St. Mary's University

Committed to Excellence!

Proceedings of the 12th Multi-Disciplinary Seminar

Research and Knowledge Management Office (RaKMO)

August 25, 2020
St.Mary's University
Addis Ababa, Ethiopia

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12th Multi-Disciplinary Seminar

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Preface

St. Mary's University has been organizing Multidisciplinary Seminar (MDS) since 2009. The purpose of the Seminar is to create opportunities for academicians and practitioners to share their research findings and key insights with their peers and academic staff. Due to COVID-19 outbreak, the 12th MDS was conducted virtually. Ten papers were presented at the Seminar and the papers had various focus areas; from exploring the policy and legal framework on extractive resources to external debt and economic growth, agricultural trade and regional integration, to external debt and economic growth, from climate-smart agricultural practices to corporate governance and consumers' cooperative Societies and from analyzing Bank's efficiency to language and politics in Sub-Saharan Africa.

The researchers came from three different institutions; i.e., Addis Ababa University, Zemen Bank and St. Mary's University. However, the lions share goes to St. Mary's University, as eight papers were presented by the University's staff and graduate students. Paper presenters shared how they identified their research gap, the methodologies employed, findings they have come up with and the research ethics they have pursued while conducting their research.

SMU publishes papers presented at the Seminar every year in proceedings for wider dissemination and use. In doing so, the University recognizes the contributions of the scholars and the practitioners for their valuable outputs.

Therefore, this proceeding is a compilation of eight papers presented at the 12th MDS on the 25th of August 2020. The University would like to note that the ideas reflected in the papers are those of the authors and do not necessarily represent the position of the Research and Knowledge Management Office of St. Mary's University.

The Research and Knowledge Management Office of St. Mary's University would like to thank all participants who contributed to the realization of the event and publication of the proceedings.

St.Mary's University

Impact of Global Governance of Extractive Resources on Ethiopian Extractive Resource Policy and Legal Framework
Binnyam A. Idris, St. Mary's University

Abstract

Ethiopia has policies and laws meant to govern the extractive resources and industries. The policies and laws in place share cohesion compared with the fragile global governance system dominated by bilateral and multilateral treaty arrangements and voluntary standards. A closer scrutiny of the existing legal and policy regime reveals the influence the global forces of the world have on their content as well as structure. Natural resources, being of high importance to economic development and the associated political tension, raised in benefit sharing, call for a governance regime that responds both to the domestic demands as well as international competition. The continued influence of global actors and globalization on the domestic policy and legal space specifically manifested by liberal thoughts of 'transparency in resource governance' can act as a barrier to the resource gain threshold or as a Godsend in battling the resource curse. This paper argues that Ethiopian Extractive Industries policy and legal regime is influenced and will continue to be influenced by the global governance structure and there is a need for a contextual approach and further study on governance of extractive industries as a way to escape the fears of globalization while guaranteeing its benefits.

Keywords: Extractive resources, Extractive Industries (EIs), globalization, extractive industries governance, Extractive Industry Transparency Initiative (EITI)

Introduction

This paper evaluates the impact of globalization, resulting in shrinking domestic policy and legal space in the Extractive Industries (EIs) of Ethiopia. The law and globalization interlink and its effects have been one recent area of interest for many scholars. Different kinds of literature have addressed the effects of globalization in various areas of law as well as the effect law has in shaping globalization and assess the shift in jurisprudence towards the development of global law. Globalization of law has also affected the Extractive Industries (EIs). The peculiar features of the industry coupled with the huge importance it bears for a nation's development and global economy, efforts of a different sort have been made in the past decade to develop a harmonized governance structure. Although at this stage, we cannot speak of a global structure that deals with the core concerns of EIs, we can still identify a multitude of norms meant to govern areas of contention in the EIs with far-reaching implications on domestic policy and law-making space. Ever since the modern legal structure was in place in Ethiopia, the governance of EIs was a matter of priority. The laws have gone through different phases of development, and the process is continuing to this date.

By evaluating and examining the global governance in place for EIs and exploit the workings of different institutions with global influence, the paper tries to identify the impact such has

made on the policy and legal space of Ethiopian EIs. To achieve this purpose, the work is divided into five parts. The first part focuses on Globalization and EIs. A brief presentation of what EIs are and how they are characterized is made with the notions of globalization defined. This will be followed by an assessment of the existing multilateral norms governing EIs. This will help in understanding the global laws in place together with the commonalities and points of variation in each. In a related discussion, part three identifies the core issues of concentration by the global structure. The scope of global governance is a function of the impact the governance endeavors to achieve. Accordingly, three core areas of concern will be discussed in this section. The next part of the paper devotes wide coverage to the Extractive Industry Transparency Initiative (EITI) as a governance structure for the increasing influence this voluntary governance has made on the global EIs and the direct participation Ethiopia is making in this framework. The final part of the paper addresses the impact EITI and other governance structures have made on the Ethiopian legal and policy space. This is the part where the influence of multilateral norms with the advent and development of globalization is made to reflect itself at the local policy and legal regime. The workings of different actors that foster the sharp pace of influence of globalization and resulting harmonized legal regimes as the World Bank Group will be highlighted with special reference to Ethiopia. The paper rests with a final remark as to how the Ethiopian Legal Regime should handle the global influence.

Extractive Industries and Globalization

Extractive Industries (EIs) are operations that harvest resources such as metals, minerals, aggregates, and other items from the earth.[1] Any process that involves the extraction of raw materials from the earth to be used by consumers like oil and gas drilling, mining, and quarrying falls in the extractive industry scope.[2]

The UN defines EIs as "*Those industries engaged in finding, developing, producing, and selling non-renewable resources such as crude oil, natural gas, and hard minerals and their products.*"[3] The Cambridge English dictionary expands the definition to encompass the people who engage in the industry.[4]

Extractive industries contribute to a nation's overall economic development.[5] In fact, in some countries, the reliance on the industry is very high that it becomes impossible to imagine the nation's economic existence in its absence.[6] This fact holds true for most African countries.[7]

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[1] Extractive Industry. Business Dictionary.com. WebFinance.Inc.
http://www.buisnessdictionary.com/definition/extractive industry.html (accessed: June 21, 2018).
[2] Ibid.
[3] UN, (2017) *United Nations Handbook on Extractive Industries Taxation* 5, New York.
[4] Extractive Industry. Cambridge University Press.
https://dictionary.cambridge.org/dictionary/english/extractive-industry (accessed: June 21, 2018).
[5] Wise, Holly & Sokol Shytylla, (2007) *The role of the extractive sector in expanding of economic opportunity*, CSR Report No.18.Cambridge.MA: Kennedy School of Government, Harvard University.
[6] For a detailed statistical presentation of dependency on extractive industry see Roe, Alan; Dodd, Samantha (2017): *Dependence on extractive industries in lower-income countries: The statistical tendencies*, WIDER Working Paper, No. 2017/98, ISBN 978-92-9256-322-6, UNU-WIDER, Helsinki.
After an evaluation of 72 countries over a period of 18 years their finding was in favour of increasing dependence as they claim "dependence on the extractive industries has increased in the 18-year period between 1996 and 2014 in low- and middle-income countries, which are the main concern of this paper" p9.
[7] Ibid.

EIs occupies an outsize space in the economies of many resource-rich countries, accounting for at least 20 percent of total exports, and at least 20 percent of government revenue, in 29 low-income and lower-middle-income countries of which, in eight of these countries the EIs accounts for more than 90 percent of total exports and 60 percent of total government revenue.[8] Meanwhile, the expansion of the extractive sector has spurred investment in these countries, reflected in the quintupling of foreign direct investment in Africa between 2000 and 2012—from $10 billion to $50 billion.[9] Investment in the EIs has the potential to transform a developing nation to its desired economic development.[10] Yet a failure to manage it prudently may result in economic, social, and environmental harm.[11] This has called for the development of different regulatory frameworks to govern the industry and the main actors in the industry[12]

The frameworks encompass local legislations as well as global standards which are meant to govern the core issues of EIs.[13]

As EIs primarily base on natural resources which in many jurisdictions are owned by the state/people, the law is highly interested in the governance of operations involving natural resources. The EIs sector presents a challenge to policymakers at the policy design and legal framework stage and continues to be a concern at subsequent stages of exploration, production, and distribution.[14]

The core concerns of the law in EIs governance revolve around among others; award of contract and licenses, regulation and monitoring of operation including human rights, collection of tax and royalty, revenue management and allocation, and implementation of sustainable development policies and projects.[15]The sector is prone to sophisticated disputes

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[8] International Monetary Fund. (2007) *Guide on Resource Revenue Transparency*. Washington, DC: IMF

[9] UNCTAD, (2013). "Time Series on Inward and Outward Foreign Direct Investment Flows, Annual, 1970–2012."

[10] Bellmann, Christophe. (2016) *Trade and Investment Frameworks in Extractive Industries: Challenges and Options*. E15 Expert Group on Trade and Investment in Extractive Industries — Policy Options Paper. E15Initiative. Geneva: International Centre for Trade and Sustainable Development (ICTSD) and World Economic Forum. 4.

[11] Columbian centre on sustainable investment http://ccsi.columbia.edu/our-focus/investments-in-extractive-industries/ (accessed: June 23, 2018).

[12] Chris W.J. Roberts. (2013) *Extractive sector regulations and policy in Africa; old practices and new model for change*. This was a work in an international forum hosted by an institute on governing natural resources for African development. The majority of papers presented reflect on the need of regulation for proper utilization of resources. The brief of the presentations can be accessed at http://www.nsi-ins.ca/nsi-forum-governing-natural-resources-for-africas-development(accessed June23, 2018).

[13] http://www.osisa.org/books/regional/what-laws-each-country-say, (accessed June20,2018) Kabebma details the EIs legal land scape for some selected 6 resource rich African countries Angola, Congo, Mozambique, South Africa, Zambia and Zimbabwe.

[14] *Supra* note 3.

[15]Cameron, Peter D., and Michael C. Stanley (2017) *Oil, Gas, and Mining: A Sourcebook for Understanding the Extractive Industries*. Washington, DC: World Bank.

of ownership and administration in situations where the government structure is a federal one that recognizes the rights of both the Federal and state governments.[16]

Ethiopia is a country located in East Africa with a population of 102.4 million. It has a 2.5% annual population growth rate. It covers 1,104.3 square kilometers. The nation's poverty headcount ratio covers 26.7% of the total population. With an annual 7.6% GDP growth in 2016, the industry contributed to 22% of the GDP which counts for 73 billion dollars. The country has a net inflow of FDI amounting to 3,989 million dollars.[17] Though the country is a leading producer of gold and limestone with smaller quantities of tantalum, salt and pumice a 2016 report put the contribution of the EIs to the GDP at 1% while the sector contributed to 14% of total export and 2% of government revenue.[18] This infant contribution should not be a misleading fact as to the countries untapped significant mineral and oil resources.

