re-grading process that results in unbearable demurrage costs. Finally, members, clients and ECX employees condemn the uniform application of the same weight loss adjustment rate across all warehouses regardless of variations in the temperate zone.

**Table 4.8 Risk management**

Items	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	%
ECX can reduce risk associated with market interaction at high level	8(6%)	29(21.8%)	37(27.8%)	47(35.3%)	12(9.1%)	100
ECX use effective risk management mechanisms for market actors on the spot	7(5.3%)	26(19.5%)	40(30.1%)	47(35.3%)	13(9.8%)	100
ECX can properly identify operational risks that counter face	5(3.8%)	24(18%)	46(34.6%)	45(33.8%)	13(9.8%)	100
ECX can control the risk that arise due to operational activities	3(2.3%)	35(26.3%)	44(33.1%)	39(29.3%)	12(9.1%)	100
Credit risk due to shortfall in members account is handled by ECX	6(4.5%)	31(23.3%)	41(30.8%)	40(30.1%)	15(11.3%)	100
ECX can mitigate risk through different mechanisms	6(4.5%)	33(24.8%)	47(35.3%)	39(29.3%)	8(6.1%)	100

*Source: own survey, 2018*

On risk management part there were six different questions administered to the respondents and wrap up with table 4.8 as a result of this performance of risk management question were provide to the customers ECX can reduce risk associated with market interaction at high level, they responded that of responding members hold 44.4% hold strongly agree and agree, 27.8% had neutral and 27.8% strongly disagree and disagree. The respondents were asked to answer ECX use effective risk management mechanisms for market actors on the spot answered that 45.3% strongly agree and agree, 30.1% neutral and 24.8% strongly disagree and disagree. This implies that there is effective risk management practice in ECX as the respondents are higher percentage rate towards it. Respondents were asked to answer this question ECX can properly identify operational risks that counter face that 43.6% strongly agree and agree, 34.6% neutral, and 21.8% strongly disagree and disagree. On this question ECX can control the risk that arise due to operational activities the respondents were answered that 38.4% strongly agree and agree, 33.1% neutral and 28.6% strongly disagree and disagree this infers that ECX risk identification and control mechanisms are implemented in the organization.

Credit risk due to shortfall in members account is handled by ECX the respondents were answered that 43.6% strongly agree and agree, 41.4% neutral and 27.8% strongly disagree and disagree. ECX can mitigate risk through different mechanisms the respondents were answered

that 35.4% strongly agree and agree, 35.3% neutral and 29.3% strongly disagree and disagree. This data refers that credit risk and risk mitigation respondents had greater number of percentage rate of strongly agree and agree.

In connection with the risk management factor of market efficiency with the higher percentage rate indicates reduction of risk, effective risk management, and proper identification of risk respectively. It shows that risk management is controlled by the organization together work with banks in order to mitigate the risks that counter face on trading system.

Another factors of market efficiency is risk management to mitigate different risks, department head B were answered that it has separate division for managing risk that identify, analyze, and implementing the right risk control/management mechanisms of various risk types operational risk, credit risk, market risk, liquidity risk, and others. These several risks in the case of happening it is treated and secured by the insurance policy of the organization (*Personal Interview, Mar, 2018*).

Forward contracts, however, generated new risks for the parties involved in the forms of transportation risk, delivery risk and credit risk. The first category pertains to the deterioration of goods during transportation, unforeseen changes in shipping costs and extraordinary events such as wars, riots or strikes that may prevent the transportation from happening at all. Delivery risk refers to the concern that the quality and the quantity of the good delivered does not correspond to the agreed contract. Credit risk regards the payment of the good delivered (Piero Cinquegrana, 2008).

Bethlehem Girma (2009), considers a variety of strategies exist for managing price risk. Physical strategies such as open position monitoring, marking to market, and back-to-back trading, can provide simple and effective reductions in risk exposure. Even placing forward contracts that can provide a flexible approach to managing price risk by offsetting an organization's open positions can be used. Contract farming is also a current trend in agricultural commodity production that reduces the price risks for both producers and processors.

**Table 4. 9 Clearing and settlement**

Items	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	%
ECX provide uniform clearing and settlement services to their customers	7(5.3%)	32(24.1%)	42(31.6%)	39(29.3%)	13(9.8%)	100
ECX adopts a satisfactory dispute settlement procedure related to quality grading.	4(3%)	39(29.3%)	46(34.6%)	38(28.6%)	6(4.5%)	100
ECX settles trades on T+1 basis.	3(2.3%)	27(20.3%)	53(39.8%)	40(30.1%)	10(7.5%)	100
ECX ensures orderly trading procedures to avoid (disruptive, manipulative and dishonest) practices.	8(6%)	31(23.3%)	40(30.1%)	44(33.1%)	9(6.8%)	100
ECX warehouses have adequate facilities to store the commodities in good condition.	12(9%)	31(23.3%)	47(35.3%)	31(23.3%)	12(9.1%)	100
The number of locations of ECX warehouse are enough to depositors	8(6%)	42(31.6%)	38(28.6%)	40(30%)	5(3.8%)	100
ECX develops a convenient trading schedule that is (trading hours, and duration).	6(4.5%)	36(27.1%)	42(31.6%)	39(29.3%)	10(7.5%)	100

Source: own survey, 2018

There were seven questions in regarding with assessment of clearing and settlement performance of ECX responded as of which ECX provide uniform clearing and settlement services to their customers strongly agree and agree by 39.1% of respondents, neutral response by 31.6% of respondents and strongly disagree and disagree by 29.4% of respondents. For equation ECX adopts a satisfactory dispute settlement procedure related to quality grading 33.1% strongly agree and agree, 34.6% in the middle of the road and 32.3% strongly disagree and disagree. It indicates that there is a higher percentage of strongly agree and agree in relation with clearing and settlement performance and there was almost evenly distributed amount of responses concerning with the dispute settlement procedure.

