Determinants of Market Efficiency of Ethiopian Commodity Exchange: The Case of Coffee Market

By: Yordanos Yalew

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

Advisor: Temesgen Belayneh (PhD)

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CERTIFICATION

This thesis work entitled to certify that**, "DETERMINANTS OF MARKET EFFICIENCY OF ECX: THE CASE OF COFFEE MARKET."** submitted in partial fulfillment of the requirements for the award of the degree of Masters of Marketing Management to the School of Commerce, Addis Ababa University, through the Department of Marketing Management done by Yordanos Yalew is an authentic work carried out by her under our guidance. The matter embodied in this thesis has not been submitted earlier for award of any degree or diploma to the best of our Knowledge and belief.

Advisor:	Signature	Date
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External Examiner:	Signature	Date
Asres Abitie (PhD)	_____	_____

Declaration

I, the undersigned, declare that this thesis "MARKET EFICIENCY OF ETHIOPIAN COMMODITY EXCHANGE: THE CASE OF COFFEE MARKET" is my original work and has not been presented for a degree in any other university and that all sources of materials used for the thesis have been duly acknowledged.

Yordanos Yalew

Signature and Date

Statement of Certification

This is to certify that Yordanos Yalew carried out her research on the topic entitled "DETERMINANTS OF MARKET EFFICIENCY OF ETHIOPIAN COMMODITY EXCHANGE: THE CASE OF COFFEE MARKET." under my supervision. This work is original in nature and is suitable for submission for the award of Degree of Master of Marketing Management.

Advisor:. Temesgen Belayneh(PhD)

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List of Acronyms

ANOVA	Analysis of Variance
SPSS	Statistical Packages for Social Science
ECX	Ethiopian Commodity Exchange
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Program
USAID	United States Agency for International Development
WRS	Warehouse Receipt System
EMH	Efficient Market Hypothesis
NMDTs	Non-members direct traders
IP	Identity Preservation
VIF	Variance Inflation Factors
TM	Trade Member
ICAs	International commodity agreements

Abstract

The Ethiopian commodity exchange (ECX) is the one and only modern market in Ethiopia that launched trading operation in April 2008 with a vision to revolutionize the country's agriculture through an efficient, dynamic, forward-looking and orderly marketing system. Coffee is one of the important commodities traded in ECX. Market efficiency is one of the cost benefit analysis measurement tools that are used to determine by some factors. Among these factors Identity preservation model, transaction cost, warehouse system. Price discovery, risk management, rule and regulation and trading system had been used for this study. Recently market reform was made on ECX specifically on the coffee trade. So this research tried to measure the effect of the identified factors on market efficiency specifically on the coffee market. A total of 161 questionnaires were distributed to ECX members and NMDTs participating on coffee trade. Only 148 questionnaires were returned at the end of the data collection process, which gave the response rate of 91.92 per cent. Quantitative approach and Descriptive and explanatory research design was employed. Data collected were analyzed using descriptive statistics then correlation and regression by using SPSS version 20. A survey questionnaire was prepared to collect a primary data. Identity preservation has the strongest effect on ECX coffee market efficiency (0.281) followed by Price discovery (0.267), Trading system (0.264), and rule and regulation (0.232). However, there were no significant relationships between transaction cost (-0.028), warehouse system (-0.018) and risk management (-0.012) in ECX coffee market efficiency. The findings of this survey will be used to make recommendations to ECX family to enhance their level of insight about the exchanges coffee market efficiency.

Key Words: *Market efficiency, ECX, Identity Preservation, Transaction cost, rule and regulation, Warehouse, Price discovery, Risk management, trading system and NMDTs.*

CHAPTER ONE

INTRODUCTION

1.1. Background of the study

Historically, commodity exchanges date back to the middle ages. The growth and the scale of overseas trade in England had created the incentive to establish the Royal Exchanges in the sixteenth century (Forrestor, 1931). There are more than 100 of these exchanges across developing countries of which only three are located in Africa (Gabre-Madhin and Goggin, 2005). It is observable that various markets in developing countries are categorized by small trading volumes, imperfect competition and for its unpredictability prices. If there is a low trading volume then it can be indicator for the limitation of the disseminated information both in quality and quantity.

To resolve market inefficiencies, particularly concerning prices along the agricultural marketing channel, a landmark proclamation was issued by the parliament in 2007 that paved the way for the establishment of the ECX under the supervision of the Ministry of Agriculture and Rural Development (MoARD) in Proclamation No-551/2007. The ECX was finally established in April 2008 with the aim of filling the gap created by missing institutions and infrastructure in agricultural commodity markets (Gabre-Madhin, 2001).

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.

Participants on the ECX trade spot contracts that standardize the quality, quantity, payment and delivery of agricultural goods. There are few studies on market efficiency of Ethiopian commodity exchange. Linking of buyers and sellers in to commodity market for the effective and efficient accomplishment of transactions among the participants is the most challenging task.

1.2. Statement of the Problem

Commodities exchange play vital role in marketing agricultural outputs and improving the return for the primary producers (Bethlehem Girma, 2009). The Ethiopian Commodity Exchange is a unique partnership intended for creating marketplace where buyers and sellers meet to transact in a way that brings transparency, integrity and efficiency to the market which can be achieved by innovation and technology, constant learning and the commitment to excellence. . It is noted that coffee is among of the first commodities traded at the ECX and also coffee is still the most significant export commodity in Ethiopia.

Different researchers studied the market efficiency of ECX like; Hussein (2010) indicated that Ethiopian Commodity exchange is weak-form inefficient market. Camilla (2015) call for further examining ECX marketing efficiency: the extent of the contribution of ECX to increase efficiency is still an open question since very few formal evaluation has so far been implemented. Abdurezack (2010), also studied market efficiency of Ethiopian commodity exchange specifically on export coffee market.

However, recently a major reform passed in 2018 that reshaped the ECX in likely its most dramatic form. Building on the Identity preservation program, a system called the Preserved Coffee Trading System was implemented, providing traceability to the local cooperative or private mill, whose coffee previously would have been blended regionally.

In light of the above conditions this research examined determinants of market efficiency of ECX coffee market by incorporating the new model which has not been included on other researches. Furthermore unlike other researches done on ECX's coffee market efficiency this research was conducted by integrating nonmember traders (NMDTs) in the population of the study so that other market actors' idea will also contribute for the study.

1.3. Research Question

- To what extent does Identity Preserve model contributes to the market efficiency of ECX coffee market?
- To what extent trading system contributes to the market efficiency of ECX coffee market?

- To what extent practice of price discovery contributes to the market efficiency of ECX coffee market?
- To what extent warehouse system contributes to the market efficiency of ECX coffee market?
- To what extent does risk management contributes on the market efficiency of ECX coffee market?
- To what extent does transaction cost contributes on the market efficiency of ECX coffee market?
- To what extent does rule and regulation contributes on the market efficiency of ECX coffee market?

1.4. Objectives

1.4.1. General Objectives

The general objective of this research is to examine the core determining factors of Ethiopian commodity exchange coffee market after the reform is implemented.

1.4.2. Specific objectives

- To examine the effect of Identity Preserve model on market efficiency of ECX coffee market.
- To determine the effect of ECX transaction cost on market efficiency of ECX coffee market.
- To examine the extent to which the practice of price discovery affect market efficiency of ECX coffee market.
- To examine the effect of warehouse system on market efficiency of ECX coffee market.
- To examine the effect of trading system on market efficiency of ECX coffee market.
- To examine the effect of risk management on the market efficiency of ECX coffee market.
- To examine the effect of rule and regulation on the market efficiency of ECX coffee market.

1.5. Significance of the study

This study is believed to provide a chance of broadening the skill of analyzing and interpreting the current operation of commodity exchanges especially regarding coffee trade. It also increases the stack of information all have about the performance of commodity exchanges. Policy makers, planners and Ethiopian commodity exchange to make knowledgeable decisions regarding their service deliverance mechanisms for better. And also the study will contributed or draws lessons on the issue under consideration for better success in the field.

1.6. Scope of the Study

The study was confined to study the determinants of market efficiency of ECX only on the coffee trade. The study covered only few among several of the determinants that affect marketing efficiency of ECX coffee market. Considering the manageability of data, budget, time and resources availability, the target population was taken from Addis Ababa ECX branch members and non-member direct traders only.

1.7. Limitations of the study

Though this study 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. And this study is methodologically limited because researcher didn't take all the population which is members and nonmember traders of the ECX as well the clients. For the same reason area coverage was limited geographically 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 the study was expected to give value in designing appropriate strategies to reduce market inefficiency of ECX.

1.8. Definition of terms

Commodity: Webster (2010) defined commodity as an economic goods, as a product of agriculture or mining an article of commerce especially when delivered for shipment, a mass-produced unspecialized product a good or service whose wide availability typically leads to smaller profit margin and diminishes the importance of factor (as brand name) other than price, one that is subject to ready exchange or exploitation within a market.

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)

Ethiopian Commodity Exchange (ECX): is among of the agricultural exchange markets found in Africa. Currently, the country is following a development policy of Agricultural Development Lead Industrialization. This policy inspires farmers and private investors to produce market focused commodities (Paul I, 2011).

1.9. Organization of the Paper

The study is organized in to five chapters. The first chapter deals with the background of the study, statement of the problem, objectives of the study, the research questions, the significance of the study, and Scope of the study. The second chapter discusses review literature of the study. The third chapter is research methodology. The fourth chapter discusses data analysis and finding. Finally, chapter five compresses the major issues presented in the study and provide summary, conclusion and recommendation.

CHAPTER TWO

2. Review of related literature

2.1. Theoretical Literature Review

2.1.1. The Concept of Market efficiency

It is difficult to get a single definition of market efficiency that may hold for all markets. Even within the same market, different authors use different definitions. The concept of market efficiency had been projected in the dissertation submitted by Bachelier (1900). In his initial paragraph, Bachelier identifies that "past, present and even discounted future events are reflected in market price, but often show no apparent relation to price changes". This appreciation of the informational efficiency of the market leads Bachelier to continue. According to (Bachelier. 1900) , If the market in effect, does not predict its fluctuations, it does assess them as being more or less likely, and this likelihood can be evaluated mathematically.

Then Fama (1970) collected an ample review of the theory and evidence of market efficiency. Though his paper proceeds from theory to empirical work, he notes that most of the empirical work preceded development of the theory. The theory involves defining an efficient market as one in which trading on available.

A market can be considered to be efficient, therefore, only if we postulate a model for returns. From this point on, tests of market efficiency become joint tests of market behavior and models of asset pricing. The weak form of the efficient market hypothesis claims that prices fully reflect the information implicit in the sequence of past prices. The semi-strong form of the hypothesis asserts that prices reflect all relevant information that is publicly available, while the strong form of market efficiency asserts information that is known to *any* participant is reflected in market prices. The literature begins, therefore, with studies of weak form market efficiency.

Fama (1970) summarizes the early random walk literature, his own contributions and other studies of the information contained in the historical sequence of prices, and concludes that "*the results are strongly in support*" of the weak form of market efficiency. He then reviews a

number of semi-strong and strong form tests, highlighting those that we cover in the next two sections, and concludes that "in short, the evidence in support of the efficient markets model is extensive, and (somewhat uniquely in economics) contradictory evidence is sparse.