Globalization refers to a process of historical change signifying real interconnectedness in political, economic, social, and cultural spheres, intentionally or otherwise, by a multitude of actors.[19] In the specific sense of law, globalization of law refers to the process where varying domestic laws of nations develop a common character whereby governance structures are harmonized. Put in other words, globalization of law is about the harmonization and denationalization of the domestic legal orders through international agreements that oblige the states to transpose the international legal obligations into domestic law.[20] It may also refer to the reforms and modifications of prior legal structures to be in conformity with a certain model.[21]

The neoliberal led global movement has introduced different packages that impacted domestic policy.[22] Led by the World Bank Group and other prominent free-market proponents, countries were expected to follow suit of an agenda that helps shape globalization in a manner that secures a near to uniform domestic policy.[23] Law being an instrument of implementing policy, it was a matter of time before the sovereignty of law-making power of nations was eroded in the face of policies drafted by influential global institutions and global powers which this paper refers to as global forces.

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[16] James H. Goetz,(1982) *Federalism and Natural resources,* Montana Law Review, 43, 2; p.156 , Saubia Ramzan,(2013) *Ownership and Management of Natural Resources in Federal Systems: Challenges, Prospects and a Way Forward For Balochistan*, , 3,1, Public Policy and Administration Research.p.42.

[17] https://data.worldbank.org/country/ethiopia (accessed: July 3,2018)

[18] https://eiti.org/ethiopia#tax-and-legal-framework- (accessed : January 20,2019)

[19] Nayef R.F. Al-Rodhan,(2006) Historical Milestones of Globalization ,Geneva centre for the security police.p.1.

[20] Jost Delbruck (1993) *Globalization of Law, Politics, and Markets Implications for Domestic Law - A European Perspective*, Indiana journal of global legal studies.11,1; p.33. At times the agreements may take voluntary nature.

[21] Hikmahanto Juwana (2004) *Law and Development under Globalization: The Introduction and Implementation of Competition Law in Indonesia,* Forum of International Development Studies, 27, p.2. To see a specific case where globalization affects domestic economic policy space see Justina A.V. Fischer (2012) The choice of domestic policies in a globalized economy, World trade institute, Berne.

[22] David M. Kotz (2002) *Globalization and neoliberalism,* Rethinking Marxism, 12, 2; pp. 64-79.

[23] C.V.R Wait and T. A Thibane, (2015) *The role of international institutions of global governance in steering globalization*, Economic Research South Africa working paper 531, p.19.

The major reforms in the economic aspect were linked to the post-1980s development model referred to as the Washington consensus.[24] The policies that define the consensus contain ten major points i.e. fiscal discipline, increased public expenditure on social services and infrastructure, tax reform to broaden tax bases and reduce marginal tax rates, market-determined interest rates, unified and competitive exchange rate, import liberalization, openness to foreign direct investment, privatization, deregulation, and securing property rights.[25] Accordingly, the shift towards more market-oriented reforms in the agriculture, manufacturing, and financial sector was well observed. Although the impact is left for further detailed investigation, there is no denial of the fact that the EIs have also passed through a similar reform.[26] Such a paper is intended to provide a case study of the impact globalization has made in the sector.

Global Governance of Extractive Resources and Industries

This section presents selected global arrangements dealing with the governance of resources and extractive industries. To start with the question on the need for global governance is answered to the positive considering the features of resources the EIs are based on or operate. The three major features particular to extractive resources in the global arena are the volatility of price, non-renewability of resources, and uneven distribution of resources in the world.[27] All these characters call for a certain governance structure or else the risk the world will face in energy supply or total industry collapse is plausible.

Here one must not be misled by the title of the section for the increasing competition for extractive resources has not been paralleled by sufficient efforts to widen and strengthen

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[24] John Williamson (2004) *The Washington Consensus as Policy Prescription for Development*. Institute for International Economics. There are wide ranging thoughts as to what the Washington consensus actually is. In order to be fair to the concept I have prefer to present what the original author who coined the term and the principles have to say…. My original usage: A list of ten specific policy reforms, which I claimed were widely agreed in Washington to be desirable in just about all the countries of Latin America, as of 1989. That is how it acquired the "Washington" in the title, which was unfortunate in that it suggested (a) to the conspiratorially minded that this was a list of policies that Washington was seeking to impose on the world, and (b) to some of the reformers that Washington was seeking to take credit for the reforms that they were implementing. One of the purposes of the conference (held in 1989) was exactly to explore how much beyond Washington views had changed: We concluded (focusing on Latin America) that there was indeed a big change of views in process (Williamson 1990). 2. The set of economic policies advocated for developing countries in general by official Washington, meaning the international financial institutions (the IFIs, primarily the IMF and World Bank) and the US Treasury. The original ten points were augmented with a further ten, with a heavy emphasis on institutional reforms and some recognition of the social dimension. 3. Critics' beliefs about the set of policies that the International Financial Institutions (IFIs) are seeking to impose on their clients. These vary somewhat by critic, but usually include the view that the IFIs are agents of "neoliberalism" and therefore that they are seeking to minimize the role of the state.

[25] Stanley Fisher (-----), *The Washington Consensus in Global economics in extraordinary times*, p 17. Available at https://piie.com/publications/chapters_preview/6628/02iie6628.pdf . On the success or failure of these principles in the context of developing countries please see Charles Gore (2000) *The Rise and fall of the Washington Consensus as a Paradigm for Developing Countries,* World Development 28,5; pp. 789-804.

[26] Jewellord T. Nem Singh, (2010*) Governing the Extractive Sector: The Politics of Globalisation and Copper Policy in Chile*, Journal of Critical Globalisation Studies 3; p 61.

[27] Elias T. Ayuk and Rebecca A. Klege (2017) *Extractive resources, global volatility and Africa's growth prospects*, journal of sustainable development in. law & policy, 8: 1 ;p 269; https://www.wto.org/english/res_e/booksp_e/anrep_e/wtr10-2a_e.pdf Trade in Natural resources p 42.

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global governance mechanism as in the case seen in other sectors.[28] The existing framework is said to be a fragmented one with institutions geared towards the specific needs of producers on one hand and consumers on the other.[29] Many of the institutions concentrate on the oil and gas field leaving the global governance structure for many of the other minerals a sphere of a bilateral treaty. This has created a vacuum whereby much of the global governance of EIs is left to the market or unilateral[30] and bilateral initiatives despite a few multilateral institutions.[31]

Hereunder a brief discussion of the major global instruments of EIs governance will be presented.

Organization of Petroleum Exporting Countries - The organization of the petroleum exporting countries (OPEC) is a permanent inter-governmental organ created in 1960 with 14 member countries. Headquartered in Vienna, Austria, OPEC aims at coordinating and unifying petroleum policies among member countries.[32] Such arrangement is expected to result in a fair and stable price for petroleum producers, an efficient economic and regular supply of petroleum to consuming nations, and a fair return in capital to those investing in the sector.[33]

It is clear from the outset that OPEC is limited to petroleum while it highly emphasizes protecting the interest of petroleum-producing countries. OPEC claims it does not intend to put in place a policy framework that influences domestic space for members, but it rather works towards protection of interest of exporting countries from market failure in the petroleum trade.[34]

Though OPEC claims to refrain from engaging in policy framing, the OPEC fund for international development (OFID)[35], a multilateral finance development institution of OPEC members and developing countries is proof to the contrary. Widening its scope from the energy poverty struggle to areas of research, health, emergency relief, and others, the fund has designed grants to countries in Africa, Asia, and Latin America. It is plausible that these grants come in a form of a quid pro quo arrangement whereby the OPEC objective is strengthened and respected in non-member grant receiving countries which might extend to influence in the energy policies of nations.[36]

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[28] Gilles Carbonnier (2011) Introduction: The global and local governance of extractive resources", Global governance,17, 2.

[29] See below the narration on OPEC and IEA, global forums representing interests of exporting and consuming nations in the field of energy.

[30] The Dodd- Frank wall street reform and consumer protection act of 2010 in US can be cited as a unilateral structure as it impose a transparency requirement for extractive industries listed in US security and exchange commission on payments made to foreign governments.

[31] Supra note 28 ,p 131

[32] www.opec.org/opec_web/en/about_us/24.htm, Brief history (Accessed: January 20 ,2019)

[33] Ibid

[34] See Art 2 of OPEC statute which states '' The Organization shall devise ways and means of ensuring the stabilization of prices in international oil markets with a view to eliminating harmful and unnecessary fluctuations''

[35] www.http//.ofid.org (Accessed : January 20,2019)

[36] Conditionality's are one of the common features of financial institutions working on developmental objectives

International Energy Agency- The International Energy Agency (IEA) calling itself a global presence working towards a secure and sustainable future for all, has 30 member countries and 8 association countries accounting for 75% of global energy consumption and more than half of the world's energy production.[37]

Established in 1974 with the main task of coordinating a collective response to major disruptions in oil supply, it has expanded its role in advocating for policies that enhance reliability, affordability, and sustainability of energy among its members and beyond. Among the four main areas of focus for IEA, one is economic development wherein free market is considered to bring economic growth and eliminate energy poverty.[38]

The collaboration of IEA ranges from regional organizations as the Asian development bank, Asia pacific economic cooperation, African Union to G7, G8, and G 20. This wide-ranging sphere of interaction which usually emphasizes assistance for energy-related institutional build-up is likely to create an influence on developing countries who want to cooperate and work with the agency.[39] The rules and principles that help the agency function and achieve its objectives are guaranteed to find spaces in the domestic policy and legal regime of countries working in the energy sector of the EIs.

Energy Charter Treaty- The Energy Charter Treaty (ECT) of 1998 was a Europe-driven and Eurocentric legally binding multilateral instrument for the promotion of international cooperation in the energy sector providing a legal basis for the creation of an open international energy market.[40] The introduction for the treaty underscores the need and importance of global governance of EIs when it states "In a world of increasing globalization and interdependence between net exporters of energy and net importers, the value of multilateral rules providing a balanced and efficient framework for international cooperation is widely recognized"[41]

By laying down binding rules to be respected by the 53 signatory states, the treaty plans to minimize the risk associated with energy sector trade and investment. This binding nature of the agreement adds up to the influence of the instrument in affecting domestic legal instruments governing energy for even countries who are not signatories of the treaty. This is what is implied when the treaty states "Participation in the Energy Charter process represents a strategic opportunity for a state to signal its readiness for improved international cooperation; stimulate investor interest in its energy sector, and build confidence and energy security with and among its neighboring states.''[42]

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[37] www.iae.org (accessed: January 21,2019)

[38] Id.

[39] Id

[40] Energy charter secretariat (2004) The Energy Charter Treaty and Related documents, Preamble.

[41] Id

[42] The statement is claiming that even in situations when a country is not signatory its alignment of energy policy and law in line with the terms and provisions of the energy charter treaty will give it a good will by others in its seriousness on the energy sector.