With this question ECX settles trades on T+1 basis respondents were replied 37.6% strongly agree and agree, neutral 39.8% and 22.6% strongly disagree and disagree. About the question was ECX ensures orderly trading procedures to avoid (disruptive, manipulative and dishonest) practices 39.9 strongly agree and agree, 30.1% kept indifferent and 29.3% strongly disagree and disagree. As a result of this analysis the respondents of neutral was higher than other preferences

ECX settlement done within next day after the transaction was made. Malpractices in the ECX were avoided due to trading procedure as per the respondents of ECX members. ECX warehouses have adequate facilities to store the commodities in good condition with this question responded strongly 32.4% strongly agree and agree, the remaining 35.3% neutral and disagree and disagree 32.3%. This implies that the higher percentage at the middle of the road. The numbers of locations of ECX warehouse are enough to depositors the question is illustrated from the above table that 33.8% were strongly agreed and agreed, the rest of 28.6% were indifferent from them and 37.6% were strongly disagree and disagreed. This infers that warehouse problem are statistically disclosed on the organization thus the company should work out by expanding the warehouse facilities with different geographical location to maximizes market efficiency.

ECX develops a convenient trading schedule that is (trading hours, and duration) this question raised to the customers of ECX and responded like this 36.8% were strongly agreed and agreed, the remaining 31.6% were kept indifferent and 31.6% were strongly disagree and disagreed. The schedule of ECX for trading is convenient for members as the responding rate was higher.

The study indicates that the clearing and settlement and market efficiency had a better relation with the percentage with regard of uniformity of clearing and settlement, early settlement of trading system, and orderly trading procedures. Moreover, the neutral responses also had comparable higher percentage rate in the issues of settlement trades within plus one day, warehouse adequate facilities, and dispute settlement procedure. It implies that the market efficiency is affected by on time clearing and settlements.

In regarding to the methods of clearing and settlement in the market to be more efficiency and effectiveness, the department head C were replied that clearing and settlements is done together with different banks to clearing in zero defaults. It assures that the payment to the seller up on the trade interaction legal transfer of the title to funds and other security. The warehouse issue was raised but the problem of warehouse is a little bit challenging to manage in different location, most of them are rental and protected with insurance (*Personal Interview, Mar, 2018*).

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).

As discussed in the review of literature section 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. As to the key informants the company uses online trading that plays a vital role in business to minimize the consumption of time and cost, it forms platform form of the trading.

**Table 4.10 Market data dissemination**

Items	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	%
ECX disseminates reliable and accurate market information on time to their customers	6(4.5%)	25(18.8%)	46(34.6%)	45(33.8%)	11(8.3%)	100
ECX price information disseminates is satisfactory.	7(5.3%)	27(20.3%)	44(33.1%)	46(34.6%)	9(6.7%)	100
ECX market information's are easily accessible and available	11(8.3%)	25(18.8%)	41(30.8%)	45(33.8%)	11(8.3%)	100
ECX market information's are important to make a critical decision to market actors.	8(6%)	26(19.5%)	38(28.6%)	49(36.8%)	12(9.1%)	100
ECX controls the appropriateness of the information disseminate tools to the market actors.	9(6.8%)	26(19.5%)	44(33.1%)	44(33.1%)	10(7.5%)	100
Communication medias are reachable for all market actors on time.	5(3.8%)	29(21.8%)	48(36.1%)	38(28.6%)	13(9.8%)	100
The application of ICTs in ECX is taking the market to the door-step or farm-gate of the market actors.	5(3.8%)	27(20.3%)	49(36.8%)	45(33.8%)	7(5.3%)	100

*Source: own survey, 2018*

There were administered seven questions to the clients for gathering market data dissemination as factors of market efficiency and the first one “ECX disseminates reliable and accurate market information on time to their customers” 42.1% had strongly agree and agree on how ECX disseminates data, remaining 34.6% had neutral attitude and 23.3% of respondents had strongly disagree and disagree. On the other hand the question of “ECX price information disseminates is satisfactory” the respondents 41.3% strongly agree and agree 33.1% kept indifferent and 25.6% strongly disagree and disagree. It concludes that ECX is disseminating information with satisfactory price to their clients on time.

For this question “ECX market information’s are easily accessible and available” the customers were responded 42.1% strongly agree and agree, 30.8% neutral and 27.1% strong disagree and disagree at the same time with this question “ECX market information’s are important to make a critical decision to market actors” were responded just like this 45.9% strongly agree and agree, 28.6% and 25.5% strongly disagree and disagree. This statistical report manifest respondents had strongly agreed and agreed towards information accessible and as a result of this vital to give decision to market actors.

ECX members were responded the following question in this fashion for “ECX controls the appropriateness of the information disseminate tools to the market actors” 40.6% showed their agreement, 33.1% were neutral and 26.3% showed their disagreement. Members of ECX were answered this “Communication Medias are reachable for all market actors on time” 38.4% strongly agree and agree, 36.1% neutral and 25.6% strongly disagree and disagree. Customers in the ECX were responded the “application of ICTs in ECX is taking the market to the door-step or farm-gate of the market actors” 39.1% strongly agree and agree, 36.8% neutral and 24.1% strongly disagree and disagree. It implies that respondents were agreed that appropriate information through the right media reach to the door of the actors.

The above analysis generalized that market data dissemination of respondents are more likely agreed to dissemination of information regarding to display that the reliable and accurate information’s are distributed, information’s are easily accessible and available, and the important of information to make a critical decision. As we see from the above all the market information is more important to market efficiency.

Regarding the bases of that the company gives enough emphasis for market data dissemination, department head B replied that yes the company disseminating the relevant information to the society in different mechanisms by using SMS, IVR, through mass media TV, radio newspaper and with the access of the website of the organization. In addition to this the company provides awareness creation for different geographical location of the trade participants. The company uses ICT to more accessible and on time the business information to the society, how every, SMS services sometime blackout due to the infrastructure of the net work to accessing the farmers out reaching of the country (*Personal Interview, Mar, 2018*).

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. An exchange becomes the market information system as it undertakes its function of price discovery based on the public posting of buy and sells orders. When the volumes of trade on the exchange are sufficiently large to justify that price discovery according to true market fundamentals is occurring, then the dissemination of that information of market prices provides a great service to the market, and the wider economy. This fact alone is a compelling reason to justify an exchange (Gebremedhin and Goggin , 2005).