In the 1970s Eugene Fama defined an efficient financial market as ***"one in which prices always fully reflect available information".***

Fama recognized three levels of market efficiency:

- Weak-form efficiency: Prices of the securities instantly and fully reflect all information of the past prices. This means future price movements cannot be predicted by using past prices, i.e. past data on stock prices is of no use in predicting future stock price changes.
- Semi-strong efficiency: Asset prices fully reflect all of the publicly available information. Therefore, only investors with additional inside information could have an advantage in the market. Any price anomalies are quickly found out and the stock market adjusts.
- Strong-form efficiency: Asset prices fully reflect all of the public and inside information available. Therefore, no one can have an advantage in the market in predicting prices since there is no data that would provide any additional value to the investors.

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).

2.1.2. Understanding Commodities Exchanges

A commodity market is a market that trades in primary economic sector 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. It is "...an organized marketplace where physical commodities are being traded and exchanged" (FAO, 2011, p.11e).

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.) According to (Federal Negarit Gazeta, 2007) commodity exchange is a place where standardized commodity-linked contracts are traded. And contracts based on them. These contracts can include spot prices, forwards, futures and options on futures (UNCTAD report, 2009).

Commodity exchanges are very much efficient platforms, in which buyers and sellers meet to trade, to manage price risk in addition to increase transactions of physical products. They have so many benefits like development welfares; create opportunities for economies to be more wide-ranging, improving the relations between agriculture and finance, and help the commodity sector more efficient and competitive.

2.1.3. Commodity Exchange in Africa

Rashid (2010) explained that the growing interest in commodity exchange from government and donors in Africa is a clear reflection of need for commodity risk management. Because international markets remain volatile and domestic markets are thin and fragmented, risk management is critical for commodity sector development. Besides the Growing interest in commodity exchanges on the part of governments, donors, and the private sector in developing countries reflect a drive to reduce transactions costs and a need for new commodity risk management tools. Improvements in the institutions serving commodity markets are especially important to African countries that remain heavily dependent on a small range of commodities for export revenues. Because international markets are volatile and domestic markets are thin and fragmented, risk management is critical for commodity-sector development in Africa. With the dismantling or weakening of marketing boards and the unsatisfactory performance of international commodity agreements (ICAs), governments and their development partners have increasingly looked to commodity exchanges as a means of managing risk in a liberalized market environment. Since 2004, more and more countries have launched exchanges. Notable examples include the African Commodity Exchange (ACE) in Malawi established in 2004, Nigeria's exchange established in 2006, a new Zambian exchange (ZAMACE) established in 2007, and the much-publicized Ethiopian Commodity Exchange (ECX) established in 2008. Because

commodity production and trade are the primary means of livelihood for millions of households, commodity sector development is essential for poverty alleviation and overall economic development. Faced with both price volatility and high marketing costs, many see commodity exchanges as an alternative way to manage risks and increase efficiency in a liberalized market environment (Gilbert 1996; Morgan 2001; Thurow and Kilman 2009 cited in Kassaye 2019).

Table 2-1Agriculture commodity exchanges in Africa

East Africa	Southern Africa	Western Africa
a) East African Grain Council b) The Kenya Agriculture Commodity Exchange (KACE) c) Uganda Commodity Exchange (UCE) d) Ethiopia Commodity Exchange (ECX) e) Agriculture Commodity Exchange for Africa (ACE) Zambia	a) SAPEX Agricultural Exchange (part of Johannesburg Stock Exchange) b) Zimbabwean Agricultural Commodity Exchange	a) Abuja Securities and Commodity Exchange (ASCE)

Table 2.1: Agricultural Commodity Exchanges in Africa (Source: CMA, 2009)

2.1.4. Ethiopian commodity exchange

The Ethiopia Commodity Exchange was established in 2008 as a new initiative for Ethiopia and the first of its kind in Africa with a mission of transforming Ethiopian agriculture, modernize the way Ethiopia was trading its most valuable assets (its commodities) and alter the economy through a dynamic, efficient and transparent marketing system that serves all.

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. As the founder and former CEO

identified, 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).

The ECX (the "Exchange") is established by the Ethiopia Commodity Exchange Proclamation No.550/2007 as one of the basic ingredients to transform the country's agriculture to market oriented production system. According to this proclamation, the Exchange is created 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.

According to (EAG, 2015), after its establishment, the ECX started trading maize and wheat with little success. It then switched to coffee, helped by a decision from the government to replace the traditional coffee auctions by ECX. Starting with one coffee warehouse in 2008, ECX is expanding its warehousing. ECX has become one of the largest exchange markets in Africa.

Ethiopian commodity exchanges platform is unique because the it can connect the whole eco system, covers the central trading system, for it has full warehouse system, provides grade certification, conduct clearing and settlement activities, use as arbitration tribunal, has market information dissemination system that can link rural areas, expands remote electronic trading centers and also protect data center so that it help to manage membership and information. Currently the ECX trades coffee, sesame, White pea beans, maize, wheat, green mung beans, red kidney beans cheek pea and soya bean (ECX,2019) .

2.1.5. Ethiopian Commodity Exchange and Coffee market

As coffee are most important export commodity and an important source of employment in Ethiopia. Coffee is also the most traded agricultural commodity in the ECX both in terms of volume and value. In addition this commodity passed with significant reforms sector in the past years. It is key stipendiary of foreign exchange for the country. ECX first instigated trading coffee in December 2008, when the government adjourned the country's traditional coffee auction floor and made it mandatory for all coffee trading to be conducted through the exchange.

ECX offers contracts in the generally defined washed and unwashed coffee category. The basic distinction between the two categories arises in their preparation. If coffee is prepared using wet processing it becomes a washed coffee and when it is prepared using dry processing it is labeled in the Exchange as unwashed coffee. According to (ECX 2011) the type and grade of coffee is highly varied in Ethiopia. Ethiopia is the producer for the several well-known diversities of coffee including Sidama, Yirgacheffe, jimma and Harar. Apart from these, there are some other famous varieties that Ethiopia produces. The exchange makes a daily trading of the specialty and commercial coffee.

It was also explained on (ECX, 2011) that Coffee prices displayed high inter year disparities from season to season. These differences are a joint effect of the factors reflecting domestic supply and the periodic trends of the global coffee demand and supply situations. Also the variation can be seen between different varieties and grades of the coffee also. Some varieties like the yeirgacheffe and sidama command considerable premium in the International markets.
From the different reforms on the coffee market the 2018 reform is among them. This reform of Ethiopian commodity exchange includes reforms that are applied only on coffee trade. The identity preservation which is the traceability model, on-truck trading called "bonded yard" and the online auction system are among the specific changes for coffee.

2.1.6. Identity Preservation Model

Among the different definitions Identity preserved (IP) is the description given to bulk commodities marketed in a manner that separates and preserves the identity of a shipment, presumably because of unique characteristics that have value otherwise lost through commingling during normal storage, handling and shipping procedures. Identity Preservation (IP) envelopes the idea that specific traits and/or credence attributes are important to maintain or realize by various customers. (Gregory Scott Benet, 2008).

It was discussed by (Dr. M.S. Vasu, 2018) that to confirm the quality, consistency and safety of ECX's product, the ECX in cooperation with USAID and IBM, has launched the ECX traceability system. This new system includes over 5 million smallholder farmers involved in producing various commodities traded at the ECX, the system, which will begin by leading with

coffee. This is expected the quality of Ethiopian export coffee, make it worldwide and it is also expected to improve market access for specialty coffee from Ethiopia. The implementation of the system will cover a wide range of new initiatives, including electronic tracking of bags, innovations in washing and processing, and streamlined storage and transportation processes.

2.1.7. Price Discovery

The exchange has different objectives when established. Among those objectives of ECX 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. The Exchange was conducting an open-outcry system in order to guarantee competitive method of price discovery until June 2015.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 adequately large to justify that price discovery according to true market fundamentals is stirring, 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 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 exchanges rules have been bridged (www.ecx.com.et).

2.1.8. Transaction cost

Reducing transaction costs are one of the objectives of ECX. Commodity exchange reduces transaction costs by proposing services at lower cost than participants in the commodity sectors Among those costs, the costs associated with finding a seemly trans actor, negotiating the terms and conditions of a contract, guarantee of finance to fund the transaction, managing credit, cash and product transfers, and furthermore there is a cost of parties for arbitrating arguments between

contractual counterparties. Therefore, by reducing the costs incurred by the parties to a potential transaction, a commodity exchange can rouse trade (UNCTAD, 2007).

Furthermore, properly functioning commodity exchanges can stimulate more efficient production, storage, marketing and agro-processing operations, and improved overall agriculture sector performance. It is just because of these benefits that change and developing economies with large agricultural sectors have comprised commodity exchanges in recent years.

Transaction costs can be significant issue, when considering the role of commodity exchanges in the policy debate (UNCTAD, 2007). 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 questionably amount to a considerable expense, consuming substantial funds, time and goodwill.

2.1.9. Risk Management

As (Piero Cinquegrana, 2008) explained about risk management that 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.

In spite of 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, accomplishes 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).

A. Operational risk

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. (Wikipedia, October, 2007).

Operational Risks- Warehousing: According to (ECX, 2001), the operational risks related to warehousing include physical storage risks, Deterioration/Degradation, Infestation, Theft, Sampling, Grading and Inventory Management

Operational Risks- Trading: As explained on (ECX,2001) the operational risks associated to trading include System Security, Order Entry, Telecommunications, Processes and System Failures.

Operational Risk Identification: The operational risk papers method involves: Operational audits of all ECX units to categorize current and potential risks, Operational performance reports and Strategy, design and market analysis. (ECX, 2001)

B. Market Risks: Market Risks are Risks to the integrity of the market due to foul play or negligence by participants or poor market design (ECX, 2001). It is also explained that ECX Market Risks encompasses Trading Practice Violations, Market Manipulation, Fraud, Contract Design, and Member Settlement Default (ECX, 2001). 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)

A vital element of settlement and safety of the market is definite settlements. This eradicates counterparty risk as exchange/clearing house becomes counterparty to transactions. The exchange/clearing house, besides giving clearing and settlement services, manages market risk and guarantees completion of settlements. This encourages wider participation by all sections of investors and traders. This requires effective risk management systems and a legal framework which supports the same. Currently ECX uses diverse tools to manage operational and market risks. To manage the market risks the foremost tackles which are in use by the exchange are settlement guarantee fund, member audit, market analysis. But presently, the method which is largely used is marker surveillance. This system permits the exchange manage its risk by identifying whether two specific parties are engaged in buying and selling only among themselves or are offering only specific prices that can employ the market (Haggblade S., 2001).

The other perspective is the part of government in market-based price risk management. Now the government of Ethiopia is doing nothing to ease the prevailing barrier to effective hedging; that is there is static absence of mechanisms to hedge an open position since futures, options, swaps and other derivatives are not permitted to be in place.

2.1.10. Trading System

The Ethiopia Commodity Exchange (ECX) commenced trading operations in April 2008. And subsequently opened trade for white and mixed maize, hard and soft wheat, processed and 22 unprocessed pea beans, coffee and sesame (Alemu, D & Meijerink, G., 2010).

An initiative to electronic trading has taken place in recent years. The exchange has been trading through an open outcry Until June 2015. The exchange announced its modern e-TRADE Platform so that to increase the exchange's trade efficiency, transparency and accessibility (The case of ECX, 2011).