International Energy Forum- the International Energy Forum (IEF) can be considered as a unique global forum for energy-related dialogue engaging both consumers and exporters of oil and gas. Unlike OPEC and IEA the forum also incorporates transit states and major players outside the 72 member countries.[43] The forum considers itself as a neutral facilitator of open, informed, and continuing global dialogue in the energy field. The international energy forum charter with 18 sections lays down the principles of forum operation.[44]

The task of creating a common ground has been near to impossible for the varying interest of exporting and consumer nations in the energy sector. Yet since its inception in 1991, the forum prides itself in increasing the awareness of a high degree of energy interdependence calling for an improved dialogue among the major stakeholders. As a global forum representing the interest of both energy resource exporting and consuming nations IEF has a high likelihood of influencing energy-related policy and law.

Kimberly Process- the Kimberley process is an international certification scheme regulating trade in rough diamonds. With the aim of preventing the flow of rough diamonds used by rebel groups and allies to finance war or undermine legitimate governments (so-called "blood or conflict diamonds''), the process outlines a certification scheme with minimum requirements participants must fulfill to be part of the legitimate diamond trade globally.[45] The KPCS is implemented by participant's national legislation enabling the schemes to have a direct influence on the legal space of participating states.

Currently, the process has 55 participating states covering 99.8% of the global production of rough diamonds. Although the voluntary nature of the process coupled with the absence of an organization devoted to implementing the standard seemed to lessen the effect, diamond trading nations are called to incorporate the rules it has in place in their domestic legislation.[46]
It is also to be noticed that the scope of the process is limited to trade in diamond, unlike the previously discussed two frameworks which emphasize a broader EIs of the energy sector i.e. oil, petroleum, coal, and the like.

The UN "Protect, Respect and Remedy" framework - The UN "Protect, Respect and Remedy" framework for business and human rights also know as Ruggie principles named after Jhon Ruggie, the special representative to the UN appointed by UN secretary-general Kofi Annan with the task of working on clarifying the role of states, companies and other actors in the sphere of business and human rights, was an international framework making businesses responsible for their actions and their consequences.[47] The debate on the interlink between business and human rights flared mainly because of the EIs operations in the 1990s.

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[43] http://www.iea.org (accessed : January 21,2018)
[44] International Energy Forum (2011)The International Energy Forum Charter, Riyahd.
[45] https://www.kimberleyprocess.com/en/faq (accessed: January 21,2019)
[46] Ibid.
[47] Jhon Gerard Ruggie (2017) *The social construction of the UN guiding principle on business and human rights*, Harvard Kennedy School CSR Initiative, P 1.

48 The framework has three main pillars; the states duty to protect, the corporate responsibility to respect human rights, and Access to an effective remedy.[49]

Under the state's duty to protect states has a duty to protect human rights abuses committed by third parties, including business, through appropriate policies, regulation, and adjudication. Corporate related human right abuses are primarily to be checked by the states who are signatories of various human rights instruments. Policy and regulatory arrangement which governs the business human rights relation is expected to be in place. While it is possible to force states to observe their human rights obligations, it is difficult to widen such scope to businesses. This is the reason the second pillar made it necessary for businesses to have a global standard of expected conduct as a responsibility (not a duty) to respect major human rights stated in international instruments during their operation.[50] Finally, the existence of an effective grievance mechanism via judicial, administrative, or legislative measures to whosoever is victimized by operations of businesses is seen as the third important pillar by the framework.[51]

In presenting the global influence of the framework on the key engaging actors including governments, it was noticed that

> *The UN Framework has been well received by key stakeholder groups: a number of individual governments have utilized it in conducting their own policy assessments; several major global corporations are realigning their due diligence processes based on it; civil society actors have employed it in their analytical and advocacy work, and several major international organizations have drawn on it in adapting their own business and human rights policies and standards*[52]

A comparative look at the instruments in place reveals some interesting facts. The first of such fact is the varying interest the governance instruments reflect. For industrialized countries, the governance of extractive resources refers first and foremost to the web of bilateral and multilateral agreements and institutions that contribute to securing their energy supply. Large emerging economies have also turned into net importers of extractive resources and, thus, share similar concerns about energy security. They are further wary of securing the supply of minerals and metals to sustain their rapid industrialization. The so-called transit

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48 This has even led for the establishment of the Voluntary Principles for security and human right in 2000 having a set of principles designed to guide extractive companies in maintaining the safety and security of their operation with an operating framework that respect human rights. The full text of the principle is available at http://www.voluntaryprinciples.org/what-are-the-voluntary-principles/ (accessed: January 25,2019)

49 http://www.reports-and-materials.org/Ruggie-report-7-Apr-2008.pdf (accessed: January 25,2019)

50 The UN has in place other major instruments like FPIC(free, prior and informed consent) protecting indigenous peoples right in connection to development activities planned to be undertaken on their land and resources. This instrument outlines the notion of free and informed prior consent avoiding coercion, pressure or intimidation in the choice of development.

51 The full text of the document can be accessed at
http://www.ohchr.org/Documents/Publications/GuidingPrinciplesBusinessHR_EN.pdf (accessed: January 25,2019)

52https://www.business-humanrights.org/sites/default/files/reports-and-materials/Ruggie-protect-respect-remedy-framework.pdf (accessed: January 25,2018)

countries located along major energy and pipeline routes seek to extract substantial benefits from their geopolitical location; in particular, abundant and cheap energy.[53]

Further, these instruments are based on implicit/explicit principles, norms, rules, and decision-making procedures around which actor's expectations converge. In a sense, the frameworks establish a new standard or extend existing norms of international public law to non-state actors, look at incentive structures to modify actors' preference and behavior and entrust civil societies with monitoring and whistleblowing in order to constrain the influence of the political/economic elites.[54]

Major Global Concerns on Extractive Resource/Industry Governance

Although in the different global arrangements related to EIs countries have varying interests, the growing global governance structure and the influential global powers' intention in EIs governance has been directed towards addressing the following key issues.

A. Resource curse and Resource ownership- Resource curse refers to the problem related to the inability of developing nations with huge resources or resource potential to utilize same for their economic development and poverty eradication.[55] To the contrary these countries have become epicenters of illegitimate governance, corruption, and conflict raging among different factions of society.[56] The gifts of nature which were expected to result in resource blessing threshold i.e. extractions resulting in positive development has to the opposite brought them curses. In a related line of discussion even in nations of relative peace the question regarding who the real owner and beneficiary of these resources have become a bone of contention.[57]

B. Institutional and policy reform- Associated with the two core problems discussed under A and other multifaceted problems facing the EIs, the tendency for many global institutions was to concentrate on institutional and policy reforms meant to remove the obstacles facing the sector from providing its expected results. Designed with the greater reform of the Macroeconomy and highly influenced by neoliberal ideals, these reforms expect to shape the policy and legal directions nations should follow regarding the governance of their natural resources.[58] This in turn affects the domestic policy space of a nation.

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[53] *Supra* note 28, p 135-136

[54] Gilles Carbonnier etal (2011) *Global and local policy response to the resource trap*, Global Governance 17,2; pp. 247-264.

[55] Alan Beattie, False Economy; a surprising economy history of the world, 2010, London pp. 95-120.

[56] J.R. Mailey, *The Anatomy of the Resource Curse: Predatory Investment in Africa's Extractive Industries*, ACSS Special Report No. 3, 2015, Washington DC.

[57] Oli Brown and Michael Keating(2015) Addressing Natural Resource Conflicts Working Towards More Effective Resolution of National and Sub-National Resource Disputes, Chatam House; the royal institution of international affairs.

[58] Chris W.J.Roberts, (2014) Extractive Sector Regulations and Policy in Africa: Old Practices and New Models for Change. P.2

C. Contribution of Non-state actors in the EIs governance- Motivated by the conception that any effort of reforming the EIs sector in the absence of involvement of major stakeholders is expected to bear no fruit, the global system has emphasized on the direct and explicit role the engagement of non-state actors as multinational companies investing in EIs sector, civil societies working to better the sector and those affected by the sector can have.[59] Hence, most instruments have reserved a proper place for these non-state actors in connection to EIs governance.[60]

For a very long time, the main focus in promoting global regulatory mechanism has been to directly regulate corporate behavior through private global mechanism[61] or to borrow institutions from capital-exporting countries through extraterritorial regulation.[62]

As the focus of western developed donors and international financial institutions embrace the idea of governance matters consensus, the approach shifted towards the promotion of a specific type of global regulatory mechanism involving bilateral and multilateral aid agreements.[63] This has not made things easier for resource governance since it is intrinsically linked to economic development, making it intensely political and contested than a mere legal matter. The need to make the states central figures of governance by empowering them and shifting the industry or home country responsibility to Host states was a new strategy devised for better global governance of EIs. This has given birth to institutions as the Extractive Industry Transparency Initiative.

Extractive Industry Transparency Initiative (EITI)

Although Extractive Industry Transparency Initiative is one of the global governance systems for EIs, it deserves a separate discussion for the shift in major world powers endorsing it as fitting for their policy.[64] In the Ethiopian case too, it is worth presenting it in detail for it is the only global instrument the current Ethiopian EIs is participating in and cognizant of.

The transparency revolution at the heart of the natural resource governance is said to arise in the triumphalist phase of global neoliberalism that celebrated market efficiency, limited states, and good governance.[65] It is proper then to conclude the globalization and law aspect

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[59] Eghosa O. Ekhator (2014) *The roles of civil society organizations in the extractive industries transparency initiative in Nigeria*, International Journal of Not-for-Profit Law 16, 2.
[60] EITI in the Ethiopian case has 43 civil society organizations actively engaging in extractive industry transparency.
[61] OECD's guideline for multilateral enterprises with voluntary standards in guiding corporate behaviour is an example in this aspect.
[62] FCPA, foreign corrupt practice act where US law enforcement institutions investigate, try and punish transnational companies that corrupt foreign officials is an example.
[63] Lars Buur etal (2013) Extractive natural resource development: governance, linkage and aid, Danish Institute for International Studies, pp.75-77.
[64] The continuing importance of EITI to the World Bank's extractives work program is reflected by references to EITI in World Bank country strategy documents (CAS, CPS, CPF, etc.) for 43 of the 47 IDA/IBRD EITI implementing countries. See below foot note 95.
[65] Gilbert M. Khadiagala (2014) *Global and Regional Mechanisms for Governing the Resource Curse in Africa*, resource insight 12, South Africa.

of EIs, being manifested in its influence to plant the notion and elements of transparency in the EIs operation by directing domestic laws and policy in such line.[66] Haufler best described how the liberal norms affect the design in policy and laws by employing transparency and disclosure as its peak value of governance in the following expressive words:

> *Liberalism anoints the private sector as having significant legitimacy and authority, while simultaneously delegitimizing expansive government action. In this environment, transparency is viewed as a way to regulate the private sector, and information disclosure as efficiency-enhancing and necessary for the proper functioning of markets. Liberal norms of democratic accountability also require public disclosure of information in order to have an informed citizenry. The normative environment today includes ideas about corporate responsibility, which is widely supported by the public around the world. All of these – market efficiency, democracy, and corporate social responsibility – support and facilitate the adoption of policies of information disclosure by corporations as a means of achieving public benefits.*[67]

In 1999 a UK-based NGO called Global Witness reveals the questionable role of foreign firms in the Angolan civil war. This galvanized a group of civil societies towards a publish what you pay campaign calling for the mandatory publishing of payments made by extractive companies to governments in resource-rich countries and revenues received by governments from the companies later transforms to EITI. [68]

In 2002's World Summit for Sustainable Development in Johannesburg, the Tony Blair initiative introduces the EITI which was officially launched in London a year after and immediately endorsed by G8 countries.[69]

EITI is a global regulatory mechanism to encourage governance improvement in resource-rich but governance-poor developing countries working as a coalition of governments, civil societies, companies, and international organizations.[70] The idea behind EITI was that bringing together host countries, home countries, extractive corporations, and civil society organizations, leveraging a significant pool of incentives, checks and balances would be more effective than a conventional global regulatory initiative in the gradual promotion of governance reform.