**Table 4.11 Transaction cost**

Items	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	%
ECX reduces transaction costs by offering services at lower cost than that which participants in the commodity sectors	6(4.5%)	35(26.3%)	42(31.6%)	38(28.6%)	12(9%)	100
Higher transaction cost affects ECX market efficiency	8(6%)	27(20.3%)	37(27.8%)	50(37.6%)	11(8.3%)	100
ECX transaction costs affected by information infrastructure.	5(3.8%)	26(19.5%)	40(30.1%)	54(40.6%)	8(6.0%)	100
Poor transport costs to be the main transaction costs at ECX and obstacles for improvements in market efficiency	10(7.5%)	31(23.3%)	34(25.6%)	49(36.8%)	9(6.8%)	100
ECX transaction cost can increase market liquidity to be efficient	6(4.5%)	27(20.3%)	42(31.6%)	47(35.3%)	11(8.3%)	100

*Source: own survey, 2018*

Regarding performance of transaction cost there was around five questions asked on the issue and the respondent “ECX reduces transaction costs by offering services at lower cost than that which participants in the commodity sectors”, 37.6% had responded strongly agreed and agreed, 31.6% had neutral and 30.8% had responded strongly disagreed and disagreed. On the other side the question of “higher transaction cost affects ECX market efficiency” were responded 45.9% strongly agree and agree, 27.8% kept neutral and 26.3% strongly disagree and disagree. For this question “ECX transaction costs affected by information infrastructure” respondents were answered that 46.6% showed their agreement. 30.1% kept indifferent and 23.3% showed their disagreement. These all implied that the respondents inclined with the agreement of the statements ECX reduce transaction cost and its information infrastructure, at the same time it increases efficiency.

With the regarding of this question “Poor transport costs to be the main transaction costs at ECX and obstacles for improvements in market efficiency” the respondents 43.6% strongly agree and agree, 25.6% neutral and 30.8% strongly disagree and disagree. The question of “ECX transaction cost can increase market liquidity to be efficient” the respondents were replied that 43.6% showed their agreement, 31.6% kept indifferent and 24.8% showed their disagreement. It infers that poor transportation cost and market liquidity could limit the market efficiency.

The above transaction cost summarized that higher transaction cost and infrastructure for information, poor transaction cost and increased market liquidity is higher percentage rate. This shows that the transaction cost have a great number of percentage rate as compared with the others options and we can also claim that there is positive relationship with the market efficiency. Department head A claimed for the challenges that come across to reduce the transaction cost to make platform of the trading system, transportation infrastructure is poor and demand and supply will not be equal there is a formation of imperfect market.

Commodity exchanges lowered transaction costs by reducing intermediaries and facilitating the matching of buyers and suppliers. Third, they provided storage facilities and clearing services, thereby further increasing the liquidity and efficiency of commodity cash markets ( Piero Cinquegrana , 2008).

Transaction costs are considerably reduced in commodity exchanges by “facilitating contact between buyers and sellers; enabling centralized grading of products; ensuring that contracts are enforceable; providing a mechanism for price discovery; simplifying transactions with standard contracts; and, transmitting information volumes. Further an Exchange increases market

liquidity, enables the transfer of price risks, and enhances trust, order, and integrity in the market” (Gabre Madhin, 2006).

More over the transaction cost can be affected by the information infrastructure of the trading system. According to the study analysis of (UNCTAD, 2009) Transaction costs lie at the core of understanding why commodity exchanges are useful. Small-scale farmers typically face proportionally the steepest transaction costs if they look to participate in markets. This is driven by factors including poor transportation, storage and communications infrastructure, a lack of access to information and expertise, and limited access to financing rooted in a lack of collateral. Moreover, transaction costs tend to be significantly higher in developing economies than in developed ones a consequence of imperfect market formation and weak or absent infrastructure and sector support institutions. It will be argued in this study that commodity exchanges can facilitate trade by significantly reducing many of the transaction costs outlined above.

#### **4.4.1 The Challenges of Market Efficiency**

As indicated in chapter two, the challenges of market efficiency the most attention seeking problem that most developing countries commodity exchanges are facing is lack of liquidity. Department A, B, C and D comment on the problem relates to the inefficiencies in different operational areas of the exchanges including trading and contracts, settlements, spot price discovery, risk management and nature and structure of the exchange itself. Besides, there are certain set of challenges where commodity exchanges require regulatory amendments to make this market vibrant and some other set of challenges, where commodity exchanges have to take up the initiatives (*Personal Interview, Mar, 2018*).

The problems relates to the inefficiencies in different operational areas of the exchanges including trading and contracts, settlements, spot price discovery, risk management and nature and structure of the exchange itself. Besides, there are certain set of challenges where commodity exchanges require regulatory amendments to make this market vibrant and some other set of challenges, where commodity exchanges have to take up the initiatives. These kinds of challenges include: warehouse receipt issues like in fungible nature of warehouse receipts, not serving as collateral and means of financing, not used for settlements, quality of the warehouse and of course the credibility of the goods valuation.(Bethlehem Girma, 2009)

Department head A and C emphasized that the strategy and plan related to market efficiency, the company has no specific strategies and plans for merely market efficiency that the company implemented to be more efficient but as a whole the company has strategies and plans. They do agree that the company has annual budget needed to implement the factors of market efficiency. As needed the budget is redistributed to each factor every fiscal year. Although, respondents said that about current market participants towards its market efficiency, the numbers of trading members are increasing in an alarming rate from time to time this shows that trade participants are directly related with the market efficiency. Although, the company should not expand its financial budgetary and other essential components for market efficiency (*Personal Interview, Mar, 2018*).

The practice of trade guarantee in ECX to the market actors, they gave response as the market actors are required to deposit settlement guarantee fund before trading at the exchange it was done to put on the fund in the banks special ECX accounts. On the issue of measure the volume of the commodity with respect to the current warehousing systems, they answered that on the past fiscal years the volume of the commodity was lesser than current situation. This is directly affected as the number of participants increase and also the volume of the commodity increase taking consideration of measurements (*Personal Interview, Mar, 2018*).