(Thomas, 2008) discussed that this has been motivated by technological advances and by the advantages in speed, cost, transparency and functionality that such trade typically offers over the established "open outcry" form of trading, which brings traders together on a trading floor. And in addition Computer technology has the potential to increase the efficiency, transparency, and liquidity of the commodity markets by increasing the speed of transactions and lowering

transaction costs. Electronic trading typically brings a number of other possible advantages. These include limiting informational asymmetries between trading interests, allowing potentially longer trading hours, and increasing access to markets regardless of one geographical location

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

After the reform, coffee trading has been transformed into transparent, traceable and identity preserved trading model. The new electronic coffee trading system was designed and developed by the Exchange's Information Technology professionals and known as e-Auction Electronic Trading. It was to switch the former electronic trading system to e-auction.

e- Auction has changed the pattern in which bidders acquire the products. Users can join in the online auction from anywhere at any time compliantly through the internet. Just with a terminal and internet connection, the user can buy products online at cheaper rates by participating in online auction. The products do not need any physical location in case of online auction and the inventory can be managed electronically and upon sale the product would be shipped physically. (http://preciseethiopia.com/e-auction-a-milestone-in-ethiopias-agricultural-trading/)

2.1.11. Rule and Regulation

Commodity exchanges normally institute and strongly enforce relevant procedures, rules, regulations and guidelines to regulate the conduct of members, brokers and Tran's actors. They are often able to take corrective action against parties in the event of non-compliance with the rules and procedures. They also tend to establish formal systems for quick and low cost resolution of trade disputes (Gideon O.E, 2003).

Eventually, the whole exchange system depend on trust – trust in the exchange (and its clearing house), trust in the brokers to whom clients trust their money, and trust in the warehouses and warranty managers who will subject the pieces of paper that will essentially be delivered on the exchange. A good system of regulation is indispensable to ensure such trust. While the exchange

is a self-regulatory organization, there is a requirement to be an over-arching regulatory and legal infrastructure in place to ensure regulation at different levels: self-regulation by the brokers, warehouses and the exchange, regulation by trade associations who license and monitor their members, and regulation by a state regulator, such as an Exchange Commission.

Government has two important role to play an oversight role by which the government disciplining those who try to operate the markets for their own benefit, and safeguarding the sanctity of contracts; and secondly, an allowing role by which the government providing the necessary legal and regulatory framework for the smooth functioning of the system. The regulatory intervention should be most active at the time of the establishment of the exchange and of contracts. If the contracts are well framed, and delivery modalities provide effective line of defense against attempts at manipulation, government has to only act as a watchdog intervening only when necessary. Accordingly the goal of regulatory agency is not only to regulate but also to instruct the culture of self-regulation among the contestants. This in turn, over a period of time, will give way for more self-regulation preserved by the advisory role of state regulation (Sahadevan, 2002).

2.1.12. Warehouse system

Warehouse can be defined as a place in which goods or merchandise are stored; a storehouse. The warehouse receipt system (WRS) provides a platform for the introduction of other institutional innovations, notably grading, contracting and exchange trading.

WRS is 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.

The 2018 reform came with new system that commodities that are traded in ECX can remain on track within the confines of what is known as a "bonded yard," defined as a fenced secured yard for trucks to be parked until the consignment is sold on truck and picked up by the buyer.

2.2. Empirical Review

There are different researches that indicated market inefficiencies like poorly instituted modes of production (Zewdu et al., 2010), high marketing costs (Rashid et al.2010), volatile prices (Gemech and Struthers, 2007), inadequate market infrastructure (Rashid 2010, Gabre-Madhin, 2009), and an unorganized commodity marketing approach (Gabre-Madhin, 2009; Gemech and Struthers, 2007) are among indicators of market inefficiency that significantly limit coffee growers' share from the value of exports and total earnings from the sector.

(Gebremedhin and Goggin, 2005**)** rational for the establishment of the ECX that the Ethiopian grain markets faced some constraints such as; shortage of adequate market organization between buyers and sellers, the lack of market information dissemination system, the lack of trust between market actors, the absence of contract enforcement, and the lack of system for commodities grades and standards, infers 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 the study included in the conclusion that establishing of a commodity exchange will eliminate constraints that the Ethiopian commodity market faced.

Black (1986) presents a list of wide-ranging pre-conditions for setting up successful commodity exchanges. This discussion essentially with developed countries, but most of the conditions are applicable to developing countries as well. The list of viability conditions in the literature can be grouped into four broad categories: i) commodity-specific conditions; ii) effective regulatory environments; iii) contract-specific conditions and iv) other enabling conditions. In addition to these, there are several policy related conditions, such as exchange rates policies, trade bans, and agricultural price policies, that are critical for the successful establishment of commodity exchanges (Rashid et al 2010).

Furthermore, Rashid (2015), explained how to considered exchanges to be successful. That is if they: i) conduct trade and ii) generate enough revenue to profitably pay for their operations. Again, the Ethiopian Exchange (ECX) is an exception in that, although it generates enough revenue to pay for itself, it only does so with direct policy support, which requires all export commodities to go through the exchange.

As 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.

Regarding the trading system Sarkar and Tozzi (1998), argues 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 exceeding (Tse and Zabotina, 2001) explained 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. Furthermore, the new e-Auction amendment made on the electronic trade was explained by (Netsanet, 2019) "E-auction delivers all the necessary information about the origin and supplier of a specific type of coffee in which will enhance business trust by making the view for suppliers provide quality product to the market. Our meticulous inspection mechanism has also significant contribution in ensuring quality." And that it is beneficiary both for buyers and sellers. However, (Gebre-Medihin E. 2017), had discussed in contradict that the creation of an identity-preserved traceability trading system appears to be a daunting prospect for a commodity exchange that was established on the premise of precisely the opposite: non-identity preserved and highly liquid trading of relatively homogenous and interchangeable commodities.

Regarding price discovery different studies were conducted. Among them ((Mattos and Garcia 2004; Shakeel and Purankar 2014 Cited Andersson, Bezabih, and Mannberg ,2011) argued, the literature on price discovery in agricultural commodity markets in developing countries provides mixed evidence concerning whether commodity exchange systems have contributed to improved efficiency. Research on price discovery in the context of commodity exchange markets in Africa, where markets are extremely thin, is very scant (Gabre-Madhin and Goggin 2005 Cited Andersson, Bezabih, and Mannberg, 2011). Exceptions include Abdurezack (2010), Francesconi and Heerink (2011) and Katengeza (2012), but their results do not draw a completely clear picture of the effect of commodity exchanges. According to (Yang et al. 2001), Preceding research on the developed world has generally shown that commodity markets play an effective role in price discovery, and thereby improve market efficiency The picture for the developing world is less clear.

As discussed by (Gebremedhin & Goggin, 2005) transferable warehouse system is extremely corresponding 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. In consistence to the above discussion, Gideon (2010) reported on quality of warehouse and storage management skills tend 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. The recent reform had come with new system which is on-truck transaction, which is called bonded yard with a belief that it can help the warehouse load and enhance efficiency. However, (Gebremedihin, 2017) discussed in contradict to that this idea risks adding even more inefficiencies and risks with trucks that cannot remain immobile beyond a few days without creating transport market constraints. It scarcely resolves the issues around delays and frauds from manual sampling of commodities on truck as well as grading and weighing of commodity.

On the subject of transaction costs, (Gabre Madhin, 2006) discussed that transaction costs are much 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". Yet it was discussed by (UNCTAD, 2009) that transaction costs have a tendency 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 drawn above.

Concerning rule and regulations (Gideon O.E, 2003) discussed that commodity exchanges tend to establish formal systems for quick and low cost tenacity of trade disputes. As accessed on (The case of ECX, 2011). It was expounded that properly implemented and regulated, commodity exchanges can contribute greatly to the accomplishment of a country's economic and developmental goals and support the bargaining power of weak groups such as small farmers

2.3. Conceptual Framework

The ECX market efficiency was examined in terms of independent variables such as Identity preserved model, transaction cost, warehouse system, price discovery, risk management, rule and regulation and trading system.

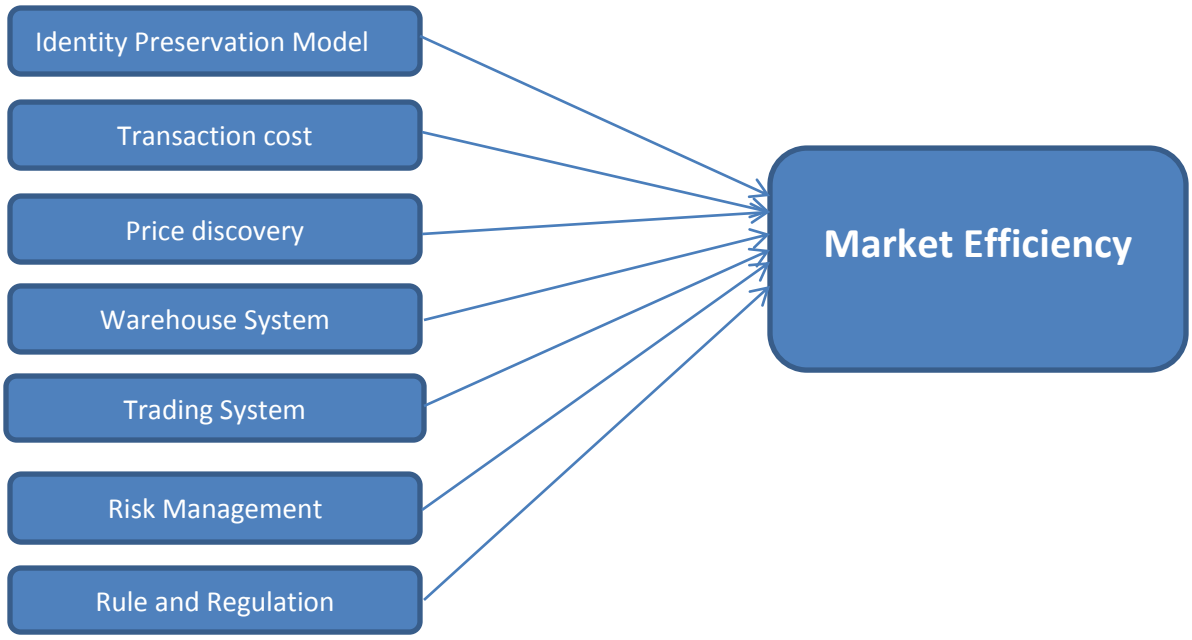


Figure 2-1Conceptual Framework

Source: Researcher own concept

2.4. Research Hypothesis

Identity preservation model: IP (Identity Preservation) is established to confirm the quality, reliability and safety of products, the ECX has launched the ECX traceability system. According to (Dr. M.S. Vasu, 2018) the system, which has activated by conducting with coffee, was expected to increase exports of high-quality Ethiopian coffee worldwide and improve market access for specialty coffee from Ethiopia. The employment of the system had include a wide array of new initiatives, including electronic tracking of bags, innovations in washing and processing, and streamlined storage and transportation processes.. Thus the following hypothesis is formulated:

H1: Identity Preservation has a positive and significant effect on market efficiency of ECX's coffee market efficiency.

Transaction cost: (Gabre Madhin, 2006) discussed that transaction costs are considerably reduced in commodity exchanges by simplifying contact between buyers and sellers; enabling centralized grading of products; ensuring that contracts are enforceable; providing a tool for price discovery; making straightforward transactions with standard contracts; and, transmitting information volumes.

H2: Transaction cost has a positive and significant effect on market efficiency of ECX coffee market efficiency.

Warehouse system: As discussed by 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. In addition the supporting new system of on truck transaction is employed out of the need to somehow address the current concerns and inefficiencies in the ECX warehouse receipting system.(Gebre-Madhin, 2017). Thus the following hypothesis is formulated:

H3: Warehouse system of ECX has a positive and significant effect on market efficiency of ECX coffee market efficiency.

Price discovery: ECX customs software models for producing real time price, volume, alerts for each clearing member's unusual trade activities. The software has the capability to bond transaction prices and trades volumes in each commodity traded in real time and in the past and if there is uncommon changes in trading pattern alert the market surveillance team. Market surveillance team searches all uncommon trading patterns and pass on indication 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). Thus the following hypothesis is formulated:

H4: Price discovery has positive and significant effect on market efficiency of ECX coffee market efficiency.