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[66] See the next section of this paper which outlines how EIs governing laws in Ethiopia have responded to the transparency influence.

[67] Virginia Haufler (2010) *Disclosure as Governance: The Extractive Industries Transparency Initiative and Resource Management in the Developing World*, Global Environmental Politics,10,3; p 56. Haufler calls the global governance instruments , especially those related with transparency ''regimes of restraint'' in the sense of the purpose they purport to achieve

[68] Hence the emphasis of the governance structure is basically financial transparency. Yet resource related revenue and finance transparency is a key in extractive industry governance.

[69] www.eiti.org (Accessed: January 25,2018)

[70] Id

EITI has developed a Standard[71] countries must fulfill in order to be recognized as compliant. The international EITI Board upholds the EITI Standard. It monitors and assesses the progress of countries in meeting the requirements of the Standard. All implementing countries are held to this same global standard. Every country that joins the EITI as a member is assessed against the EITI Standard in a process called Validation. EITI Validation reviews the country's progress against the EITI Requirements, analyses the impact of EITI compliance in the country, and makes recommendations for strengthening the process and improving the governance of the sector. The Board then designates the country as having made satisfactory progress, meaningful progress, inadequate progress, or no progress. Currently, there are 51 implementing countries, with 14 satisfactory progress and 31 yet to be assessed, Ethiopia inclusive.[72] The former Ethiopian Minister of Mines committed to EITI and launched the Ethiopian EITI (EEITI) in July 2009. Ethiopia became an EITI Candidate country in March 2014 and published its first EITI report in March 2015 covering the period 2013/14 from 8 July 2013 to 7 July 2014.[73]

The EITI standard requires transparency and disclosure of full information in five distinct areas connected to EIs and their operation namely legal/institutional framework, exploration & production, revenue collection, revenue allocation, and social & economic spending.[74] Regarding the first area of concern, the EITI requires disclosures of information related to the rules for how the extractive sector is managed, enabling stakeholders to understand the laws and procedures for the award of exploration and production rights, the legal, regulatory, and contractual framework that apply to the extractive sector, and the institutional responsibilities of the State in managing the sector. The EITI Requirements related to a transparent legal framework and award of extractive industry rights include disclosure in connection to a nation's legal framework and fiscal regime, license allocations, register of licenses, contracts, beneficial ownership, and state-participation in the extractive sector.[75]

In relation to exploration and production, the EITI requires disclosures of information enabling stakeholders to understand the potential of the sector. The EITI Requirements related to transparency in exploration and production activities include information about exploration activities, production data, and export data. [76]

With the conviction that an understanding of company payments and government revenues informs public debate about the governance of the extractive industries, the EITI requires a comprehensive reconciliation of company payments and government revenues from the

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[71] EITI standard 2016 (2017) EITI International secretariat, Oslo, Norway. The standard is said to follow the principle on the affirmation that public understanding of government revenues and expenditure over time, could help public debate and inform choice of appropriate and realistic option for sustainable economic growth and reduction of poverty in resource-rich countries.

[72] Supra note 68.

[73] Ethiopian Extractive Industry Transparency Initiative (2018) EEITI report for the year 2015, MOORE STEPHENES, P 5.

[74] EITI factsheet(2008) EITI international secretariat Oslo Norway

[75] *Supra* note 69, p 17.

[76] *Supra* note 69, p 22.

extractive industries. In the third EITI requirements related to revenue collection, a comprehensive disclosure of taxes and revenues, sale of the state's share of production or other revenues collected in kind, infrastructure provisions and barter arrangements, transportation revenues; State-Owned Enterprises transactions, subnational payment, level of disaggregation, data timeliness and data quality are required to be reported.[77] The EITI requires disclosures of information related to revenue allocations, enabling stakeholders to understand how revenues are recorded in the national and where applicable, subnational budgets. The fourth EITI requirements related to revenue allocations include disclosure on the distribution of revenues, subnational transfers, and revenue management & expenditures.[78]

Finally, on the social and economic spending disclosure, the EITI requires information related to social expenditures and the impact of the extractive sector on the economy, helping stakeholders to assess whether the extractive sector is leading to the desirable social and economic impacts and outcomes. The requirements include social expenditures by companies, State-Owned Enterprises quasi-fiscal expenditures, and an overview of the contribution of the extractive sector to the economy.[79] Although the core areas of compliant are these five standards, there is a voluntary extension of requirements leading some to observe EITI widening scope and labeling it as an ambiguous global regulatory mechanism with multiple regulatory targets and objectives.[80]

Impact of Global Governance on Ethiopian Extractive Resource/Industry Policy and Legal Framework

The Ethiopian Constitution states that the right to ownership of all natural resources is vested in the state and people of Ethiopia.[81] Under the federal system of government, the federal government is provided the power of enacting laws for the utilization and conservation of natural resources[82] while the administration of natural resources is provided for state governments as per the laws to be enacted by the federal government.[83] It is the duty of the government to hold natural resources and deploy them for the common benefit and development of the Ethiopian people.[84] One can then observe that governance of the EIs means governance of the natural resources the industries rely up on to invest and operate. A

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[77] Ibid.

[78] *Supra* note 69 p 26.

[79] *Supra* note 69 P 28.

[80] 9 There is no expectation that EITI countries should cover environmental information. However, there is a growing interest in environmental transparency related to the oil, gas and mining sectors in different countries. More than 28 EITI implementing countries have made transparent information on environmental taxes, levies and other payments. Some have also disclosed environmental policies, management practices and compliance

[81] Art 40(3) of Ethiopian constitution

[82] Art 51(5) and 55(2) a of Ethiopian constitution

[83] Art 52(2) d of Ethiopian constitution

[84] Art 89(5) of Ethiopian constitution, See also how article 5(2) of the Mining proclamation is a verbatim copy of this constitutional provision.

discussion of policies or laws[85] in the domestic space relating to natural resources is in a way a discussion of the EIs.

Ethiopia does not have in place a mining policy at the current phase. With this in mind, the responsible government organ is now working towards developing a policy that will be a base for further action in the sector.[86] The pro-liberal reforms undertaking in Ethiopia at a more robust pace than the previous periods are expected to influence the content of the policy as well as detailed frameworks of governance.

The preamble of the mining operation proclamation replicates the various constitutional principles discussed above as the justification for the need of developing a mining law. The neo-liberal attitude and global influence are clearly visible in the objective part of the proclamation which discusses tenure security for investors in respect of exploration and operation of mining activities.[87] Most businesses in the EIs are transnational companies many of which are located in the Global North whose respective governments want the protection of their interest. To the resistance of complete opening of the field to the competition of private actors as desired by the global order ,the mining operation proclamation has made the role of the government not only as custodian of resource and licensing authority but an active participant and owner in the operation of EIs.[88]

Again the door is closed for foreign investors to engage in artisanal mining or special small-scale mining operation.[89] The idea of protecting local firms and small scale businesses operated by locals and individuals by such exclusion is a good stand held by the law. But this does not avoid the fear global governance might force the legislator to label the playing field for all who are interested to invest despite the scale of investment.

Ethiopia is already part of the EITI, a voluntary standard we embarked to comply with.[90] The legal recognition provided for EITI is a direct manifestation to the changes in the operation of

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[85] By extractive industry related laws a reference is being made to the energy policy, the mining operation proclamation and regulation, petroleum operation proclamation and regulation, transactions of precious minerals proclamation and different directives issued by the ministry of mines, oil and petroleum.

[86] Information by Ato Mamo Esmelalem Mihretu, Economic policy advisor to the Ethiopian Prime minister (2019) Public lecture, AAU, COLGS.

[87] Art 4(4) of Proc 678/2010

[88] Article 8 of the proclamation speaks of government mining operations where in the government is entitled to operate mining activities alone or with a partnership with private investor. Also Article 70 of the same law allows the government to acquire without cost a participation interest of 5% in any small and large scale mining operation and additional equity up on negotiation.

[89] Artisanal mining is defined by the proclamation as a mining operation carried out by individuals or small and micro enterprise which is mostly of manual nature and that does not involve the engagement of employed workers. Special small scale mining operation is mining operation of gemstones or placer resources of gold, silver, platinum or tantalum of which the annual run-of-mine does not exceed the limit stated in paragraph (a) of sub—article (35) of this Article, which is carried out by individuals or small and micro-enterprises who were the holders of artisanal mining license and have sufficient financial capacity to employ modern machineries and equipment in such operation.

[90] The amendment for the mining operation proclamation has incorporated EITI in its definition part. Accordingly EITI is defined a coalition of government, mining companies and civil societies established to

the mining sector and the regulatory authority as a result of the globalization of the governance of EIs. This standard as endorsed by the major global actors that are shaping the governance structure of EIs and requiring reforms in the major areas of a legal structure, the likelihood of the current legal framework to be in tune with accepted EITI standards is very high. A case in point will be the amendment to the mining operation proclamation in 2013 which has added the obligation of becoming a member of the Ethiopian extractive industry initiative on small scale and large scale mining operators.[91] The amendment has also made it a duty of the licensing authority to disclose revenue collected from mining to the public.[92] This addition to the mining operation proclamation is a direct impact of Ethiopia's involvement in the EITI.[93]

There is recognition that EITI is better understood and analyzed alongside other regulatory efforts to promote governance reform in developing countries such as bilateral and multilateral development assistance agreements.[94] This conviction which is also shared by this writer is an important point to note for the interlink between governance regimes and the support they receive by the leading economic aid organs of the world which will have a direct impact in influencing domestic policy and legal framework.

World Bank Group was quick to endorse EITI as part of its approach towards extractive industries.[95] World Bank and IMF started to include participation in EITI as a condition for countries to receive the benefits from the Heavily Indebted Poor Country (HIPC) initiative blurring the line between incentive and conditionalities. When Ethiopia started its candidature to the initiative on behalf of the World Bank Group Country Director for Ethiopia, Lars Christian Moller, Lead Economist, and World Bank Group stressed the need to have a strong and effective governance system, legal and regulatory frameworks, good geoscientific information, and capable domestic human resources to develop the sector's potential.[96] The World Bank Group energy and extractive team Ethiopia has also recommended a policy advice on the need to reform the mining operation law of the nation based on globally prevailing good practice.[97]

On the other hand, the energy policy of the country has stated that natural gas resources will be developed and utilized to meet as much of the country's energy demand as possible while

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disclose to the public the revenue government received from mining license holders, and the amount of all payments made by the mining license holders to the government.