ECX has strategy to measure and monitor the liquidity of settlement guarantee fund and to ensure that there are sufficient funds to meet clearing member's transaction exposures. This is done by preparing scenario analysis over an appropriate timeframe of likely inflows and outflows of funds ([www.ecx.com.et](http://www.ecx.com.et)).

All department heads agree that as far as the determinant/factors of market efficiency that improve the market actor's satisfaction in ECX, those factors are critical for market efficiency as well maximizing the level of satisfaction. Besides of this they suggested other factors that affect also should be observed with the other point of view.

#### **4.5 Correlation Analysis**

In order to address the research questions and the hypotheses made in chapter one, the researcher tried to identify the correlation types and the relationship strengths between dependent variable and independent variables i.e. Market Efficiency and factors of Market Efficiency (price discovery, quality grading, risk management, clearing and settlement, market data dissemination, transaction cost).

**Table 4.12 Pearson correlation analysis result**

Correlations							
	Price Discovery (PD)	Quality Grading (QG)	Risk Management (RM)	Clearing & Settlement (CS)	Market Data Dissemination (MD)	Transaction Cost (TC)	Market Efficiency (ME)
<b>PD</b>	<b>1</b>						
<b>QG</b>	.361**	1					
<b>RM</b>	.348**	.507**	1				
<b>CS</b>	.315**	.497**	.528**	1			
<b>MD</b>	.236**	.304**	.353**	.400**	1		
<b>TC</b>	-.302**	-0.434	-.439**	-.386**	-0.49675	1	
<b>ME</b>	.314**	.396**	.430**	.479**	.453**	-.403**	1

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

Source: own survey, 2018

### Correlation coefficient between independent and dependent variables

The coefficient of correlation between market efficiency and transaction cost was -0.403. It shows that there is negative relationship between them and also it means that when transaction cost increases by 100%, market efficiency decrease by 40.3%. Another descriptive variable employed in the study was market data dissemination. The coefficient of correlation between market efficiency and market data dissemination was 0.453, which indicates that there is weak and positive correlation between market efficiency and market data dissemination. It further shows that if market data dissemination is increase by 100%, market efficiency will be increased by 45.3%. The coefficient of correlation between market efficiency and clearing and settlement was 0.479. This figure reveals that there is strong and positive relationship between market efficiency and Clearing and settlement.

It further indicates that when Clearing and settlement is increased by 100%, market efficiency will be increased by 47.9%. The coefficient of correlation between market efficiency and risk management was 0.430. This shows that weak and positive relationship between market efficiency and risk management. Market efficiency is increased by 43.0% when risk management is increased by 100%. The coefficient of correlation between market efficiency and quality grading was 0.396. This shows that weak and positive relationship between market efficiency and quality grading. Market efficiency is increased by 39.6% when quality grading is increased by 100%. The coefficient of correlation between market efficiency and price discovery was 0.314. This indicates that weak and positive relationship between market efficiency and price discovery. Market efficiency is increased by 31.4.0% price discovery is increased by 100%. The

correlation relationship between clearing and settlement and market efficiency is a bit greater than the relationship between other variables.

## 4.6 Regression Analysis

### I. Normality Test

Data normality test is the first test that must be done before the data was processed based on the models of the research especially, if the purpose of the research is inferential. Normality test is intended to determine the distribution of the data in the variable that will be used in the research, data were good and decent used in research is normally distributed data (Ruth, 2017).

The Results to check normality are available in the figure labeled Normal P-P Plot below. Based on the normal P-P Plot all the points are clearly shown to lie in a reasonable straight diagonal line from the bottom left to top right. This would suggest that there are no major unconventionalities from normality

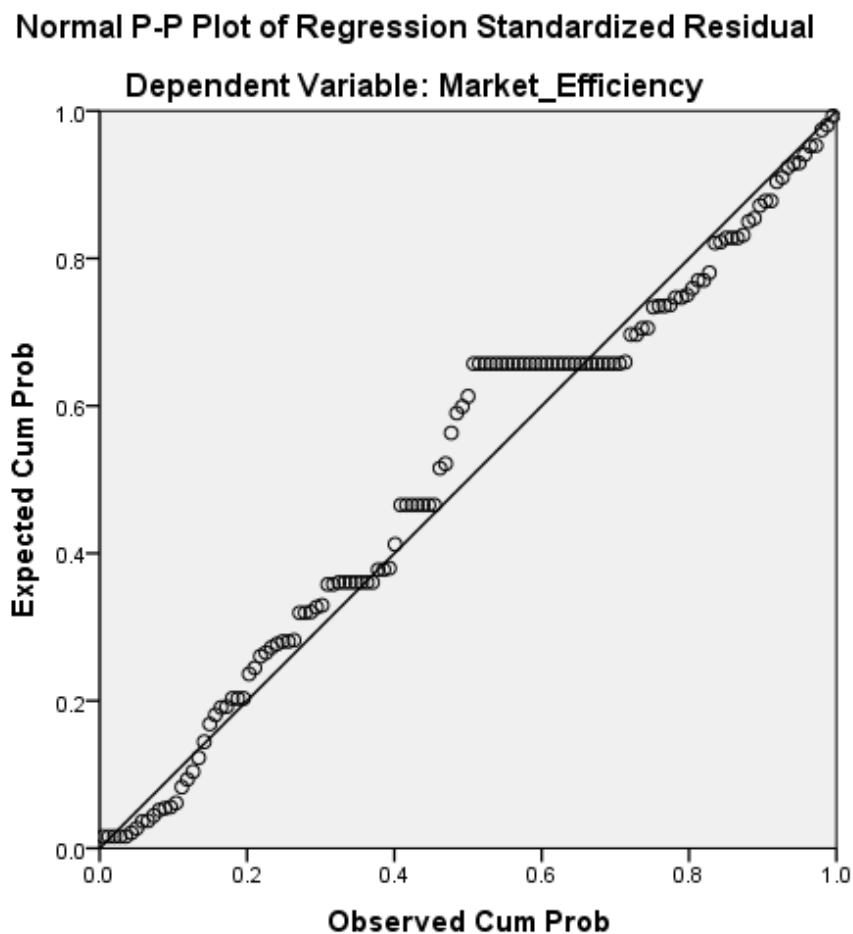


Figure 4.1 Normal P-P plot of Regression Standardized Residual

## II. Collinearity Test

In order to determine whether the problem of collinearity or multiple collinearity exists or not, we can examine two diagnostics, tolerance and the variance inflation factor (VIF). A tolerance value of 1 indicates that the variable is not correlated with the other(s), and a value of 0 that it is perfectly correlated. Likewise, a VIF value of more than 2 indicates a close correlation, and a value approaching 1 indicates little or no association.