Risk management: One of the key reasons for trading on the exchange is because it greatly reduces the probability of contract default or non-performance. Currently ECX uses diverse tools to manage operational and market risks. To control the market risks the foremost tackles which are in use by the exchange are settlement guarantee fund, member audit, market analysis. But presently, the method which is largely used is marker surveillance. This system permits the exchange manage its risk by identifying whether two specific parties are engaged in buying and selling only among themselves or are offering only specific prices that can employ the market (Haggblade S., 2001).

H5: Risk management system of ECX has positive and significant effect on market efficiency of ECX coffee market.

Rule and Regulation: As refer to from (The case of ECX, 2011), It was expounded that properly implemented and regulated; commodity exchanges can contribute greatly to the accomplishment of a country's economic and developmental goals and support the bargaining power of weak groups such as small farmers.

H6: ECX rule and regulation has a positive and significant effect on market efficiency of ECX coffee market.

Trading System: An exchange requirements a system to match multiple offers to sell and bids to buy, whether this is a system where buyers and sellers are physically exist or an electronic system where trading is done distantly. The trading platform must be efficient, robust, not too expensive, and fit with clients' needs. With or without technology, every exchange needs a trading system that efficiently contests offers and bids. Electronic trading typically passes a number of other potential advantages. These include limiting informational asymmetries between trading interests, allowing potentially longer trading hours, and increasing access to markets irrespective of one geographical location (Thomas, 2008). Thus the following hypothesis is formulated:

H7: A trading system has a positive & significant effect on ECX coffee market efficiency.

CHAPTER THREE

3. RESEARCH METHODOLOGY

3.1. Introduction

According to Kothari (2004*)* Research methodology is a way to thoroughly solve the research problem. It may be agreed as a science of studying how research is done scientifically. In the study the various steps that are usually adopted by a researcher in studying the research problem along with the logic behind them. The research methodology is used to attain the objectives of a study. 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 are explained and justified

3.2. Research Approach

The study method used is quantitative method with emphasis on conducting questionnaire and analyzing the data by statistical software. Quantitative methods are research techniques primarily dealing with numbers and measurable features.

3.3. Research Design

A research design is the union of conditions for collecting and analysis of data in a way that aims to syndicate relevance to the research purpose with economy in procedure" (Kothari, 2004,) The study employed both descriptive and explanatory techniques in order to describe factor that affect marketing efficiency of ECX coffee market. Descriptive research contains surveys and fact-finding enquiries of different kinds.

The main purpose of descriptive research is description of the state of affairs it exists at present. In this case, describing the factors that affect marketing efficiency of ECX specifically the coffee trade. The major purpose of descriptive research, as the term infers to describe characteristics of a population or phenomenon whereas explanatory research design emphases on studying the relationship between variables. It is to use explanatory design to examine the determining factors.

3.4. Source of Data

According to Kothari (2004), primary data are those composed fresh and for the first time and thus happen to be original in character. And Secondary data, on the other hand, are those which have already been gathered by someone else and which have already been passed through the statistical process Primary data source was collected through employing questionnaire to identify the essential determinant of marketing efficiency of the ECX coffee market. Secondary source of data was also used for this study from, published and unpublished materials and data from ECX. Therefor the source of data for this study included both primary and secondary sources.

3.5. Population of the study

Population is defined as the broad set of units of analysis that are under investigation, while element is the unit from which the necessary data is collected (Davis 2000, pp. 220). The target population of this study is members and Nonmember direct traders (NMDTs) of ECX those are involved in coffee trade from Addis Ababa. Therefore, as per the updated data received from ECX, from the total members (347) and NMDTs (174) the target population of the research was all members and non-member traders only those are participating in coffee trade which are 268 in total. Members (Intermediary 153 and Trading 9), and non-member direct traders are 106.

3.6. Sampling Technique

(Kothari, 2004) indicated the researcher must decide the type of sample to use i.e. he must decide about the technique to be used in picking the item for sample. With regards to sampling techniques, simple random sampling was used to select the sample from the total population of all members who are trading mandating commodities.

3.7. Sample Size

From the total study population of 268 ECX members (trading members and Intermediary) and non-member traders those are engage in buying, selling and exporting of coffee in ECX. Calculating the sample size was determined by the calculation method Using taro Yamane (1967) simplified formula to calculate, the sample size for the study.

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

$$n = \frac{268}{1+268(0.05)^2}$$

n=161

3.8. Data collection procedure

Self- administer questionnaires was distributed. The questionnaire consisted of 2 sections. Section1 has surveying about the general information of the respondent. The questions ask about the gender, age and education, and occupation. Section 2 covers the main parts of the questionnaire which determines the market efficiency of Ethiopian commodity exchange. Here some questions were asked to express their agreement/disagreement in five point liker scale, where 1=strongly disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=strongly agree.

3.9. Method of Data Analysis

Data analysis is the process of systematically applying statistical and logical techniques to describe and exemplify, summarize and review, and calculate data. The researcher used both descriptive statistics and linear regression analysis method to analyze the data acquired from primary sources. The result of Descriptive statistics (mean standard deviation, frequency) is useful in providing information and detecting normality of the collected data. The researcher used linear regression analysis to examine the relationship between dependent and independent variables and also Correlation analysis was also be used to measure linear association relationship between variables, their coefficient indicates the strength of linear association between two variables. SPSS was used to analyze the data.

3.10. Reliability and Validity Analysis

3.10.1. Reliability

According to (Bhattacherjeend, 2012, p.57) Reliability is the degree to which the measure of a construct is consistent or dependable. According to Zikmund et al., (2010) scales with coefficient alpha between 0.6 and 0.7 indicate fair reliability, a Cronbach's alpha score of .70 or

higher are considered as adequate to determine reliability. As indicated below table, the finding of this research obtained an alpha coefficient of 0.905. It is, therefore, the generated data was reliable and free of random errors. The finding of this research could obtain an alpha coefficient of 0.905. It is, therefore, the generated data was reliable and free of random errors.

Table 3-1Cronbach's Alpha

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.905	.911	8

(Source: Researcher's survey, 2020)

3.10.2. Validity analysis

According to Kothari (2004) Validity is the degree to which differences found with a measuring instrument reflect true differences among those being tested. In other words, Validity is the most critical principle and indicates the degree to which an instrument measures what it is supposed to measure. In order to ensure the quality of the research design content and construct validity of the research should be checked. Again According to Saunders, et al. (2009), Validity is soundness or rationality; if the findings are really about what they appear to be or the degree to which results obtained from the analysis of the data actually represents the phenomena under study. The validity of data gathering instrument is confirmed by the ability & willingness of the respondents to provide the information requested. Kothari (2004), Content validity is the degree to which a measuring instrument provides adequate coverage of the topic under study. If the instrument contains a representative sample of the universe, the content validity is good. Its determination is primarily judgmental and intuitive. It can also be determined by using a panel of persons who shall judge how well the measuring instrument meets the standards, but there is no numerical way to express it. Accordingly In order to make the questionnaire valid, relevant & objective to problem, it was properly observed and commented by the advisor, and it also tested

on available respondents, and based on the issues which were not properly clear by the respondents were corrected and refined.

3.11. Ethical consideration

The study is free from bias as the researcher use data from respondent which were collected according to their willing. To keep and promise confidentiality of respondent they were not invited to write their name and address. In this study, the researcher tracked all the ethical procedures.

CHAPTER FOUR

Data Presentation analysis and Interpretation

3.1. Data Analysis and interpretation

In this chapter, the data collected through survey are analyzed using statistical tool of SPSS Version 20. The survey response rate and the reliability of the scales used were discussed in the previous chapter. Here discussion on the respondent's profile and market efficiency of Ethiopian commodity exchange coffee market is determine by Identity preservation, Transactional cost, Warehouse system, Price discovery, Risk management, Rule and Regulation and Trading system then analyzed by descriptive statistical tools. Finally, the results of the principal component analysis and regression analysis are presented.

This chapter contains the descriptive statistics analysis of the dependent and independent variables with discussion of its output were commenced by the researchers under the study. Then correlation and regression analysis and its discussion are presented.

3.1.1. Rates of response

The study had initially targeted 161 respondents and 148 respondents filled and returned their questionnaires thus constituting 91.92% response rate, while 13 of the respondents didn't respond and never returned the questionnaires and constituted 8.07% non-response rate. This collaborate Zikmund (2003) assertion that a response rate of 50% is adequate, whereas a response rate greater than 70% is very good. This implies that based on this assertion; the response rate in this case of 91.92% was very good and facilitated collection of data on variability perspective of the different respondents of the Ethiopian Commodity Exchange respondents.

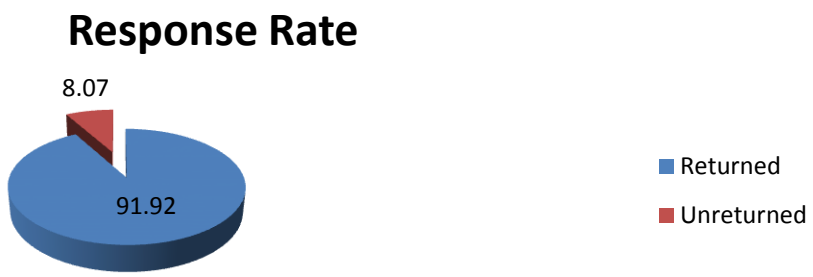


Figure 4-1 Response rate of respondents

3.1.2. Demographic profiles of respondents

The first part of the questionnaire consists of the demographic characteristics of respondents. This part of the questionnaire requested information related to personal and demographic status of the respondents.

Accordingly, the following variables about the respondents were summarized and described in the subsequent table. These variables include; gender, education level, age and occupation.

Table 4--1Response rate of gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	85	57.4	57.4	57.4
	Female	63	42.6	42.6	100.0
	Total	148	100.0	100.0	

Source: Researcher's survey data (2020)

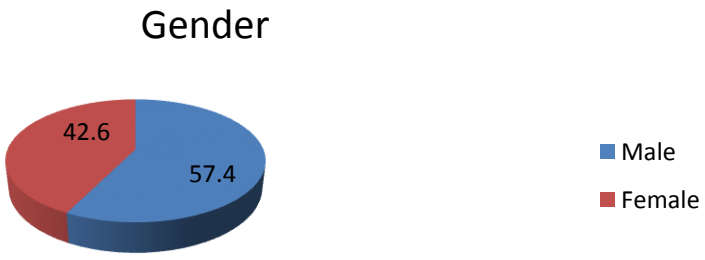


Figure 4-1 Response rate of Gender

Out of the 170 respondents, 85 (57.4%) were male and 63 (42.6%) were female. This shows the number of male respondents in the ECX greater than female respondents. Yet female participation is also encouraging.

Table 4-2 Ages of Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-30	106	71.6	71.6	71.6
	31-59	39	26.4	26.4	98.0
	60 years and above	3	2.0	2.0	100.0
	Total	148	100.0	100.0	

Source: Researcher's survey data (2020)

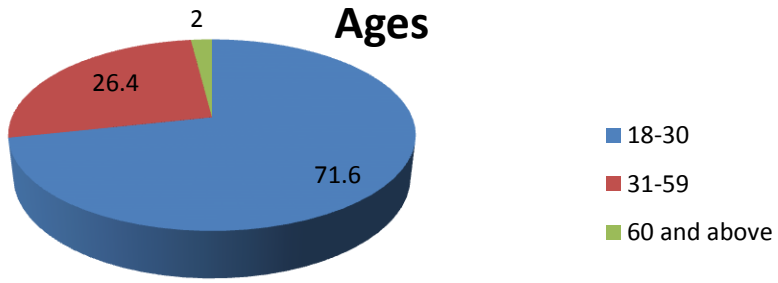


Figure 4-3 Response rate of Ages

Most of the respondents that are 106 (71.6%) are age 18-30 and 39 (26.4 %) of the respondents Age 31-59 and 3 (2%) age above 60. This survey indicates that most of ECX respondents are young.