[91] Art 34(1) of the mining operation proclamation which lists down general obligations of licences was amended to this effect by proclamation 816/2013

[92] Art 2(17) Proc 816/2013.

[93] It is also worth noticing that in a bid to promote the legal framework of EEITI and to institutionalise the EITI Process, an EITI Act is currently being reviewed by the Attorney General to be proposed to the Council of Ministers for adoption.

[94] Patrícia Galvão Ferreira(2013)Extractive Industries Transparency Initiative (EITI): Using a Global Public‐‐‐Private Partnership. P.3

[95] World Bank Group (2016) The World Bank Group in Extractive Industries 2016 Annual Review, pp.16-17.

[96] By strong and effective legal and regulatory framework it is clear that the reference is made to standards set by liberal oriented institutions like EITI.

[97] Lidya Mesfin Asres Etal (2017) *Strengthening mineral sector governance to attract investors*, World Bank Group, energy and extractive team.

promising areas for oil and natural gas will be explored by providing incentives to oil companies to encourage them to take in exploration activities.[98] It is then a policy direction set by the government that EIs will be incentivized in their operation in Ethiopia. Hence, the structure of the incentive and other details remain to be exhaustively enumerated save some cases discussed in the existing EIs laws and regulations. This is a wide area left uncovered by the legal regime likely waiting for endorsing the direction set by the global governance regime.

The recently developing interest in business and human rights as narrated by Ruggie principle has its impact on the mining operation proclamation of Ethiopia. Since 2006, the UN has shown keen interest to make the business practices of EIs in line with basic human rights instruments. In the same year, the initial report on business and human rights was presented and the mining operation proclamation was legislated devoting different provisions to the same cause and preaching the need to employ good mining operation practices generally accepted in the mining industry.[99] Specific provisions concerned with prohibition of occupational detriment against employees, environmental impact assessment, rehabilitation fund, community development fund, remedial powers of the licensing authority, compensation to be paid for those whose property is expropriated for mining operation are all influenced by global rules established to make sure EIs work within the framework of accepted human right standards.[100] This aspect of the global governance influence can be cited in a positive manner for it ensures the EIs operation does not harm the rights and interests of people and the state. As the primary responsibility of enforcing and implementing the law is laid on the licensing authority i.e. Ministry of Mines, Oil and Petroleum,[101] it can be argued that the state duty to protect human rights from various infringements is incorporated as a specific element in the mining operation proclamation. A look at the petroleum operation proclamation further opens the door for the global governance impact. This is so for the law has been in place since 1986 though the nation has passed from a socialist camp to a conditionally liberal government[102] without any amendment. The developments of the past 30 or more years surely call for a new way of looking at things. The renewed interest in the sector with the start of new operations in different parts of the country and the growing interest of multinational firms to operate in Ethiopia are all proper reasons for the regulating authority to work on the development of a timely legal framework.

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[98] The National Energy Policy, Ethiopia, sec 6

[99] Art 34(1) a Proc 678/2010. Note the year the law comes in to effect is the same year the UN respect, protect, remedy framework was in place i.e. 2010

[100] See Art 55, 57, 60,62 of Proc 678/2010

[101] Art 80(4) of Proc 678/2010.

[102] The reason I label EPRDF the ruling party since the demise of the military regime 27 years ago conditional liberal is for the reason it states a free market policy and is open to liberal ideals though it has shifted through varying modes of liberalism ending in the state led development. With the exception of closing the market for certain selected sectors most of the industries including the extractive industry are open for foreign investors and competition.

Transnational companies that plan to invest in the EIs have made it a prerequisite to evaluate the law in place governing the sector before they decide to invest.[103] This is also one of the impacts of the global governance mechanisms for these companies that want to keep their goodwill by endorsing globally accepted standards of operation. These calls for a legal and institutional structure in place which makes them feel secure about their business interest and the country they are operating in. In order to boost their goodwill and image, they are also likely to prefer a nation that endorses accepted global standards as part and parcel of their local EIs legal sphere. This is another motivating factor directing decision-makers in the area of EIs to make sure the framework in place is geared towards the global trend.

Finally, the core issues the global forces in the EIs are claiming to be rectified all fall in the policy and legal spheres of EIs governance. In fact, organs like the World Bank group has gone to the extent of narrating what the specific institutional set up for governance of extractive industries should look like by enlisting the tasks to be carried out by respective legislative and executive organs of a government.[104] This has a far-reaching implication on the independence of policy development and institutional set up by countries like Ethiopia.

Final Remark

Ethiopia is working on its Extractive Resource Policy and Legal framework. A mining policy is in the process of development. The Mining Operation Proclamation, the Mining Operation Regulation, and the Mining Tax Law have passed through constant amendments. The Petroleum Operation Proclamation was enacted thirty-three years ago and needs a timely review taking into account current developments of the sector. The Growth and Transformation Plan has set an ambitious agenda of increasing the contribution of the sector to 10% for 2024 with a plan to secure 100-500 million tax revenue and 1.5 billion dollars in export earnings. Recently, the country has officially launched it's first-ever oil production. Different Multi-National Companies have invested in the sector while many others are showing interest to do so. The executive organ primarily responsible to regulate the EIs has joined the Extractive Industry Transparency Initiative (EITI), a global coalition for better governance of the sector and its anticipated economic contribution narrowing the domestic policy space for a voluntary international standard.

These factors combined are pointers of the fast growth. The sector is undergoing calling for an efficient regulatory mechanism equipped with institutional and legal capabilities. The growing influence globalization of extractive industry governance is having on domestic policy and legal space has already started to manifest its force in Ethiopia. The paper has outlined areas of influence with potential areas of influence. Further research is needed to know about turning the inevitable global influence and its impact in shrinking the domestic policy and legal space to the advantage of the nation.

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[103] Romy Kraemer and Rob van Tulder (2009) *Internationalization of TNCs from the extractive industries: a literature review, Transnational Corporations*, 18, 1; pp. 138-156. The authors present the intrinsic and extrinsic motives leading extractive companies to emphasis on global standards of governance(internalization)

[104] Harvard Halland etal (2015) The Extractive Industry sector: essentials for economists, public finance professionals and policy makers, World Bank Study, pp. 35-44 Washington DC.

No-regret Approaches to Climate Risk Management: Crop Yield Risk and Productivity Effects of Climate-Smart Agricultural Practices in Selected Agro-Climatic Zones of Ethiopia

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Abstract

This study analyzed farmers' perception and adaptation to climate change and how Climate Smart Agricultural Practices affect crop yield risk and productivity in selected agro-ecological zones of Ethiopia. It is based on analysis of data collected from 734 randomly selected farm household heads substantiated with Focus Group Discussions, Key Informant Interview, and field observations. The study employed descriptive methods to assess farmers' perception of climate change, local indicators of climate change, and types of adaptation measures exercised to cope up with the risk. The study also used the Heckman sample selection model to analyze the two-step process of adaptation to climate change which initially requires farmers' perception that the climate is changing prior to responding to the changes through adaptation measures. Mean variance method was employed to assess the effect of Climate Smart Agricultural Practices on crop yield variability. Moreover, the Instrumental Variable (IV) estimation method was used to assess the relationship between Climate Smart Agricultural Practices and crop productivity. Based on the Heckman sample selection model result, educational attainment, the age of the head of the household, the number of crop failures in the past, and changes in temperature and precipitation significantly influenced farmers' perception of climate change in the highland agro-climatic zone of the study area. In lowland conditions, farming experience, climate information, duration of food shortage, and the number of crop failures experienced determined farmers' perception of climate change. Farmers' adaptation decision in both agro-climatic zones is influenced by household size, the gender of household head, cultivated land size, education, farm experience, non-farm income, income from livestock, climate information, extension advice, farm-home distance, and the number of parcels. Results from the Mean Variance Method and IV techniques revealed that Climate Smart Agricultural Practices helped smallholder farmers in counteracting crop yield variability as implied by the calculated negative variances. Most of the practices are also positively and significantly correlated to crop productivity. The implication is that climate related risks that lead to yield variability are significantly reduced through the use of the Climate Smart Agricultural Practices. Hence, in line with the findings, any intervention that promotes the use of adaptation measures to climate change may account for location-specific factors that determine farmers' perception of climate change and adaptive responses thereof. Moreover, there is a need to introduce and scale-up alternative set of Climate Smart Agricultural Practices that suit the local context. There is also a need for policy attention towards land consolidation so that smallholder farmers could benefit from the advantages of economies of scale in the use of different Climate Smart Agricultural Practices. Parallel to the promotion and scaling up of the practices, future research should gear towards investigating the synergetic effect and possible complementarities among the Climate Smart Agricultural Practices.

Keywords: climate smart, perception adaptation, Heckman sample selection model, mean variance, productivity, IV

Introduction

Due to its significant reliance on weather patterns as well as other environmental factors, agricultural production, especially as practiced by smallholder farmers in developing countries, is vulnerable to climate variability and change (FAO, 2014). To secure and maintain food security for the growing population, the smallholder agricultural systems need to be transformed in terms of capacity and stability (UNFPA, 2011). In the past, agricultural intensification through the use of capital-intensive inputs such as fertilizer and pesticide has been dominant but remained to be inadequate and economically infeasible along with the generation of unacceptable levels of environmental damage (IAASTD, 2009). As a substitute to this conventional approach, there is a substantial need to promote smallholder farmers' sustainable use of "no regrets" options that have positive returns on productivity, environment, biodiversity, and production risk management regardless of future climate change. Thus, greater attention is being given to alternative means of agricultural intensification (FAO, 2010a).

The "no regret" actions are packages of climate-smart agricultural practices that increase agricultural productivity on a sustainable basis and creating a balanced ecology of microflora and fauna within the agricultural environment (FAO, 2010b). Promoting farmers' use of these practices becomes the primary conduit for food security through inducing increased productivity, reduced production risk, and lower production costs (Boto, 2012). Climate Smart Agricultural Practices can generate both private and public benefits and thus constitute a potentially important means of generating "win-win" solutions to addressing poverty and food insecurity through adjustments to the new climatic patterns (Cooper and Coe, 2011; FAO, 2010b). Despite these noteworthy public-private co-benefits, the use of the practices has been relatively low among smallholder farmers in developing countries (FAO, 2010a).

Empirical evidence has shown that the gender gap in agriculture has been affecting men and women access and benefit from improved agricultural technologies. In the context of Climate Smart Agricultural Practices, this gap may have significant implications for the adoption and sustainability of the practices (Asrat and Simane, 2017). Further, if the gap is not taken into consideration, there will be a risk that the development of site-specific options could reinforce existing inequalities. In this regard, a gender-responsive approach to climate-smart agriculture can lead to improvements in the livelihood of smallholder farmers (FAO, 2015).