The results of coefficient table from regression analysis and table 4.13 which is deduced from the original table for analysis the values of Tolerance and VIF (Variance Inflation Factor) taken into consideration for the analysis. According to the values mentioned in the table, the tolerance value is more than (0.10) and the VIF, which is just the inverse of the Tolerance value, is less than 10 which is the cut-off point. This implies a problem of multi collinearity does not exist in this study.

**Table 4.13 Statistics of collinearity**

Model	Collinearity Statistics <sup>a</sup>	
	Tolerance	VIF
Price_Discovery	.813	1.229
Quality_Grading	.619	1.615
Risk_Managment	.597	1.675
Clearing_Settlement	.610	1.641
Data_Dissemination	.698	1.433
Transaction_Cost	.631	1.584

a. Dependent Variable  
Market\_Efficiency

After the normality of the data in the regression model are met, the next step to determine whether there is similarity between the dependent variables or the independent variables in a model, it is necessary to test collinearity test. Similarly, between the independent variables will result in a very strong correlation, in addition this test done to avoid habit in the decision making process regarding the partial effect of independent variables on the dependent variable.

#### **4.7 Results of the Regression Analysis**

As of the other statistical tool, the study applied the regression analysis to the study and investigated whether the constructed model is significant or not. In addition, the regression analysis tool in SPSS has calculated the 'total explained variance' of this model from the model summary table 4.14 in the output of regression analysis, the regression equation has been composed and this equation indicates the mathematical relationship between the dependent variable (market efficiency) and independent variables (price discovery, quality grading, risk management, clearing and settlement, market data dissemination, transaction cost).

The results presented in the table 4.14 labeled Model Summary under the heading R Square and Analysis of Variance ANOVA<sup>b</sup>. These will tell how much of the variance in the dependent variable is explained by the model. The analysis revealed that R is .599; this explains the correlation between the predictor variables and dependent variable. R Square ( $R^2$ ) is the square of the measure of correlation and indicates the variance in the dependent variable which is accounted for by the model that indicated 32.8% of variance in members is explained by market efficiency the predictor called independent. The Adjusted R Square value of ( $R^2 = .328$ ) in the output is to be used to provide a better estimate of the true population. In this case, the three independent variables are reasonably correlated ( $R = .599$ ).

**Table 4.14 Result of the coefficients (Model summary table and ANOVA)**

Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.599 <sup>a</sup>	.359	.328	.78407	.359	11.576	6	124	.000

a. Predictors: (Constant), Transaction Cost, Price Discovery, Clearing Settlement, Data Dissemination, Quality Grading, Risk Management

ANOVA <sup>a</sup>					
Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	42.700	6	7.117	11.576	.000 <sup>b</sup>
Residual	76.231	124	.615		
Total	118.931	130			

a. Dependent Variable: Market Efficiency

b. Predictors: (Constant), Transaction Cost, Price Discovery, Clearing Settlement, Data Dissemination, Quality Grading, Risk Management

In addition the statistical findings summarized in ANOVA table shows above, regression effect is statistically significant where  $F(6,124) = 11.576$ ,  $p < 0.01$ , indicating that prediction of the dependent variable is accomplished effectively. The  $p < 0.01$ , shows that the model has a strong significance and descriptive power of prediction. From this it can be also assumed all independent variables contribute jointly to the prediction of market efficiency

**Table 4.15 Beta under standardized coefficients**

Model	Coefficients <sup>a</sup>				
	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	.613	.404		1.518	.132
Price_Discovery	.106	.091	.093	1.161	.248
Quality_Grading	.086	.092	.086	.938	.350
Risk_Managment	.112	.087	.119	1.280	.203
Clearing_Settlement	.212	.089	.219	2.375	.019
Data_Dissemination	.203	.075	.233	2.710	.008
Transaction_Cost	-.088	.094	-.085	-.941	.349

a. Dependent Variable: Market\_Efficiency

The coefficients of the regression equation are presented in table 4.15, which shows that the independent variables (price discovery, quality grading, risk management, clearing and settlement, and data dissemination) have positive relationship with the dependent variable (market efficiency). Whereas, the independent variables (transaction cost) have negative relationship with dependent variable (market efficiency).

The prediction equation for “Market Efficiency” is given as;

$$Y1 = 0.106X1 + 0.086X2 + 0.112X3 + 0.212X4 + 0.203X5 - 0.088X6 + 0.613$$

All the factors of market efficiency measures have positive effect on market efficiency, among which clearing and settlement has the highest effect with coefficient 0.212, followed by market data dissemination (0.203), risk management (0.112), price discovery (0.106), and quality grading (0.086) respectively. But, transaction cost (-0.088) has a negative effect on the market efficiency. The t-tests were used to test the significance of the coefficient of each independent variable. The t-values of the variable are given by price discovery (1.161), quality grading (0.938), risk management (1.280), clearing and settlement (2.375), market data dissemination (2.710), and transaction cost (-0.941) with significance level of 0.248, 0.350, 0.203, 0.019, 0.008, and 0.349 respectively. The significance level for clearing and settlement and market data dissemination is less than 0.05. This implies that the regression coefficients of the two independent variables are statistically significant. However the other three variables i.e. price discovery, quality grading, and risk management have significance level greater than 0.05 which

indicates the three variables have positive effect but statistically insignificant. Transaction cost is not statistically significant.