Table 4-2Educational Qualification of Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Diploma	34	23.0	23.0	23.0
	Degree	114	77.0	77.0	100.0
	Total	148	100.0	100.0	

Source: Researcher's survey data (2020)

Figure 4-2 Response rate of the Educational Qualification

The above figures portrays with regard to educational level of respondents, the highest number are the one who finished first degree which comprising 77% of the respondent, followed by 23% of the respondents who have diploma. This survey indicate that most of respondent in the ECX who have degree and diploma respectively.

Table 4-3Occupation of Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Private Sector employee	131	88.5	88.5	88.5
	Merchant	17	11.5	11.5	100.0
	Total	148	100.0	100.0	

Source: Researcher's survey data (2020)

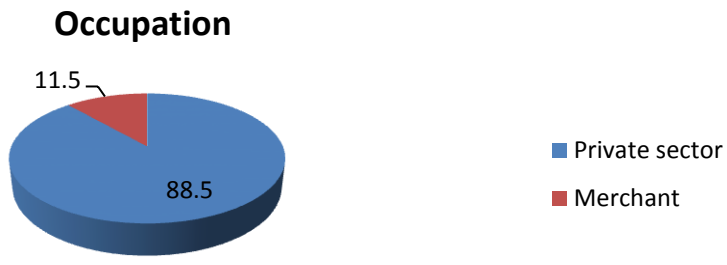


Figure 4-3Response rate of the Occupation

The highest percentage of respondents 88.5% were from private sector employee and followed

11.5% from merchant. This survey indicates that most of respondent were from private sector.

3.1.3. Data analysis related with Descriptive statistics of frequency

Table 4-4Descriptive statistics for Identity Preservation

Inquiry	*Strongly Disagree*		*Disagree*		*Neutral*		*Agree*		*Strongly Agree*	
	Fr.	%	Fr.	%	Fr.	%	Fr.	%	Fr.	%
The ECX new Identity Preservation model fulfills to client's need	4	2.7	5	3.4	47	31.8	79	53.4	13	8.8
The Identity preservation model help to ensure that the ECX price truly reflect the Market information	0	0	21	14.2	40	27.0	74	50.0	13	8.8
The ECX Identity preservation model ensures traceability of coffee.	0	0	7	4.7	48	32.4	76	51.4	17	11.5
I am advantageous of the identity preserve model.	31	20.9	9	6.1	37	25.0	67	43.2	7	4.7

(Source: Researcher's survey, 2020)

Four questions were administered to the respondents and summarized on the above table. The first question provided to the respondents was The ECX new Identity Preservation model fulfills to client's need. 8.8 % of respondents strongly agreed, 53.4% of them agreed, 31.8% are neutral and 3.4% and 2.7% of them disagree and strongly disagree respectively. The second question for respondents was The Identity preservation model help to ensure that the ECX price truly reflect the Market information. 8.8 % of respondents strongly agreed, 50.0% of them agreed, 27% are neutral, 14.2% disagreed and none of them strongly disagree. The third question was The ECX Identity preservation model ensures traceability of coffee. 11.5 % of respondents strongly agreed, 51.4% of them agreed, 32.4% are neutral 4.7% disagreed and none of them strongly disagreed. The last question on identity preservation category was I am advantageous of the

identity preserve model. 4.7 % of respondents strongly agreed, 43.2% of them agreed, 25.0% are neutral and 6.1% and 20.9% of them disagree and strongly disagree respectively.

Table 4-5Descriptive statistics for Transaction Cost

Inquiry	*Strongly Disagree*		*Disagree*		*Neutral*		*Agree*		*Strongly Agree*	
	Fr.	%	Fr.	%	Fr.	%	Fr.	%	Fr.	%
ECX reduce transaction cost by offering cost by lower cost than participants in commodity sector	24	16.2	23	15.5	33	22.3	59	39.9	9	6.1
Higher transaction cost affect ECX coffee market efficiency.	24	16.2	16	10.8	44	29.7	48	32.4	16	10.8
ECX transaction cost by information infrastructure	24	16.2	24	16.2	41	27.7	46	31.1	13	8.8
ECX transaction cost helps the coffee market liquidity to be more efficient.	31	20.9	9	6.1	37	25.0	64	43.2	7	4.7

(Source: Researcher's survey, 2020)

As summarized and presented on the table above four questions were administered for respondents on this category. The first question provided to the respondents was ECX reduce transaction cost by offering cost by lower cost than participants in commodity sector. From 148 respondents, 6.1 % of respondents strongly agreed, 39.9% of them agreed, 22.3% are neutral and 15.5% and 16.2% of them disagree and strongly disagree respectively. The second question for respondents was higher transaction cost affect ECX coffee market efficiency. From 148 respondents, 10.6 % of respondents strongly agreed, 32.4% of them agreed, 29.7% are neutral, 10.8% disagreed and 16.2% off them strongly disagree. The third question was ECX transaction cost by information infrastructure. From 148 respondents, 8.8 % of respondents strongly

agreed, 31.1% of them agreed, 27.7% are neutral 16.2% disagreed and 16.2% of them strongly disagreed. The last question on this category was ECX transaction cost helps the coffee market liquidity to be more efficient. From 148 respondents, 4.7 % of respondents strongly agreed, 43.2% of them agreed, 25.0% are neutral and 6.1% and 20.9% of them disagree and strongly disagree respectively.

Table 4-0-6Descriptive statistics for Warehouse System

Inquiry	*Strongly Disagree*		*Disagree*		*Neutral*		*Agree*		*Strongly Agree*	
	Fr.	%	Fr.	%	Fr	%	Fr	%	Fr	%
ECX warehouses are adequate enough to accommodate all the requests from members	5	3.4	7	4.7	43	29.1	72	48.6	21	14.2
The quality of the warehouse and grading service provided by ECX is satisfactory.	0	0	7	4.7	41	27.7	73	49.3	27	18.2
The ECX warehouse storage cost fair and affordable	0	0	14	9.5	41	27.7	72	48.6	21	14.2
The ECX warehouse is secured from risky casualties like theft and fire.	9	6.1	26	17.6	38	25.7	64	43.2	11	7.4
I am satisfied with the warehouse and grading system of ECX.	1	0.7	24	16.2	48	32.4	50	33.8	25	16.9

(Source: Researcher's survey, 2020)

Five questions were administered for respondents on warehouse system category and summarizes on the above table. The first question provided to the respondents was ECX

warehouses are adequate enough to accommodate all the requests from members. From 148 respondents, 14.2 % of respondents strongly agreed, 48.6% of them agreed, 29.1% are neutral and 4.7% and 3.4% of them disagree and strongly disagree respectively. The second question for respondents was the quality of the warehouse and grading service provided by ECX is satisfactory. From 148 respondents, 18.2 % of respondents strongly agreed, 49.3% of them agreed, 27.7% are neutral, 4.7% disagreed and none of them strongly disagree. The third question was, The ECX warehouse storage cost is fair and affordable. From 148 respondents, 14.2 % of respondents strongly agreed, 48.6% of them agreed, 27.7% are neutral 9.5% disagreed and none of them strongly disagreed. The fourth question on this warehouse system category was, The ECX warehouse is secured from risky casualties like theft and fire. From 148 respondents 7.4% of them strongly agreed, 43.2% of them agreed, 25.7% of them are neutral, 17.6% of them disagreed and 6.1% of them strongly disagreed. The last question on this category was I am satisfied with the warehouse and grading system of ECX. From 148 respondents, 16.9 % of respondents strongly agreed, 33.8% of them agreed, 32.4% are neutral and 16.2% and 0.7% of them disagree and strongly disagree respectively.

Table 4-7Descriptive statistics for Price Discovery

Inquiry	*Strongly Disagree*		*Disagree*		*Neutral*		*Agree*		*Strongly Agree*	
	Fr.	%	Fr.	%	Fr	%	Fr	%	Fr	%
ECX has integrated price discovery to buyers and sellers of coffee.	0	0	23	15.5	44	29.7	55	37.2	26	17.6
ECX perform market surveillance to ensure members integrity and price discovery.	0	0	16	10.8	48	32.4	72	48.6	12	8.1
ECX promote online trading to ensure better	1	0.7	17	11.5	44	29.7	68	45.9	18	12.2

price discovery.										
ECX ensures local and transparent price discovery mechanism.	15	10.1	19	12.8	30	20.3	51	34.5	33	22.3

(Source: Researcher's survey, 2020)

As summarized and presented on the table above four questions were administered for respondents on this category. The first question provided to the respondents was ECX has integrated price discovery to buyers and sellers of coffee. From 148 respondents, 17.6 % of respondents strongly agreed, 37.2% of them agreed, 29.7% are neutral and 15.5% and none of them strongly disagree respectively. The second question for respondents was ECX perform market surveillance to ensure members integrity and price discovery. From 148 respondents, 8.1 % of respondents strongly agreed, 48.6% of them agreed, 32.4% are neutral, 10.8% disagreed and none of them strongly disagree. The third question was ECX promote online trading to ensure better price discovery. From 148 respondents, 12.2 % of respondents strongly agreed, 45.9% of them agreed, 29.7% are neutral 11.5% disagreed and 0.7% of them strongly disagreed. The last question on this category was ECX ensures local and transparent price discovery mechanism. From 148 respondents, 22.3 % of respondents strongly agreed, 34.5% of them agreed, 20.3% are neutral and 12.8% and 10.1% of them disagree and strongly disagree respectively.

Table 4-8Descriptive statistics for Risk Management

Inquiry	*Strongly Disagree*		*Disagree*		*Neutral*		*Agree*		*Strongly Agree*	
	Fr.	%	Fr.	%	Fr.	%	Fr.	%	Fr.	%
ECX use effective risk management mechanism for market actors on spot.	15	10.1	19	12.8	30	20.3	51	34.5	33	22.3

ECX can control the risks that arise due to operational activity.	0	0	35	23.6	35	23.6	48	32.4	30	20.3
ECX can mitigate risk through different mechanisms.	0	0	11	7.4	38	25.7	63	42.6	36	24.3
I am satisfied with the risk management system of ECX.	0	0	17	11.5	38	25.7	69	46.6	24	16.2

(Source: Researcher's survey, 2020)

As summarized and presented on the table above four questions were administered for respondents on risk management category. The first question provided to the respondents was ECX use effective risk management mechanism for market actors on spot. From 148 respondents, 22.3 % of respondents strongly agreed, 34.5% of them agreed, 20.3% are neutral and 12.8% and 10.1% of them strongly disagree respectively. The second question for respondents was ECX can control the risks that arise due to operational activity. From 148 respondents, 20.3 % of respondents strongly agreed, 32.4% of them agreed, 23.6% are neutral, 23.6% disagreed and none of them strongly disagree. The third question was ECX can mitigate risk through different mechanisms. From 148 respondents, 24.3 % of respondents strongly agreed, 42.6% of them agreed, 25.7% are neutral 7.4 disagreed and none of them strongly disagreed. The last question on this category was I am satisfied with the risk management system of ECX. From 148 respondents, 16.2 % of respondents strongly agreed, 46.6% of them agreed, 25.7% are neutral and 11.5% disagreed and none of strongly disagreed.