In Ethiopia, smallholder farmers have been implementing Climate Smart Agricultural Practices to curtail the consequences of climate change-induced land degradation risks although the practices are not in the general use of adequate levels (Asrat and Simane, 2017). Therefore, there is a considerable policy and research interest in understanding the effect of the Climate Smart Agricultural Practices on production risk and productivity as well as the barriers in the wider adoption of the practices.

First, there is a need to understand location specific scope and drivers of perception and adaptation to climate change among smallholder farmers. This helps to design appropriate

policy responses as the vulnerability and sensitivity of each agro-ecology to climate change differs and so does the accessibility of the different adaptation methods. In this regard, there is a substantial deficit of location/agro-ecology specific information on the process of adaptation in the developing world including Ethiopia (Smit and Pilifosova, 2001; McSweeney et al., 2010). There are few researches (Deressa et al., 2009, Deressa et al., 2011; Di Falco et al., 2011), which focus mainly on a large scale (region and basin level) and overlooked location specific process of adaptation and hence unable to provide agro-ecology specific factors that drive perception and adaptation to climate change. The findings of these studies are highly aggregated and are of little help in addressing agro-ecology specific peculiarities of perception and adaptation to climate change. Understanding agro-ecology specific perceptions and adaptive behavior of smallholder farmers provides better insights and information relevant to policy that helps to address the challenge of sustainable agricultural development in the face of variable and uncertain environments. Therefore, there is a need to address agro-ecology specific farmers' perception and adaptation to climate change and the associated driving factors. In line with this, the present study intends to bridge these gaps of knowledge.

Thus, the study has four-fold purposes in relation to climate change perception and adaptation: (i) investigate agro-ecology specific farmers' perception to climate change; (ii) investigate whether, as a consequence of perception, farmers adapt to climate change in their agricultural practices; (iii) investigate agro-ecology specific social, economic, environmental and institutional factors that influence smallholder farmers' perception and adaptive decision to climate change; and (iv) compare agro-ecologies in terms of perception and adaptation to climate change. For this purpose, the study used a data set collected from 734 randomly selected farm households from the highland/midland and lowland agro-ecologies in Ethiopia. Descriptive methods were employed to compare agro-ecologies and the Heckman sample selection model was used to investigate the two-step process of adaptation to climate change.

In the same line, studies that focus on Climate Smart Agricultural Practices and the impacts of the practices are also very scant in Ethiopia. Hence, this study also addressed these knowledge gaps by determining the impact of the Climate Smart Agricultural Practices on crop production risk and land productivity. For this purpose, the study employed a mixed research approach to determine the impact of the practices on production risk and productivity considering a set of Climate Smart Agricultural Practices as indicated in FAO (2015) and FAO (2010a): (i) agronomic practices, (ii) soil and water conservation practices, (ii) conservation tillage practices, and (iii) agroforestry practices. In this regard, the key targets of the study include outcome variables (crop productivity, and production risk management) and decision (choice) variables that include different climate-smart agricultural practices. The study also explored a proximate causal link between the Climate Smart Agricultural Practices (decision variables) and the underlying determinants. Given these general premises, the study tested the following core hypotheses:

   (i)   crop productivity is positively affected by the use of Climate Smart Agricultural Practices

(ii)   (ii) crop production risk is negatively influenced by Climate Smart Agricultural Practices, and

(iii)   (iii) there is causation among Climate Smart Agricultural Practices.

Specific Objectives

1) Assess perception of climate-change and implementation of climate-smart adaptive responses to the perceived changes in climate;
2) Determine the effect of Climate Smart Agricultural Practices on crop production risk;
3) Determine the effect of Climate Smart Agricultural Practices on land productivity; and
4) Explore causal link among different Climate Smart Agricultural Practices.

Conceptual Framework

Reconciling the three objectives of increasing production, reducing climate-vulnerability and using natural resources sustainably in the face of climate change is a challenging target that developing countries are trapped in (Nkonya et al., 2011; Deressa, 2011). These are what Vosti and Readon (1997) call the *critical triangle of development objectives*. The vulnerability to climate risks is evident in Sub-Saharan Africa (Way, 2006) where poverty is indicated as a possible consequence of land degradation. Conversely, poverty may also contribute to land degradation (Nkonya et al., 2011) if the poor lack the ability and incentive to invest in land conservation and over-exploit the land resource to survive (as a coping strategy).

Consequently, the notion of the *down spiral of land degradation and poverty/vulnerability* may hold for smallholder farmers with scanty resources (Nkonya et al., 2011) indicating a spiral relationship where the land degradation leads to vulnerability/poverty which in turn leads to further degradation. Contrary to this notion, there are also empirical evidence (Scherr, 2000; Way, 2006), which argues that the poor and the vulnerable are not always responsible for degradation, but they have an interest in conserving their land, for they already know the consequences of degradation. Hence, the *poverty-environmental interaction side of the critical triangle* is more controversial and poses research challenges.

In whatever direction or degree of complexity of *poverty-land degradation linkages*, smallholder farmers are more vulnerable to negative consequences of land degradation as they lack sufficient asset base to adapt to its effects (Nkonya et al., 2011). In line with this, creating a loop that can reduce the vulnerability of smallholder farmers and land degradation ('win-win' situation) is possible (FAO, 2010a). The link among climate-smart agricultural practices, land degradation, productivity, and production risk as well as the role of exogenous factors (technological, institutional, environmental, and policy) affecting these relationships is contextualized and illustrated in Figure 1.
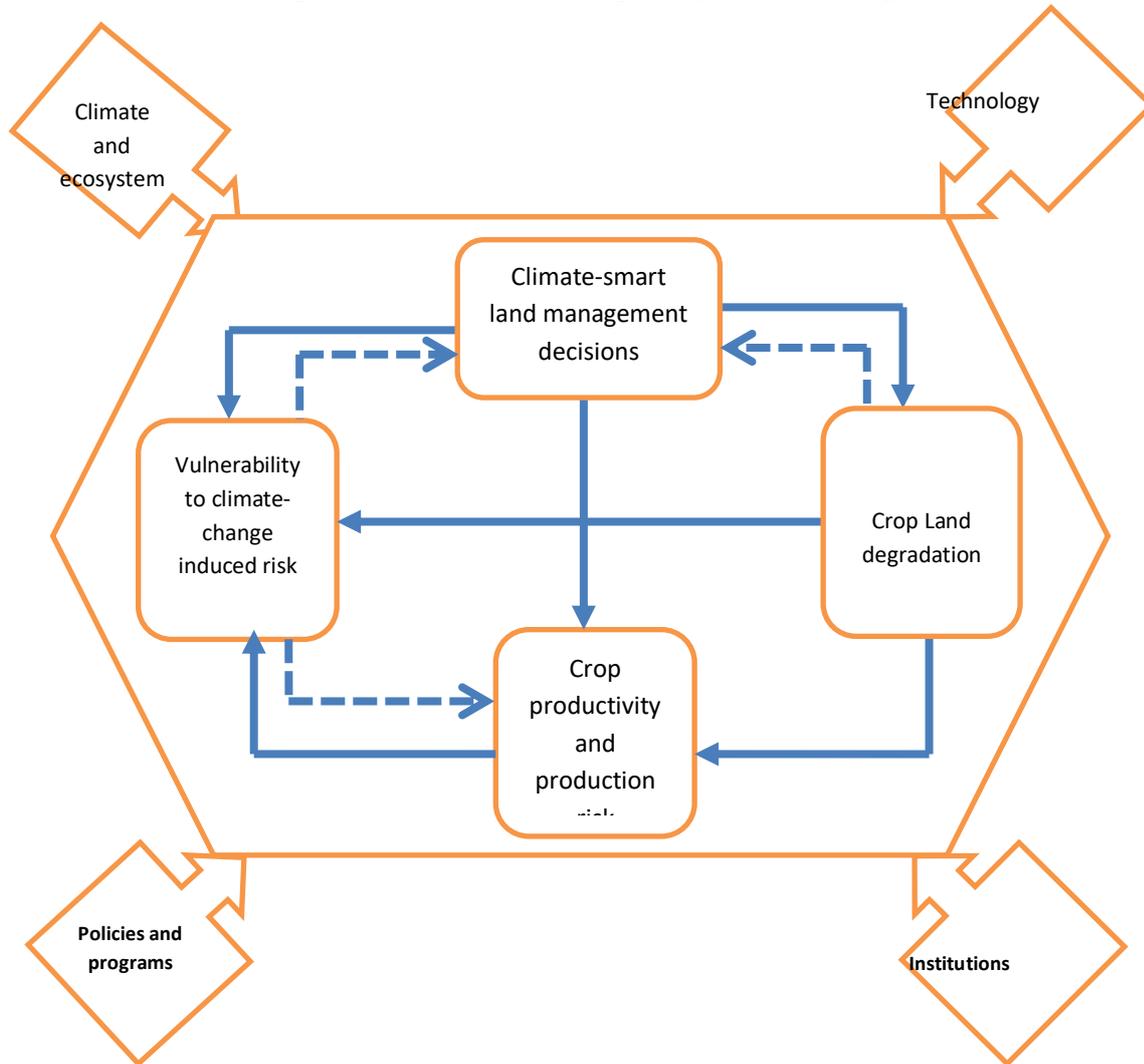
Figure 1: Causal nexus among vulnerability, climate-smart land management decision, productivity and risk

Methodology

The study was conducted in the major watersheds of central and western Ethiopia focusing on the crop sub-sector. The area is characterized by three traditional agro-climatic zones (lowland, midland, and highland) currently becoming vulnerable to climate variability and change (Asrat and Simane, 2017; Amare and Simane, 2017).

Data Types and Source

This study employed a mixed approach and hence the data types collected were both qualitative and quantitative in nature. The qualitative data set were obtained through key informant interview, focus group discussion, and community resource mapping. The quantitative data set were generated through household and plot-level surveys. A structured questionnaire was administered to collect data that address household characteristics, use of climate-smart agricultural practices, biophysical characteristics of a plot, crop production per plot, and the types of Climate Smart Agricultural Practices applied to each plot.

Sampling Design

For the qualitative data set, a non-probability sampling procedure (intensity sampling, stratified purposive sampling, and criterion-based judgment sampling) were employed. For the quantitative data set, the study followed a three-stage sampling procedure. First, all woredas (districts) in the major watersheds were stratified into the three traditional agro-climatic zones (lowland, midland, highland) and then three woredas were randomly selected. In the second stage, two kebeles (smallest administrative unit) were randomly selected from each woreda and hence a total of 6 Kebeles were included in the sample. Third, farm households in the selected kebeles were stratified into women headed and male headed and then representative sample was randomly drawn on the basis of probability proportional to size (PPS) sampling procedure.