In statistical testing, the alternative hypotheses cannot be proven directly or conclusively. Rather, it is indirectly proven by rejecting the null hypotheses with a certain level of probability. Statistical testing is always probabilistic, because we are never sure if our inferences based on sample data, apply to the population, since our sample never equals the population. The probability that a statistic inference is caused by pure chance is called the p-value. The p-value is compared with the significance level ( $\alpha$ ), which represents the maximum level of risk that the researcher is willing to take that the reference is incorrect. For most statistical analysis,  $\alpha$  is set to 0.05. A p-value less than  $\alpha=0.05$  indicates that we have enough statistical evidence to reject the null hypothesis, and thereby, indirectly accept the alternative hypothesis. If  $p>0.05$ , then we do not have adequate statistical evidence to reject the null hypothesis or accept the alternative hypothesis. Accordingly hypothesis can be rejected while it is true and cannot be rejected while it is false.

**H1:** There is a significant relationship between price discovery and market efficiency is rejected.

**H2:** There is a significant relationship between quality grading and market efficiency is rejected.

**H3:** There is a significant relationship between risk management and market efficiency is rejected.

**H4:** There is a significant relationship between clearing and settlement and market efficiency is rejected.

**H5:** There is a significant relationship between market data dissemination and market efficiency is rejected.

**H6:** There is a significant relationship between transaction cost and market efficiency is accepted.

## CHAPTER FIVE

### SUMMARY, CONCLUSION AND RECOMMENDATIONS

#### 5.1 Summary of Major Findings

Based on the hypothesis the key findings of the study are summarized as follows:-

- ✚ The study reveals that members believe that those factors that affect the efficiency are a very good instrument to increase market efficiency in ECX. And also the findings of this study clearly show that factors of market efficiency analysis of respondents and correlation analysis result have a big role in the organization.
  
- ✚ The finding showed us that the price discovery had an impact on market efficiency about more than 50% respondents had replied strongly agree and agree towards authentic price, price discovery platform and online trading promotes better price discovery. In relation to price discovery fairness of the commodity trading, adequate protection for members and the information availabilities are the main challenges that encounter. The findings indicated that the efficiency of price discovery evidenced in terms of efficient resource allocation and maximum economic members' willingness to pay in the market place for the produce, commodity or product in question.
  
- ✚ The study implies that quality grading in the organization is implemented at higher rate of respondents of positive attitude and as it is compared with the neutral respondents they have almost similar percentage of respondents with grade consistency, functionality of sampling instruments, and satisfy the grade which is delivered were positive attitude from the respondents. However, respondent's neutral margin had significance on the issues of quality grade equipments, grade consistency, and functionality of sampling equipments. It shows that the quality grading system application in the organization is questionable. Above all the quality of the products is tested by the expertise in every warehouse shades in the country with 3-4 qualified professionals and as well as equipments but it is not as such remarkable.
  
- ✚ In connection with the risk management factor of market efficiency with the higher percentage rate indicates reduction of risk, effective risk management, and proper identification of risk respectively. The finding shows that risk management is controlled by the organization in order to mitigate the risks that counter face on trading system. Moreover

it has separate division for managing risk that identify, analyze, and implementing the right risk control/management mechanisms of various risk types operational risk, credit risk, market risk, liquidity risk, and others. These several risks in the case of happening it is treated and secured by the insurance policy of the organization. Besides that, the company has separate division for managing risk that identify, analyze, and implementing the right risk control/management mechanisms of various risk types operational risk, credit risk, market risk, liquidity risk, and others. These several risks in the case of happening it is treated and secured by the insurance policy of the organization.

- ✚ The study find out that the clearing and settlement and market efficiency had a positive relation with the percentage with regard of uniformity of clearing and settlement, early settlement of trading system, and orderly trading procedures. Moreover, the neutral responses also had comparable higher percentage rate in the issues of settlement trades within plus one day, warehouse adequate facilities, and dispute settlement procedure. It implies that the market efficiency is affected by on time settlements. But, In the issue of warehousing was raised but the problem of warehouse is a little bit challenging to manage in different location, most of them are rental and protected with insurance.
- ✚ The finding revealed that market data dissemination of respondents are more percentage rate on strongly agree and agree to dissemination of information regarding to display that the reliable and accurate information's are distributed, information's are easily accessible and available, and the important of information to make a critical decision. The company uses ICT to more accessible and on time the business information to the society, how every, SMS services sometime blackout due to the infrastructure of the net work to accessing the farmers out reaching of the country.
- ✚ The study digs out the higher transaction cost and infrastructure for information, poor transaction cost and increased market liquidity is higher percentage rate. The finding indicated that the transaction cost have a great number of percentage rate as compared with the others options and we can also claim that there is positive relationship with the market efficiency. Interviewees of the department head of ECX that claimed for the challenges that come across to reduce the transaction cost to make platform of the trading system, transportation infrastructure is poor and demand and supply will not be equal there is a

formation of imperfect market. Moreover, the transaction cost can be affected by the information infrastructure of the trading system.

- ✚ All the factors of market efficiency measures have positive effect on market efficiency, among which clearing and settlement has the highest effect with coefficient 0.212, followed by market data dissemination (0.203), risk management (0.112), price discovery (0.106), and quality grading (0.086) respectively. But, transaction cost (-0.088) has a negative effect on the market efficiency. The significance level for clearing and settlement and market data dissemination is less than 0.05. This implies that the regression coefficients of the two independent variables are statistically significant. However the other three variables i.e. price discovery, quality grading, and risk management have significance level greater than 0.05 which indicates the three variables have positive effect but statistically insignificant. Transaction cost is not statistically significant.
- ✚ Some of the challenges that ECX confronts regarding the strategy and plan related to market efficiency, the company has no specific strategies and plans for merely market efficiency that the company implemented to be more efficient but as a whole the company has strategies and plans. They do agree that the company has annual budget needed to implement the factors of market efficiency but the numbers of trading members are increasing in an alarming rate from time to time this shows that trade participants are directly related with the market efficiency.