Table 4-9Descriptive statistics for Rule and Regulation

Inquiry	*Strongly Disagree*		*Disagree*		*Neutral*		*Agree*		*Strongly Agree*	
	Fr.	%	Fr.	%	Fr.	%	Fr.	%	Fr.	%
The ECX regulation helps to ensure that the ECX price truly reflects market information.	1	0.7	21	14.2	45	30.4	67	45.3	14	9.5

The ECX regulation helps to reduce risk for default.	0	0	9	6.1	23	15.5	89	60.1	27	18.2
The ECX regulation helps to enforce contract performance.	13	8.6	11	7.4	29	19.6	61	41.2	36	23.0

(Source: Researcher's survey, 2020)

Three questions were administered in this category and summarized on the above table. The first question provided to the respondents was The ECX regulation helps to ensure that the ECX price truly reflects market information. From 148 respondents, 9.5 % of respondents strongly agreed, 45.3% of them agreed, 30.4% are neutral and 14.2% and 0.7% of them strongly disagree respectively. The second question for respondents was The ECX regulation helps to reduce risk for default. From 148 respondents, 18.2 % of respondents strongly agreed, 60.1% of them agreed, 15.5% are neutral, 6.1% disagreed and none of them strongly disagree .The last question on this category was The ECX regulation helps to enforce contract performance. From 148 respondents, 23.0 % of respondents strongly agreed, 41.2% of them agreed, 19.6% are neutral and 7.4% disagreed and 8.6 of them strongly disagreed.

Table 4-10Descriptive statistics for Trading System

Inquiry	*Strongly Disagree*		*Disagree*		*Neutral*		*Agree*		*Strongly Agree*	
	Fr.	%	Fr.	%	Fr.	%	Fr.	%	Fr.	%
The ECX trade platform make the trade more transparent	0	0	22	14.9	29	19.6	61	41.2	36	24.3
The trading system of ECX uses standard specifications in an efficient way.	0	0	7	4.7	40	27.0	65	43.9	36	24.3

The ECX trading system fulfills client's need.	0	0	13	8.8	36	24.3	76	51.4	23	15.5
The ECX trading system provide performance guarantee if any default occur.	0	0	13	8.8	42	28.4	66	44.6	27	18.2
I am satisfied with ECX trading system.	0	0	10	6.8	46	31.1	77	52.0	15	10.1

(Source: Researcher's survey, 2020)

Five questions were administered for respondents on trading system category and summarizes on the above table. The first question provided to the respondents was The ECX trade platform make the trade more transparent. From 148 respondents, 24.3 % of respondents strongly agreed, 41.2% of them agreed, 19.6% are neutral and 14.9% and none of them strongly disagree. The second question for respondents was, the trading system of ECX uses standard specifications in an efficient way. From 148 respondents, 24.3 % of respondents strongly agreed, 43.9% of them agreed, 27% are neutral, 4.7% disagreed and none of them strongly disagree. The third question was, The ECX trading system fulfills client's need. From 148 respondents, 15.5 % of respondents strongly agreed, 51.4% of them agreed, 24.3% are neutral 8.8% disagreed and none of them strongly disagreed. The fourth question on this warehouse system category was, The ECX trading system provide performance guarantee if any default occur. From 148 respondents 18.2% of them strongly agreed, 44.6% of them agreed, 28.4% of them are neutral, 8.8% of them disagreed and none of them strongly disagreed. The last question on this category I am satisfied with ECX trading system. From 148 respondents, 10.1 % of respondents strongly agreed, 52.0% of them agreed, 31.1% are neutral and 6.8% and none of them strongly disagree.

3.1.4. Over All Mean Score of the determinants of market efficiency

To perform correlation and linear regression analysis on the data, the researcher has created an index for each of the constructs or variables that represent the value of the construct by averaging the subject responses to items.

Table 4-11Mean score of Respondents

Descriptive Statistics			
	N	Mean	Std. Deviation
Identity Preservation	148	3.6115	.56491
Transaction Cost	148	3.3378	.69060
Warehouse System	148	3.5851	.48380
Price Discovery	148	3.6166	.64181
Risk Management	148	3.6166	.84988
Rule and Regulation	148	3.6712	.65867
Trading System	148	3.7486	.64949
Market Efficiency	148	3.5926	.44647
Valid N (listwise)	148		

(Source: Researcher's survey, 2020)

The table indicates that trading system has the highest mean value of 3.7486 and transaction cost has the least mean value of 3.3378. Therefore, it is concluded from the above table that respondents were concerned trading system with a mean score of 3.748.That is they mostly agreed to the questions provided. While from the questions provided mostly they are about neutral.

3.2. Correlation Analysis

The correlation between dependent and independent variables along with the causal effect was analyzed using Statistical Package for Social Science (SPSS version 20). The researcher made in use Pearson Correlation coefficient to show the strength of relationship among the variables

The below correlation matrix used to provide evidence of convergent validity and Pearson correlation coefficients that reveal magnitude and direction of relationships (either positive or negative) and the intensity of the relationship (-1.0 + 1.0). Correlations are feasibly the most basic and most useful measure of association between two or more variables Marczyk, Dematteo and Festinger, 2005). General guidelines of correlations of .01 to .03 are considered small, correlations of 0.3 to 0.7 are considered moderate, correlations of 0.7 to 0.9 are considered

large and correlations of 0.9 to 1.0 are considered to be very large (Marczyk, Dematteo and Festinger, 2005).

As per table above, the coefficient show that all independent variables were positively related with dependent variables that market efficiency. Out of the seven independent variables trading system showed the highest positive relation with the dependent variable (0.762) followed by price discovery (0.730) , Risk management (0.724) , and Rule and regulation (0.717). Identity preservation model (0.699), Warehouse system (0.462), Transaction cost (0.378), are the independent variables that shows moderate relationship with the dependent variable.

The table also shows the correlation of the independent variables within themselves. It can be noted that all variables are positively correlated with each other and where most of them have moderate relationship.

Table 4-12 Correlation of variables

Correlations

		IP	TC	WS	PD	RM	RURE G	TS	ME
I P	Pearson Correlation	1	.389**	.520**	.568**	.595**	.585**	.599**	.699**
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000	.000
	N	148	148	148	148	148	148	148	148
T C	Pearson Correlation	.389**	1	.330**	.449**	.374**	.430**	.335**	.378**
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.000	.000
	N	148	148	148	148	148	148	148	148
W S	Pearson Correlation	.520**	.330**	1	.467**	.381**	.495**	.412**	.462**
	Sig. (2-tailed)	.000	.000		.000	.000	.000	.000	.000
	N	148	148	148	148	148	148	148	148
P D	Pearson Correlation	.568**	.449**	.467**	1	.758**	.617**	.723**	.730**
	Sig. (2-tailed)	.000	.000	.000		.000	.000	.000	.000
	N	148	148	148	148	148	148	148	148
R M	Pearson Correlation	.595**	.374**	.381**	.758**	1	.748**	.801**	.724**
	Sig. (2-tailed)	.000	.000	.000	.000		.000	.000	.000
	N	148	148	148	148	148	148	148	148
R U R G	Pearson Correlation	.585**	.430**	.495**	.617**	.748**	1	.708**	.717**
	Sig. (2-tailed)	.000	.000	.000	.000	.000		.000	.000
	N	148	148	148	148	148	148	148	148
T S	Pearson Correlation	.599**	.335**	.412**	.723**	.801**	.708**	1	.762**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000		.000
	N	148	148	148	148	148	148	148	148
M E	Pearson Correlation	.699**	.378**	.462**	.730**	.724**	.717**	.762**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	
	N	148	148	148	148	148	148	148	148

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

3.3. Test for Linear Regression Model Assumptions

3.3.1. Test of normality of the Data

Among the others, one of the assumptions was normality of the data that should be tested before running the analysis of the data using Skewness and Kurtosis. According to (Fieled 2005), normally disseminated data assumed that the data are from one or more normally distributed populations.

The rationale behind hypothesis testing relies on having normally distributed populations and so if these assumptions are not met then the logic behind hypothesis testing is flawed. Therefore, value of S (Skewness) and K (Kurtosis) and their respective standard errors were computed. An absolute value between -2 and +2 score for Skewness and Kurtosis is expected to be significant at $p< 0.05$. Large sample will give rise to small standard errors and so when sample sizes are big, significant values arise from even small deviations from normality for both skewness and Kurtosis (Fieled, 2005)

Table 4-13Test of Normality

Descriptive Statistics					
	N	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Std. Error
Identity Preservation	148	-.149	.199	.043	.396
Transaction Cost	148	.174	.199	-.297	.396
Warehouse System	148	.129	.199	.087	.396
Price Discovery	148	-.085	.199	-.748	.396
Risk Management	148	-.204	.199	-1.134	.396
Rule and Regulation	148	-.346	.199	-.371	.396
Trading System	148	-.344	.199	-.803	.396
Market Efficiency	148	-.037	.199	-.831	.396
Valid N (listwise)	148				

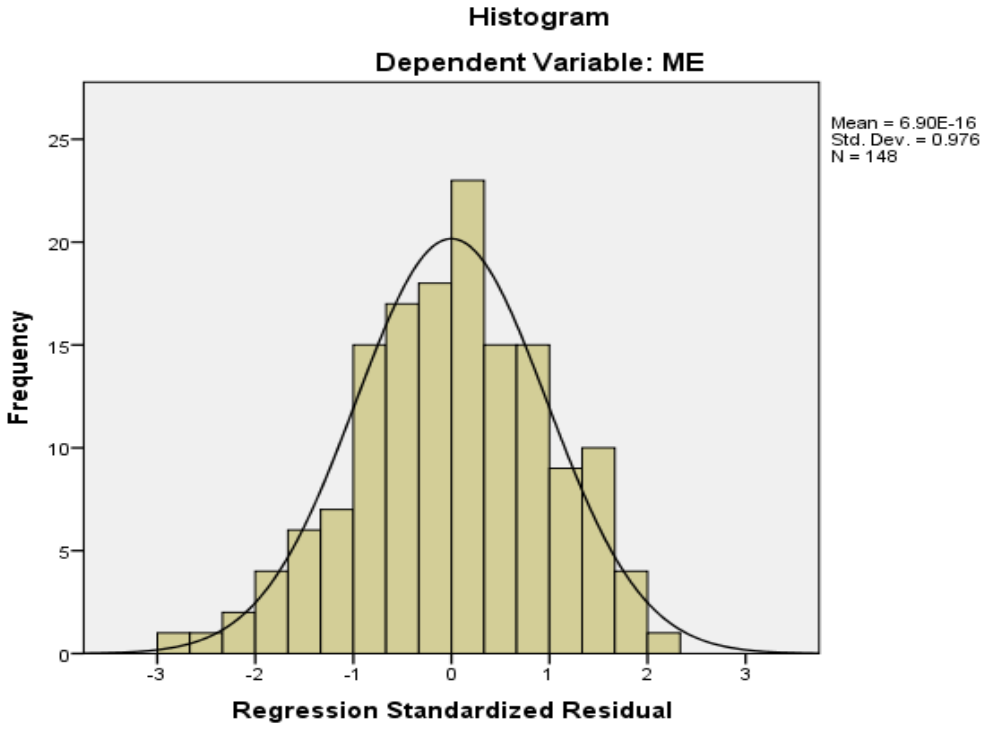
(Source: Researcher's survey, 2020)

As we can see from the table above all the absolute value of skewness and kurtosis are between -2 and +2

3.3.2. Normality Assumption

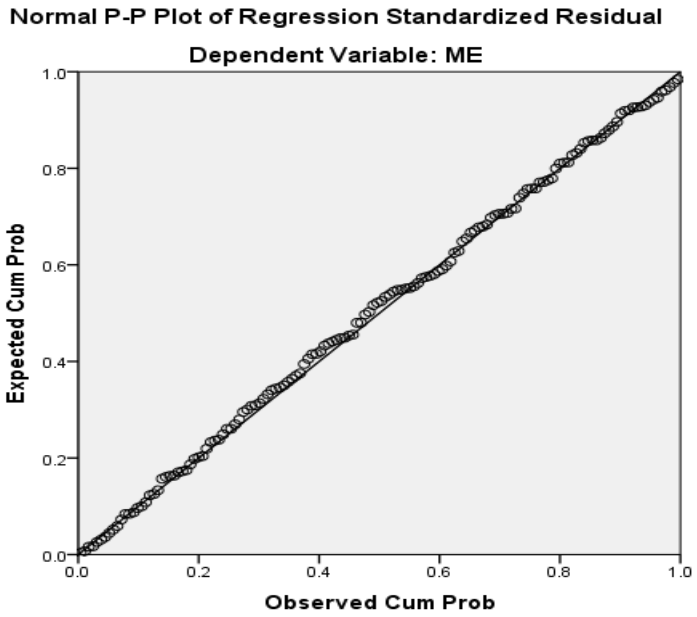
Data normality test is the first test that must be done before the data was processed based on the models of the research especially, if the purpose of the research is inferential. Normality test is intended to determine the distribution of the data in the variable that will be used in the research, data were good and decent used in research is normally distributed data (Ruth, 2017). Normality of a data should be tested before running the regression analysis because multiple regressions require that the independent variables in the analysis be normally distributed.