Given the study population, sample size determination was made based on a statistically proven approach developed by Cochran (1977) and Kothari (2004). We also followed Kothari (2004) to estimate the minimum sample size for the study given the study population. However, the sample size from this approach is valid only if the simple random or systematic random sampling methods are applied. Multistage sampling requires a larger sample size to achieve the same precision. The present study followed a multistage sampling procedure, and hence the calculated sample size was adjusted through a design effect based on Cochran (1977) and Daniel (1999). Previous studies of such type (Daniel 1999) estimated a design effect in a range of 1.5-2.

$$n = \frac{NZ^2 P(1-P)}{d^2(N-1) + Z^2 P(1-P)}$$

Where:

n = sample size of household units with finite population correction,

N = total number of farm household units (population size),

Z = Z statistic for a level of confidence (Standardized normal variable that its value correspondence to 95% confidence interval which is equal to 1.96),

P = farm household units variable in terms of percentage (Expected proportion in proportion of one),

1-P= non-farm households, and

d = allowable error or precision {0.5*(1-P)}

Data Analysis

The data were analyzed using descriptive statistics and three econometric models, namely Heckman's sample selection model; the mean-variance method of Just and Pope (1979), and the Instrumental Variable (IV) estimation method. The descriptive statistics were employed to describe farmers' perception of climate shocks, responses implemented to address the shocks, and the constraints faced in implementing the responses. The Heckman's sample selection model was employed to analyze the two-step processes of adaptation to climate change. The mean-variance method of Just and Pope (1979) for cross-sectional data was used to estimate production risk offsetting effects of the climate-smart agricultural practices. For this purpose, households were stratified into users and non-users of the practices. The hypothesis tested in this regard was that the Climate Smart Agricultural Practices would help

to reduce the variance of production among those who had adopted the practices.

Following the production risk analysis, the Instrumental Variable (IV) estimation method was employed to determine the effect of Climate Smart Agricultural Practices on crop productivity at household and plot level. Crop productivity is a function of various plot level and household level variables. In this case, applying ordinary least squares (OLS) regression may lead to a bias due to potentially available endogenous choices that involve Climate Smart Agricultural Practices and the basic inputs included as explanatory variables (Bascle, 2008; Wooldridge, 2006). Therefore, to adequately address the endogeneity, the IV estimation is proved to be a suitable option (Baum et al. 2003) in studies that potentially involve endogenous choices.

Model specification one: Heckman's sample selection model
Based on Heckman (1976), when a farmer's decision process about the adoption of new technology requires more than one step, models with two-step regressions, such as the Heckman's sample selection, are appropriate to correct for selection bias generated during the decision-making processes. The Heckman's sample selection model is based on farmer's utility or profit-maximizing behavior and the assumption is that a farmer uses a new technology only when the perceived utility or profit from using the new technology is significantly greater than the traditional or the old method.

Similar to technology adoption, adaptation to climate change is a two-step process that involves perceiving that the climate is changing, and then responding to the change through adaptation measures (Deressa et al., 2011). Therefore, the Heckman probit selection model is employed in this study to investigate the determinants of perception and adaptation to climate change. The first stage of the model (the selection model) considers whether a farmer perceived a change in climate and the second-stage of the model (outcome model) explores whether the farmer adapted to climate change conditional on the first stage. In the two-stage process, the second stage of adaptation is a sub-sample of the first. Thus, it is likely that the second stage sub-sample (that includes those who perceived and responded to the change) is non-random and necessarily different from the first (which included those who did not perceive climate change), and this creates a sample selection bias (Deressa et al., 2011). Therefore, the Heckman two-step maximum likelihood procedure was used to correct for this selection bias. The underlying relationship in the Heckman's sample selection model consists of a latent equation given by:

$$y_j = x_j \beta + u_{1j} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (1)$$

Such that we observe only the binary outcome given by the probit model as

$$y_i^{\ probit} = (y > 0)\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots.$$
(2)

The dependent variable is observed only if j is observed in the selection equation

$$y_i^{\ select} = z_j \delta + u_{2j} > 0 \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots. \dots$$
(3)

$u_1 \sim N(0, 1)$

$u_2 \sim N(0, 1)$

$corr(u_1, u_2) = \rho$

Where y_j^{select} is whether a farmer has perceived climate change or not, z is an m vector of regressors, which include different factors hypothesized to affect the perception; δ is the parameter estimate, u_{2j} is an error term and u_1 and u_2 are error terms, which are normally distributed with mean zero and variance one. Thus, equation 3.3 is the first stage of the Heckman's two-step model which represents farmers' perception of the changes in climate. Equation 1 is the outcome model which represents whether the farmer adapted to climate change, and is conditional upon the perception model. When the error terms from the selection and the outcome equations are correlated ($\rho \neq 0$), the standard probit techniques yield biased results (Deressa et al., 2011; Van de Ven & Van Praag, 1981). Thus, the Heckman probit (heckprob) provides consistent and asymptotically efficient estimates for all parameters in such model.

The dependent variable for the selection equation is whether a farmer has perceived or not the climate change. The explanatory variables include socio-demographic, environmental and institutional factors selected based on hypothesized relationships described in literature on factors affecting the awareness of farmers to climate change or their risk perceptions (Maharjan et al. 2011; Deressa et al., 2011; Deressa et al., 2009) and field observations made in the study area. In the case of the outcome model, the dependent variable is whether a farmer has adapted or not to climate change. The explanatory variables are chosen based on the climate change adaptation literature (Deressa et al., 2011; Maharjan et al., 2011; Deressa et al., 2009; Hassan and Nhemachena, 2008) and the field observations made in the study locations. The hypothesized explanatory variables for the Heckman's two-step model used in this study are described in the section that presents the empirical model results.

Model Specification two: Instrumental Variable Estimation

This study used both household and plot level data to assess how different climate smart agricultural practices are related to crop productivity. Crop productivity was assessed at plot level because there is a possibility to have multiple types of crops produced on a given plot. Moreover, since it is difficult to compare productivity using quantity units, aggregation was made using monetary units (value of crops) so as to have a common denominator for comparison. For this purpose, the total value of crop production from a given plot was aggregated by the regional price levels of the respective crops and then converted into per hectare basis. Following this, the relationship between productivity and climate smart agricultural practices was assessed employing the instrumental variable (IV) estimation as analytical framework.

Crop productivity (value of crop production per hectares) is a function of various plot level and household level variables. In this case applying ordinary least squares (OLS) regression may lead to a bias due to potentially available endogenous choices that involve climate smart agricultural practices and the use of the basic inputs included in the explanatory variables. It

may result in some correlation between these potential endogenous variables and the error terms of the equation. Based on Bascle (2008) and Wooldridge (2006), there are three sources of violating edogeneity conditions in OLS, which include errors in variables (due to measurement error), omitted variables (due to omission of explanatory variables), and simultaneous causality (resulted when causality runs in both direction from the regressors to the dependent variable and vise versa). When simultaneous causality occurs, the OLS leads to biased and inconsistent estimators. Therefore, to adequately address these sources of endogeneity, the IV estimation is proved to be suitable option (Baum et al., 2003). The IV is also called two-stage least square (2SLS) reflecting the fact that the estimators are calculated in a two-step procedure (Maddala, 1992). Following Wooldridge (2002) and Maddala, (1992) and considering variables of interest in this study, the IV estimation can be specified as follows:

$$Y_1 = \beta_0 + \beta_1 Y_2 + \beta_2 X + U \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(4)$$

Where, Y_1 is value of crop yield per hectare; Y_2 is a vector of endogenous variables that include the Climate Smart Agricultural Practices and the use of basic inputs; X is a vector of exogenous variables that are assumed to affect crop yield; and U is the error term of the model. Equation (6.1) is called a structural equation. Endogeneity of Y_2 means that it is correlated with the error term U, and hence violates an important assumption under OLS. In order to obtain consistent estimators in this case, we need some additional information. The information come by way of new variables called instruments (Bascle 2008).

Let Z denotes a vector of such instruments satisfying two major properties: uncorrelated with U, also called orthogonal the error process (exogeneity condition, i.e. $Cov(Z,U) = 0$) and correlated with the endogenous variable Y_2 (relevance condition i.e. $Cov(Y_2, Z) \neq 0$) (Baum et al., 2003; Wooldridge, 2002). This means Z is a variable directly affecting the endogenous variable and may not directly related to the dependent variable Y_1. This requires potential exogenous variables that are hypothesised to have an influence on the Climate Smart Agricultural Practices and the basic inputs but with no hypothesised direct effect on value of crop yield.

Hence, Z includes variable categories like human capital (family size, dependency ratio, age, sex, and level of education) and village level factors (like market distance) which are assumed to affect crop yield through an indirect way by affecting the Climate Smart Agricultural Practices and the other potential endogenous variables. The predicted probabilities of the dummy endogenous variables can also be used as instruments of their actual values. It is also possible to exclude those explanatory variables that are jointly statistically insignificant from regression and use them as instruments in the less restricted version of the model (Jansen et al., 2006; Nkonya et al., 2004; Pender et al., 2004).

In the IV estimation, we estimate the value of crop yield by a two stage procedure in which the potentially endogenous variables are predicated from the first stage by regressing on the

other exogenous variables and used in the second stage estimation as independent variables. It follows by first fitting the regressors as follows:

$$Y_2 = \alpha_0 + \alpha_1 X + \alpha_2 Z + \varepsilon \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (5)$$

Equation (2) is first stage regression in the IV method (also called reduced form for the endogenous variable equation) where the endogenous regressor, Y_2, is expressed as a function of a vector of exogenous variables X, and a vector of excluded instruments Z. The key idea is that this stage isolates the variation in Y_2 that is not correlated with the error term U in the structural equation. Here both X and Z are called instruments, included and excluded respectively. For identification of the above equation, there must be at least as many excluded instruments as there are endogenous regressors and the process is called order condition for identification.

For obtaining a vector of predicted values in the $\hat{Y}_2$ equation (6), the two stages least square method requires estimation of the second stage by replacing the right hand vector of the endogenous variable by $\hat{Y}_2$ in equation (6). Then we will have the following equation

$$Y_1 = \beta_0 + \beta_1 \hat{Y}_2 + \beta_2 X + U \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(6)$$

However, the estimated standard errors from the second stage are wrong ones, as it is computed by using $\hat{Y}_2$ instead of Y_2. This has to be corrected using the appropriate technique as indicated in Meddala (1992). In STATA, the 'iverge2' command with the option 'first' automatically reports these values based on the command created by Baum et al. (2003).

The IV coefficients are consistent, provided that a unique solution to the estimation problem exists and the instruments are uncorrelated with error term in the model (Davidson and Mackinnon, 2004; Nkonya et al., 2008). However, in finite samples, IV estimators are generally biased, and they can be more biased than OLS estimates if the instruments are weak predictors of the endogenous explanatory variables (Davidson and Mackinnon, 2004). In the IV estimation, it is necessary to have at least as many restrictions as endogenous explanatory variables to be able to identify the model (order condition model), and additional restrictions (over identifying restrictions) that can help to increase the efficiency of the model, provided that these restrictions are significant predictors of the exogenous explanatory variables.