## 5.2 Conclusion

The researcher tries to conclude this study with two focal points in respected with the positive and negative assumptions. The performance factors assessed were price discovery, quality grading, risk management, clearing and settlement, data dissemination, and transaction of cost. To see association of factors of performance with market efficiency data analysis was done, and all the factors had statistically significant association with market efficiency except transaction cost. The positive assumption of market efficiency to be more active in the organization it strongly works on factors that highly affect the market efficiency on market data dissemination, clearing and settlement, risk management quality grading respectively according to their higher percentage rate. At the same time the survey aims to examine the respondents of negative assumption towards to market efficiency factor transaction cost and other challenges which is practiced in the company.

The survey was conducted on ECX members in Addis Ababa and descriptive analysis was used to summarize respondents' attitude on market efficiency. Correlation and regression analysis were also used examine the relationship and effect of factors of market efficiency. The result of the survey reveals that members have positive attitude towards almost all of the factors of market efficiency of ECX. It is believed that company that can use those factors of market efficiency to be more competent in Africa as well as in the world. ECX market efficiency, as measured by the six independent attributes, positively affects to use the services.

Moreover, most the market efficiency attributes are found to be desirable to influence members' participation in the membership trading but the two had strong relation clearing and settlement and market data dissemination. The remaining factors of market efficiency risk management, price discovery, and quality grading had relatively the higher influence than the other attributes but, transaction cost had negatively attributed. It shows that these opportunities should be magnified on the other side with the lesser percentage of factors of efficiency manipulated further by observing other market efficiency factors. Thus, all these factors affect the market efficiency in this dimension: operational efficiency, pricing efficiency and technical efficiency in general.

### 5.3 Recommendations

- ✚ As researcher analyzed it form the major finding and conclusion the impact of factors of market efficiency to increase market efficiency in terms of operational, pricing, and technical, ECX recommended developing a market efficiency strategy and policy in concerning about the strong and lesser performance of each factors of market efficiency and also including others variable which is not in this study.
- ✚ The researcher strongly believe that this study determine some of the factors that affecting the market efficiency as observed form the survey analysis, even if there are some challenging to confronting the issue of warehouse, information infrastructure, transaction cost with poor transportation, slightly quality measurement difficulties. As trading participants increase from time to time so, allotted finance for warehousing should also increase to establishing new warehousing systems and rental too. In the case of information and transportation infrastructures ECX recommended that in revised and developed system to have a good culture of working together with other governmental organization to enhance the market efficiency and make synergy effect. Through, use of information technology to automate the End-to-End system from warehousing to trading to clearing and settlement of payments to delivery of commodity.
- ✚ ECX is a *non-profit* autonomous commercial enterprise (company) established by its own law, that can only reinvest its profits in its scaling up and innovation (no dividends to investors). Thus, government should allocate some amount of fund for the organization to be more in market efficiency it also helps to collect more foreign currency in the presence of exporting trade system for those policy makers of the country. Market actors also have a great impact on market efficiency; ECX advised that to give them a chance to be active participants in the trading system in the presents of challenging was happened. Especially, Exporters may have determined some factors of market efficiency due to experience sharing with abroad business interaction.
- ✚ ECX intended to address the root causes of much the problems encountered the market efficiency in terms of operational, pricing, and technical. In order to bring significant changes in the trade system as well as, to be more competitors in the global trading system.

#### **5.4 Further Area of Investigation**

The limitation of this study is focusing on some factors of efficiency. The study had examined the factors affecting the market efficiency by focusing only on the head quarter ECX members only not including other geographical locations, at the same time the effect of market efficiency on other neighboring country experience could be studied. Similarly studies could also be done by incorporating the influence of other market factors included in market efficiency.

The data collected strictly focused only on primary data which is gathered the sample data was very limited only in the ECX members but should include other clients Farmers affiliated with cooperatives close to the ECX warehouse sites through questionnaire and interview. Therefore, studies should inculcate other data collection mechanism such as focused group discussion and in-depth interview. Therefore, further studies should address the question raised by other sectors.

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## Annex I

### ADDIS ABABA UNIVERSITY SCHOOL OF COMMERCE MARKETING DEPARTMENT QUESTIONNAIRE TO BE FILLED BY ECX MEMBERS

#### Dear respondents:

This is a questionnaire prepared to study on Factors that Affecting Market Efficiency of ECX. Your honest and kind answer is very decisive for the findings of this research study: Therefore, I request you to answer honestly and kindly. The purpose of this study is for the fulfillment of Master's Degree in Marketing Management. The confidentiality of your response is respected by the researcher.

**Thank you!**

#### Note:

- No need of writing your name
- Write a  $\surd$  mark on the space provided for choosing

#### Part I: Participant Information/ Demographic Data

1. Gender  Male  female
2. Which of the following age categories describes you?  
 <25  25 to 35  36 to 40  41 to 50  51 to 60  
 61 and above
3. What is your highest educational status/Qualification?  
 Below grade 12  12 grades complete  
 Certificate  College diploma  
 First degree  Second degree  
 Other Specify: \_\_\_\_\_
4. How long have you been a member?  
 Less than 1 year  Between 1 year and 2 years  Between 2 year and 4 years   
Between 4 year and 6 years  Greater than 6 years
5. Please specify the membership type of your at ECX.  
 Trading Member  Intermediary member
6. Please specify your trade type.  
 Exporter  Supplier  Domestic trader  Processor  Farmers  
 Cooperative  Others (please specify) \_\_\_\_\_

**ADDIS ABABA UNIVERSITY SCHOOL OF COMMERCE  
MARKETING DEPARTMENT  
QUESTIONNAIRE TO BE FILLED BY ECX MEMBERS**

**Dear respondents:**

This is a questionnaire prepared to study on Factors that Affecting Market Efficiency of ECX. Your honest and kind answer is very decisive for the findings of this research study: Therefore, I request you to answer honestly and kindly. The purpose of this study is for the fulfillment of Master's Degree in Marketing Management. The confidentiality of your response is respected by the researcher.