From the Histogram figure below it can be noted that the distribution is normal curve, demonstrating that data witnesses to the normality assumption. As the assumption holds as the histogram was a bell- shaped and the residuals were normally distributed around its mean of zero which indicates that the data were normally distributed, and the inferences made about the population parameters from the sample statistics tend to be valid.



(Source: Researcher's survey, 2020)

Figure 4-4Normality Histogram figure



(Source: Researcher's survey, 2020)

Figure 4-5Normal P-P Plots

Now scroll all the way down to the normal P-P plot. When see a diagonal line and a bunch of little circles. Ideally, the plot becomes look like the figures above. If the data is not normal, the little circles will not follow the normality line. Due to this reason the researcher data become normal.

3.3.3. Multicollnearity Test Assumption

In regression, multicollinearity occurs when independent variables in the regression model are more highly correlated with each other than with the dependent variable. When the independent variables are highly correlated with one another; they are basically measuring the same thing. In other words, when two variables are highly correlated, they both communicate basically similar information. One way to assess multicollinearity is to inspect correlations among the independent variables. It was argued that, Correlation coefficient below 0.90 may not cause serious multicollinearity problem, (Hair et al. 2006 cited by Muhammed 2012). Multicollinearity can be detected using tolerance value and variance inflator factor (VIF) value. Multicollinearity does not exist among all the independent variables provided that the tolerance value of all the independent variables was greater than 0.1 and the VIF values of all the independent variables are also less than 10.

Table 4-14 Multicollinearity

Model	*Collinearity Statistics*	
	Tolerance	*VIF*
Identity Preservation	.507	1.971
Transaction Cost	.735	1.360
Warehouse System	.634	1.577
Price Discovery	.342	2.928
Risk Management	.240	4.162
Rule and Regulation	.351	2.852
Trading System	.297	3.371

(Source: Researcher's survey, 2020)

As from the table above all independent variables are greater than 0.1 tolerance value and the VIF value of all the independent variables are also less than 10 due to this Multicollinearity do not exist.

3.3.4. Homoscedasticity assumption

Homoscedasticity means that the variance about the regression line is the same for all variables known as homogeneity of variance. The assumption could be checked using scatter plot between residual and predicted or independent variable. Below graph show that as the predicted values increase, the variation in the residuals should be roughly similar.

The scatter plot of the residuals below appeared right below the normal scatter plot in data output. Ideally, it was get a plot that looks something like the plot above. The data looks like shot it out of a shotgun it does not have a clear pattern, there are points equally distributed above and below zero on the X axis, and to the left and right of zero on the Y axis. These indicate that the data become homoscedasticity because it looks somewhat like a shotgun blast of randomly distributed data.

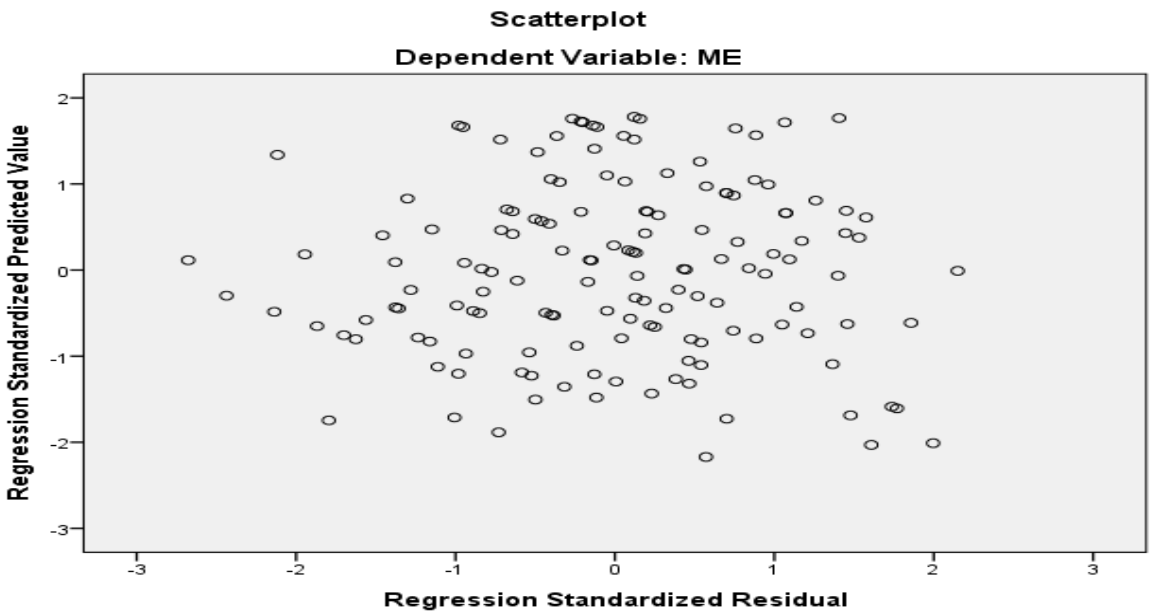


Figure 4-6Homoscedasticity assumption

3.3.5. ANOVA

The ANOVA test is a way to discover out if survey results are significant. In other words the ANOVA test helps us to figure out if we need to reject the null hypothesis or accept the alternative hypothesis.

Table 4-15 ANOVA

ANOVA

Model		Sum of Squares	Df.	Mean Square	F	Sig.
1	Regression	21.397	7	3.057	54.137	.000[b]
	Residual	7.905	140	.056		
	Total	29.302	147			

a. Dependent Variable: Market Efficiency

b. Predictors: (Constant), Trading system, Transaction Cost, Warehouse System, Identity Preservation, Rule and Regulation, Price Discovery, Risk Management

As can be seen from the table above it can be said that the entire alternative hypothesis were accepted. The ANOVA should be considered to assess the statistical significance of the results. If the test equals 0 it means there is no relationship between the dependent and independent

variables. As can be seen from the ANOVA table, the independent variable significantly predicts the dependent variables, 54.137.

3.3.6. Model Summary

As we can see from the model summary in the table 4.16, the correlation between the five independent attributes and the dependent variables indicated that there is moderate relationship (.855) and the weighted combination of the predictor variables explained or affect approximately 73% (R square) variation level of marketing efficiency dependent variable is explained by the independent variable (Identity preservation, Transaction cost, Warehouse system, Price discovery, Risk management, Rule and Regulation and Trading system.) the remaining 27% is by extraneous variables that can affect dependent variable.

Table 4-16Model Summary

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.855[a]	.730	.717	.23762

a. Predictors: (Constant), Trading System, Transaction Cost, Warehouse System, Identity Preservation, Rule and Regulation, Price Discovery, Risk Management

b. Dependent Variable: Market Efficiency

(Source: Researcher's survey, 2020)

3.3.7. Regression Analysis

Regression analysis allows market researchers to analyze relationships between one independent and one dependent variable. In marketing applications, the dependent variable is generally the outcome we care about, while the independent variables are the tools we have to achieve those outcomes with. It can also help make predictions (Mooi & Sarstedt, 2011 cited Andualem Getie, 2017).

Table 4-17 Regression Analysis

Model	*Unstandardized coefficients*		*Standardized coefficients*	*t*	*Sig.*
	B	Std. Error	Beta		
Constant	1.006	.169		5.956	.000
IP	.222	.049	.281	4.562	.000
TC	-.018	.033	-.028	-.555	.580
WS	-.016	.051	-.018	-.323	.747
PD	.185	.052	.267	3.549	.001
RM	-.006	.047	-0.012	-.137	.892
RUREG	.157	.050	.232	3.128	.002
TS	.181	.055	.264	3.270	.001

(Source: Researcher's survey, 2020)

The Table above shows the constant, beta, and significance level of each variable. According to the above table, the standardized coefficients for the seven independent variables; Identity preservation, Transaction cost, Warehouse system, Price discovery, Risk management, Rule and regulation and Trading system are **.**281, -.028, -.018, .267, -0.012, .232, .264 respectively. The strength of each independent variable effect on dependent variable can be tested by standardized Beta Coefficient. The regression coefficient explains the average amount of change in the dependent variable that is caused by a unit change in the independent variable. The larger value of Beta coefficient an independent variable has, it brings the more support to the independent variable as the more significant determinant in predicting the dependent variable. So here Identity preservation model is the one that support the dependent variable the most. As the constant and b values are known. The model for this regression was:

$OME=\alpha+\beta1x1+\beta2x2+\beta3x3+\beta4x4+\beta5x5+\beta6+\beta7$……..(1)

$OME=\alpha+\beta1IP+\beta2TC+\beta3WS+\beta4PD+\beta5RM+\beta6RuREG+\beta7TS$……(2)

OME=0.169+0.281IP-0.028TC-0.018WS+0.267PD-0.012RM0.232RUREG0.264TS… (3)

The regression table also indicates that the seven variables which are; Identity preservation, Transaction cost , Warehouse system, Price discovery, Risk management, rule and regulation and Trading system influence ECX coffee market efficiency at 95% confidence interval with a sig. level of 0.000, 0.580, 0.747, 0.001,.892,.002 and 0.001 respectively.

The model suggests that identity preservation has the strongest effect on ECX coffee trade efficiency (0.281) with sig. level (.000) followed by Price discovery (0.267) with sig. level (.001), Trading system (0.264) with sig. level (.001) and rule and regulation (0.012) with sig. level (.002). Therefore, H1, H4, H6 and H7 are supported. However, there were no significant relationships between transaction cost, warehouse system and risk management, since they have $p>0.05$. Therefore, hypotheses H2, H3 and H5 are rejected. Thus, it is conclusive that transaction cost, warehouse system and risk management are not the determinants of ECX's coffee market efficiency among respondents.