**Thank you!**

**Note:**

- No need of writing your name
- Write a ✓ mark on the space provided for choosing

**Part II: Questions: Related to Market Efficiency**

Please read each statement carefully and show the extent of your agreement on the statements by putting a tick mark (✓) in the boxes against each rating scale of choice. The rating represents your level of agreement as follows:

**5 = Strongly Agree, 4 = Agree, 3 = Neutral, 2 = Disagree, and 1 = Strongly Disagree.**

Ser. N	Items	Rating				
		1	2	3	4	5
		Str. Dis.	Disagree	Neutral	Agree	Str. Agree
<b>A</b>	<b>Price Discovery</b>					
1	ECX has an integrated authentic price discovery to buyers and sellers	1	2	3	4	5
2	ECX improve their earning through effective price discovery platform	1	2	3	4	5
3	ECX ensures local and transparent price-discovery mechanism	1	2	3	4	5
4	ECX perform market surveillance to ensure the integrity of the members and price discovery	1	2	3	4	5
5	Does ECX promote online trading to ensure better price discovery?	1	2	3	4	5

6	Does ECX use price discovery for wider supply and more accurate market information?	1	2	3	4	5
<b>B Quality Grading</b>						
1	ECX provide quality grading and sampling system.	1	2	3	4	5
2	ECX quality grading professionals have the required skills in enhancing market efficiency	1	2	3	4	5
3	ECX can use quality grading equipment to increase market efficiency.	1	2	3	4	5
4	ECX quality professional determine grade consistently	1	2	3	4	5
5	ECX uses weighing equipment for accurate measurement of commodities.	1	2	3	4	5
6	ECX ensures that the functionalities of sampling instruments (clean, dry and free from other constraints)	1	2	3	4	5
7	ECX satisfies buyers and sellers with the commodity grade it delivers	1	2	3	4	5
<b>C Risk Management</b>						
1	ECX can reduce risk associated with market interaction at high level	1	2	3	4	5
2	ECX use effective risk management mechanisms for market actors on the spot	1	2	3	4	5
3	ECX can properly identify operational risks that counter face	1	2	3	4	5
4	ECX can control the risk that arise due to operational activities	1	2	3	4	5
5	Credit risk due to shortfall in members account is handled by ECX	1	2	3	4	5
6	ECX can mitigate risk through different mechanisms	1	2	3	4	5
<b>D Clearing and Settlement</b>						
1	ECX provide uniform clearing and settlement services to their customers	1	2	3	4	5
2	ECX adopts a satisfactory dispute settlement procedure related to quality grading.	1	2	3	4	5
3	ECX settles trades on T+1 basis.	1	2	3	4	5
4	ECX ensures orderly trading procedures to avoid (disruptive, manipulative and dishonest) practices.	1	2	3	4	5
5	ECX warehouses have adequate facilities to store the commodities in good condition.	1	2	3	4	5

6	The number of locations of ECX warehouse are enough to depositors	1	2	3	4	5
7	ECX develops a convenient trading schedule that is (trading hours, and duration).	1	2	3	4	5
<b>E Market Data Dissemination</b>						
1	ECX disseminates reliable and accurate market information on time to their customers	1	2	3	4	5
2	ECX price information disseminates is satisfactory.	1	2	3	4	5
3	ECX market information's are easily accessible and available	1	2	3	4	5
4	ECX market information's are important to make a critical decision to market actors.	1	2	3	4	5
5	Does ECX control the appropriateness of the information disseminate tools to the market actors?	1	2	3	4	5
6	Communication medias are reachable for all market actors on time.	1	2	3	4	5
7	The application of ICTs in ECX is taking the market to the door-step or farm-gate of the market actors.	1	2	3	4	5
<b>F Transaction Cost</b>						
1	ECX reduces transaction costs by offering services at lower cost than that which participants in the commodity sectors	1	2	3	4	5
2	Higher transaction cost affects ECX market efficiency	1	2	3	4	5
3	ECX transaction costs affected by information infrastructure.	1	2	3	4	5
4	Poor transport costs to be the main transaction costs at ECX and obstacles for improvements in market efficiency	1	2	3	4	5
5	ECX transaction cost can increase market liquidity to be efficient	1	2	3	4	5
<b>G Market Efficiency</b>						
1	I am satisfied with the company's market efficiency strategy and plan.	1	2	3	4	5
2	Does ECX use market efficiency measurement tools?	1	2	3	4	5
3	I am interested in ECX trade guarantee to insure the commodity	1	2	3	4	5

4	I am working with the company since the company is good place to make a profit through market participation.	1	2	3	4	5
5	Do customers understand the value and related risk of the organization's service about its market liquidity?	1	2	3	4	5
6	How satisfied are you with respect to company's market efficiency in terms of volume?	1	2	3	4	5
7	I am interested in the profit that gains from the ECX transactional efficiency	1	2	3	4	5
8	Overall would you consider the presence of market efficiency as a positive for selecting this business?	1	2	3	4	5

**Annex II**  
**ADDIS ABABA UNIVERSITY SCHOOL OF COMMERCE**  
**MARKETING DEPARTMENT**  
**INTERVIEW GUIDE**

1. Does your organization have a clear and defined strategy to be more efficient in the market?
2. Does the company allot sufficient funds/budget to carry out the major factor to determine of market efficiency? (price discovery, quality grading, risk management, clearing and settlement, market data dissemination and transactional cost )
3. What are the main challenges in the formation of price discovery on the trading systems and how to measure in market efficiency?
4. How do you evaluate the current market participants towards its market efficiency?
5. How do evaluate the quality grading system in the ECX?
6. How does the company entertain the risk management to mitigate different risks?
7. Do you think that the company gives enough emphasis for market data dissemination?
8. What are the methods of clearing and settlement in the market to be more efficiency and effectiveness?
9. Does the company have lunched online trading to improve the factors of market efficiency?
10. What are the challenges to reduce the transaction cost to make platform of the trading system?
11. What is the practice of trade guarantee in ECX to the market actors?
12. How do you measure the volume of the commodity with respect to the current warehousing systems?
13. What do you suggest regarding market efficiency determinant/factors in order to improve the market actor's satisfaction in ECX?

**Thank you for your participation**

# Annex III

## Histogram

Dependent Variable: Market\_Efficiency