As indicated on the table 4.19, Transaction cost has no positive and significant effect on market efficiency of ECX coffee market. One of the main purposes of Ethiopian commodity exchange is to reduce transaction cost so that to enhancement market efficiencies. Yet the result is supported with different researches, like (Manuel Hernandez, Shahidur Rashid, Solomon Lemma, and Tadesse Kuma, 2017), the strict regulations that the ECX has introduced into the country's coffee market have resulted in higher transaction costs. Another supporting study is, (UNCTAD, 2009) 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. (Gabre-Madhin, 2001) also indicated that the poor infrastructural development in the country, is the source of higher transaction cost and unfair distribution of trade benefits. The study of kassaye (2019) also argues that ECX transaction cost is high. *There are different costs that are incurred by ECX traders like trading fee, loading and unloading fee, quality and grading cost, product transfer cos. So still the exchange cannot reduce the cost to the extent that it can affect the efficiency significantly among respondents*.

Table 4-18Hypothesis testing

Hypotheses	*Accepted/ Rejected*
H1: *Identity Preservation has positive and significant effect on market efficiency of ECX coffee market.*	***Accepted***
H2: *Transaction cost has positive and significant effect on market efficiency of ECX coffee market.*	***Rejected***
H3: *Warehouse system has positive and significant effect on market efficiency of ECX coffee market.*	***Rejected***
H4: *Price discovery has positive and significant effect on market efficiency of ECX coffee market.*	***Accepted***
H5: *Risk Management has positive and significant effect on market efficiency of ECX coffee market.*	***Rejected***
H6: *Rule and Regulation has positive and significant effect on market efficiency of ECX coffee market.*	***Accepted***
H7: *Trading system has positive and significant effect on market efficiency of ECX coffee market.*	***Accepted***

The table also indicated that Warehouse system has no positive and significant effect on market efficiency of ECX coffee market. This result is consistence with Gideon (2010) quality of warehouse and storage management skills tends to be highly variable in most African countries. (Gebre-Madhin E., 2017) also indicated that the idea of on truck trading born out of the need to somehow address the current concerns of inefficiencies in the ECX warehouse system. This notion is risks injecting even more inefficiencies. It hardly resolves the issues around delays and frauds from manual sampling of commodities on truck as well as grading and weighing of commodity. *So even if the exchange warehouses are expanding, the standard of the warehouse infrastructures also automating and digitalizing of the system are still in question among the respondents.*

The table also presented that Risk management has no positive and significant effect on market efficiency of ECX coffee market. Risk management specially price risk, is a core objective in establishing any exchange. Yet this result is consistence with (Kassaye M. 2019) the current risk management of ECX did not cover adequately the scope and importance of the commodity price risk problem. Besides the risk management techniques(specially the mainly

used market surveillance) fails to provide ways for assessing, monitoring, and managing the price risks faced by individual producers, producer groups, banks, trading companies, and other firms operating in commodity markets. *It can be understood that ECX risk management system is not sufficient among respondents and since risk management is vital in commodity market .further effort is required from ECX to manage various risks*

The other four identified factors (Identity preservation, price discovery, rule and regulation and trading system) are indicated on the table that they have positive and significant effect of ECX coffee market efficiency. Concerning Identity preservation this study result is consistent with According to (Dr. M.S. Vasu, 2018) ensure the quality, consistency and safety of their products, the ECX in collaboration with USAID and IBM, has launched the ECX traceability system. (Assefa B. 2018) also emphasis on his study that even though ECX create a more reliable way to connect buyers and sellers there are still problems which are faced by all actors in value chain, infrastructural problems, and traceability issue are among the mentioned ones.

One of the objectives of ECX is providing a mechanism for price discovery According to this study price discovery has positive and significant effect on ECX coffee market efficiency. This result is consistence to other studies (Gebremedhin & Goggin, 2005), Justified that when the volumes of trade on the exchange are sufficiently large to justify that price discovery according to true market fundamentals is occurring, and 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 price discovery.

Regarding trading system and rule and regulation, this study's result which shows that both have positive and significant effect on market efficiency of ECX coffee market is supported by different studies among them, Sarkar and Tozzi (1998), argues that although open outcry systems were more effective to trade highly active contracts, electronic trading has the potential to enhance operational efficiency and reduce cost. Furthermore, Thomas (2008) stated that Electronic trading leads to reduced price movement, then it would lead to lower volatility and hence lower risk in the market.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

3.4. Summary of major findings

The objective of this study was to examine the market efficiency of Ethiopian Commodity Exchange coffee market that the institution promised and working toward. Out of the total of 161 questionnaires distributed 148 of them are collected and processed as it is found to be sufficient to capture the required information.

In order to do this, seven determinants of market efficiency variables are used. These variables are Identity preservation, Transaction Cost, Warehouse system, Price discovery, Risk management, Rule and Regulation, Trading System.

Sampling and Data collection

- A sample size was selected using simple random technique based on the theoretical framework and objectives of the study.

- Forty three items were provided in a 5 point Likert scale to the respondents. The gathered data were analyzed by means of descriptive and inferential statistics using SPSS version 20 software.

From the Descriptive statistics, the following result was achieved:

- The findings of the descriptive analysis regarding ages, gender, occupation and educational background indicate that majority of the ECX respondent are youth ,male, employees at private organizations and degree holders respectively.

From the inferential statistics part the following results were achieved:

- The finding from the correlation analysis indicates that these seven independent variables are found to have moderate and strong relationship with market efficiency that revealed from the Pearson's Correlation Coefficient. Out of the seven independent variables

trading system showed the highest positive relation with the dependent variable (0.762) followed by price discovery (0.730) , Risk management (0.724) , and Rule and regulation (0.717). Identity preservation model (0.699), Warehouse system (0.462), Transaction cost (0.378), are the independent variables that shows moderate relationship with the dependent variable.

- Then the regression analysis reveals, Identity preservation(.281), Trading system(.264), Rule and Regulation(.232), and price discovery(.267) have significant and positive effect on market efficiency while warehouse system(-.018), risk management(-.012) and transaction cost(.028) has insignificant effect on market efficiency of ECX coffee market.

3.5. Conclusion

The findings support determinants of ECX coffee market efficiency. Thus, from the initially proposed market efficiency sources, Identity preservation, Price discovery, rule and regulation and trading system showed significant and positive effect while warehouse system, risk management and transaction cost have insignificant influence on the market efficiency of ECX coffee market.

One of the objectives of this study was to find out which dimension has the most significant impact in determining the market efficiency in Ethiopian Commodity Exchange coffee market and the results revealed that Identity preservation was the most significant variable affecting market efficiency. However, the other dimensions also have influenced market efficiency with different intensity

From this study the researcher reaches in the conclusion that potential to reduce many of the transaction costs associated with the trade of coffee are in demand. Regarding the warehouse system even if expansion is appreciated still the problem related to automating and enhancing the efficiency is in demand. And also the identity preservation model is doing well which is very much valued. e- Auction and rule and regulation are also appreciated.

3.1. Recommendations

- As researcher analyzed it from the finding, the newly employed identity preservation model has significant effect on the efficiency so the researcher recommends if the identity preservation model can also be employed to other commodities, so that traceability is achieved for other commodities too.

- The researchers recommend both for ECX and government to introduce modern technology based inventory management system, to attract and invite warehouse investors for standard and modern warehouse infrastructure so that there will be better management and better quality consistency and increase efficiency.

- The researcher recommends the concerned ECX family that even if it needs careful design the introduction of forward contracts and futures contracts be applied as it was planned. This can bring the possibility of hedging which will enhance price risk management.

- 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 benefits to gather more foreign currency in the presence of exporting trade system for those policy makers of the country.

3.2. Further Area of Investigation

The limitation of this study is focusing on some determinants of efficiency. The study had examined determinants of the market efficiency by focusing only on coffee market in addition only on the head quarter ECX members and NMDTs only not including other geographical locations, other ECX market actors.. Similarly studies could also be done by incorporating the other determinants of ECX coffee 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.

APPENDIX

Questioner

Dear participants:

General introduction: My name is Yordanos Yalew. I am MA student at Addis Ababa university school of commerce and I am doing my thesis research entitled, "**Determinants of market efficiency of Ethiopia commodity exchange the case of coffee market".** This Questioner is designed to gather data from ECX. The aim of this survey is to identify and measure factors affect marketing efficiency of ECX. Your genuine, frank, timely response is vital for the success of my study. I want assure you that your privacy for responding to this questionnaire is completely kept in secret. I know that your time is valuable, and I hope that you will take the time to complete the questionnaire.

Please attempt to answer all the questions and click one in appropriate box that best suits your Perspective for each statement.

Thank you for your kind cooperation and precious.

A. Demographic information

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

1. Gender: Male □ Female □

2. Age: 18-30 years □ 31-59 years □ 60 years and above □

3. Education qualification: Primary (≤ Grade 8) □ Secondary (9 – 12th Grade) □

Diploma □ Degree □ Post-graduate or above □

1. Occupation: Government employee □ Private sector □ Merchant□ others……

No		**Level of agreement**				
		1	2	3	4	5
A	**Identity Preservation**					
1	The ECX new Identity Preservation model fulfills to client's need					
2	The Identity preservation model help to					

	ensure that the ECX price truly reflect the Market information					
3	The ECX Identity preservation model ensures traceability of coffee.					
4	I am advantageous of the identity preserve model					
B	**Transaction Cost**					
1	ECX reduces transaction cost by offering cost by lower cost than participants in commodity sector.					
2	Higher transaction cost affect ECX coffee market efficiency.					
3	ECX transaction cost by information infrastructure.					
4	ECX transaction cost helps the coffee market liquidity to be more efficient.					
C	**Warehouse system**					
1	ECX warehouses are adequate enough to accommodate all the requests and is secured from risky casualties like theft and fire					
2	The quality of the warehouse and grading service provided by ECX is satisfactory.					
3	I am satisfied with the ECX warehouse receipt system.					
4	The ECX new warehouse system: bonded yard is suitable and efficient.					
5	I am satisfied with the warehouse and grading system of ECX.					
D	**Price discovery**					
1	ECX has integrated price discovery to buyers and sellers of coffee.					
2	ECX perform market surveillance to ensure members integrity and price discovery.					
3	ECX promote online trading to ensure better price discovery.					
4	ECX ensures local and transparent price discovery mechanism.					
E	**Risk Management**					
1	ECX use effective risk management mechanism for market actors on spot.					
2	ECX can control the risks that arise due to operational activity.					

3	ECX can mitigate risk through different mechanisms.					
4	I am satisfied with the risk management system of ECX.					
F	**Rule and Regulation**					
1	The ECX regulation helps to ensure that the ECX price truly reflects market information.					
2	The ECX regulation helps to reduce risk for default.					
3	The ECX regulation helps to enforce contract performance.					
G	**Trading System**					
1	The ECX trade platform make the trade more transparent					
2	The trading system of ECX uses standard specifications in an efficient way.					
3	The ECX e-Auction which is identity preserved trading system fulfills client's need.					
4	The ECX trading system provide performance guarantee if any default occur.					
5	I am satisfied with ECX trading system.					
H	**Market Efficiency**					
1	I am satisfied with the market efficiency strategy and plan of the exchange.					
2	ECX achieved its vision of revolutionizing Ethiopian Coffee market through dynamic and efficient market.					
3	I consider the presence of market efficiency for selecting this business.					
4	Identity preservation model have significant and positive impact on market efficiency of the coffee market					
5	ECX's transaction cost has positive and significant impact on market efficiency of the coffee market					
6	Warehouse system has positive and significant impact on market efficiency of the coffee market					
7	Price discovery has positive and significant impact on market efficiency of the coffee market.					

8	Risk management has positive and significant impact on market efficiency of the coffee market.					
9	Rule and Regulation has positive and significant impact on market efficiency of the coffee market.					
10	Trading system has positive and significant impact on market efficiency of coffee market.					

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