Therefore, it is vital to make different tests in the IV estimations. First, it is necessary to test whether the excluded instruments are significant predictors of the exogenous variables (test of relevance of instruments). This is a test of whether these instruments are correlated with the endogenous variables. When the correlation is strong (weak), the instrument is strong (weak). When there is no correlation, the instrument is said to be irrelevant. In this study, relevance of the instruments is made using Shea's partial R^2 and the standard partial R^2 obtained from the first stage regression. As a rule of thumb, if partial R^2 is large and Sheas's partial R^2 is small, one may conclude that the instruments lack sufficient relevance to explain all the endogenous regressors.

Another important test made in IV estimation is test of exogeneity condition (also called orthogonality condition) of instruments. It is the test whether the instruments are not correlated with the error term of the structural equation (i.e. whether they do not add additional explanatory power to the regression after controlling for the endogenous variables). This is also called test of over identifying restrictions. This test can be performed only if there are more instruments than the endogenous variables and assumes that at least one instrument is exogenous.

In this study, over identifying restrictions were tested using Hansen's J test which is robust to heterodcedasticity (Baum et al., 2003). A failure to reject Hansen's J statistic mean, that the instruments can be considered as exogenous. Generally, when instruments are valid (i.e. relevant and exogenous), the resulting IV estimator of the structural model is consistent estimator of the true population parameter.

The IV estimators are less efficient than OLS when the explanatory variables are all exogenous. Therefore, it is also essential to have a test for endogeneity on the suspected explanatory variables, a test to know whether IV method is even necessary (Wooldridge, 2002). Endogenety bias, potentially resulting from the actual values of the endogenous explanatory variables (OLS method) rather than their predicted values (IV method) can be tested by using Hausman test (Green, 2003; Hausman, 1978). However, this test can possibly result in a negative statistic, and furthermore, the Hausman command will report the correct statistic but with a wrong degree of freedom. To overcome this problem in the present study, the endogeneity of the potentially endogenous variables are tested using the C-statistic test (Baum et al., 2003). The test is perhaps best interpreted not as a test for endogenitey or exogeneiety of regrossors per se, rather as a test of consequence of employing different estimation methods (in this case, OLS and IV) on the same equation.

The other estimation and data issues considered included hetertoskedasticity, multicolinearity, and outliers. For these, appropriate logarithmic transformation of the continuous uncensored variables toward normality will be made. This gives an empirical merit of improving the model specification. The merits are reducing problem of non-linearity, outliers, and heterosckedasticity (Mukherjee et al., 1998) and simplifying interpretation of results (Nkonya et al., 2008). Hence, in estimating the IV model, a logarithmic Cobb-Douglass type specification was used. That means both the dependent and the continuous uncensored right-hand side variables under this model are transformed into logarithmic forms. The Huber-White robust standard errors is also used in all cases to address heteroskedasticity, while multicollinearity was tested using Variance Inflation Factor (VIF).

Results and Discussion

Farmers' Perception of Climate Change

The descriptive analysis indicated that about 52 percent of the respondents from the highland/midland and 62 percent from the lowland had perceived a change in climate (Table 1). This difference in perception of climate change between the two locations is statistically

significant ($\chi2 = 6.636$ with $P<0.001$).

Table 1: Perception of climate change in the study watersheds

Perception	Highland/midland		Lowland		Total		χ2 value	P-value
	N	%	N	%	N	%		
Not perceived	175	47.7	141	38.4	316	43.1	6.636***	0.006
Perceived	192	52.3	226	61.6	418	56.9		
Total	**367**	**100**	**367**	**100**	**734**	**100**		

*** Values are significant at $P < 0.001$.

The descriptive analysis also signified that more than 55 percent of the respondents perceived an increasing trend in temperature while 42 percent and 25 percent, respectively perceived a stable and decreasing temperature. Regarding precipitation, about 64 percent of the respondents indicated a decreasing trend while 34 percent of them testified an increasing trend. Parallel to this, those farmers who inferred an increasing trend in temperature and a decreasing trend in precipitation itemized the respective local indicators that make them deduce these trends (Table 2).

Table 2: Indicators of farmers' perception of increasing temperature and decreasing precipitation

Indicators of temperature change	N	Percent
Longest months with high day time temperature	133	33.3
Frequent occurrence of heat induced crop disease	119	29.3
Switch to heat tolerant crop types/varieties (not previously adapted to the area)	110	27.1
Frequent occurrence of heat induced livestock disease	107	26.4
Frequent occurrence of heat induced human disease	103	25.4
Emergence of new plant species/invasive species in the form of weed	82	20.2
Quick disappearance of water sources/points due to high evaporation	80	19.7
Indicators of precipitation change	**N**	**Percent**
Shortened length of rainy season	136	28.9
Change in planting time/date to adjust to onset of rainfall	123	26.2
Early onset and early exit of rainy season	114	24.3
Erratic nature of rainfall/Increased volume of rainfall at a time	100	21.3
Late onset of rainy season	99	21.1
Crop failure due to water shortage	98	20.9
Switch to drought tolerant crop types/varieties (not previously adapted to the area)	64	13.6

Farmers' Adaptive Responses

In the highland/midland condition, 62 percent of the respondents indicated that they know climate change adaptation measures and implemented at least one in the past. In the lowland, only 48 percent of the respondents reported to have knowledge of adaptation options while 52 percent of them had no any past experience concerning the measures (Table 3). This difference in the exposure to adaptation measures is statistically significant ($\chi2$=14.659 with P<0.001), showing the existence of a verified difference between the two agro-climatic zones.

Table 3: Awareness of adaptation measures in the study area

Exposure to adaptation	Highland/midland		Lowland		Total		χ2 value	P-value
	N	%	N	%	N	%		
No exposure	139	38	191	52	330	45	14.659***	0.000
Have exposure	228	62	176	48	404	55		
Total	**367**	**100**	**367**	**100**	**734**	**100**		

*** Values are significant at $P < 0.001$.

The respondents also were compared in terms of the use of different adaptation strategies in their agricultural practices without considering their perception of climate change. The most used adaptation measures include soil and water conservation and agronomic practices such as crop rotation, conservation tillage, intercropping, adjusting planting dates, diversifying crop types, use of fertilizer, use of improved crop varieties, application of manure, and irrigation practices. Accordingly, about 48 percent of the respondents in the highland/midland and 44 percent in the lowland used soil and water conservation practices (Table 4). However, the use of this practice is not statistically different between the two agro-climatic zones implying that the role of soil and water conservation in copping the hazards of climate change was evenly recognized in both areas.

Table 4: Adaptation through soil and water conservation measures

Use of soil and water conservation practices	Highland/midland		Lowland		Total		χ2 value	P-value
	N	%	N	%	N	%		
Non users of the practices	191	52	206	56	397	54	0.714	0.415
Users of the practices	176	48	161	44	337	46		
Total	**367**	**100**	**367**	**100**	**734**	**100**		

Congruently, about 60 percent of the respondents from the highland/midland and 49 percent from the lowland implemented agronomic practices as adaptation strategy (Table 5) without considering their perception of climate change. The difference between the two agro-climatic zones in terms of use of agronomic practices was statistically significant ($\chi2$=8.497 with P<0.01). More use of the agronomic measures in the highland/midland condition might be attributed to farmers' longer years of crop cultivation experience and better exposure to the practices compared to the farmers in the lowland.

The proportion of respondents that any of the adaptation practices was higher in the lowland. The non-users pinpointed the constraints for not responding to climate change through adaptation, lack of climate change perception being the major deterrent. Moreover, respondents who failed to respond through the adaptation measures indicated lack of awareness about the adaptation measures, liquidity constraint, and lack of access to the adaptation measures as critical barriers.

Table 5: Adaptation through agronomic practices

Use of agronomic practices	Highland/midland		Lowland		Total		χ^2 value	P-value
	N	%	N	%	N	%		
Non users of the practices	147	40	187	51	334	46	8.497**	0.004
Users of the practice	220	60	180	49	400	54		
Total	**367**	**100**	**367**	**100**	**734**	**100**		

*** Values are significant at $P < 0.01$.

Determinants of Perception and Adaptation to Climate Change

Tables 6 and 7 portray a summary of explanatory variables used in the Heckman probit selection and outcome models, respectively. As indicated in the Tables, about 52 percent of the respondents in the highland/midland and 62 percent in the lowland perceived a climate change. Conditioned on this perception level of climate change in the two agro-climatic zones, about 52 percent of the respondents in the highland and 49 percent in the lowland implemented at least one adaptation options available to them.

The Heckman probit model was first tested for its suitability and explanatory power over the standard probit model. The test results indicated the presence of sample selection problem (dependence of the error terms from the outcome and selection models) justify the use of the model with rho significantly different from zero (Wald $\chi2$=10·77 with P=0·001). Moreover, the likelihood function of the Heckman probit model was significant (Wald $\chi2$=84.36 with P<0·001), showing its strong explanatory power.

Table 6: Summary of model variables for the Heckman probit selection model

Dependent variable description	Farmers' perception status to climate change			
	Highland/midland		Lowland	
	Perceived (%)	Not perceived (%)	Perceived (%)	Not perceived (%)
Perception (Perceived=1)	52	48	62	38
Independent variables	Mean	SD	Mean	SD
Education level of HH head (years)	5.25	2.98	3.98	1.86
HH head age (years)	43.99	13.12	43.61	11.72
Climate change information (yes=1)	0.6	0.5	0.4	0.5
Frequency of drought (last 20 years)	2.30	1.43	2.81	1.48
Frequency of drought (last 10 years)	2.37	2.16	2.23	1.11
Number of crop failures (last 10 years)	2.33	1.22	2.09	1.26
Duration of food shortage (months)	2.91	1.50	2.37	1.66
Temperature (increasing=1)	0.7	0.3	0.65	0.3
Precipitation (increasing=1)	0.3	0.7	0.4	0.6

Table 7: Summary of model variables for the Heckman probit outcome model

Dependent variable description	Farmers' adaptation status to climate change			
	Highland/midland		Lowland	
	Adapted (%)	Not adapt (%)	Adapted (%)	Not adapted (%)
Adaptation (adapted=1)	52	48	49	51
Independent variables	**Mean**	**SD**	**Mean**	**SD**
Education of HH head (years)	5.25	2.98	3.98	1.86
Household size (number)	6.08	2.44	5.92	2.31
HH head sex (male = 1)	0.89	0.22	0.9	0.21
Farming experience (years)	22.68	11.47	14.71	7.27
HH head age (years)	43.99	13.12	43.61	11.72
Crop cash income (Ethiopian currency)	3352.23	3005.44	1332.64	952.61
Livestock cash income (Ethiopian currency)	3927.65	4916.84	3927.65	4916.84
Non-farm income (Ethiopian currency)	3393.89	3726.03	2566.24	1899.33
Extension advice (yes=1))	0.7	0.3	0.4	0.3

Climate change information (yes=1)	0.6	0.5	0.4	0.5
Cultivated land size (hectares)	2.23	1.69	3.85	1.08
Plots with steep slope (%)	0.5	0.5	0.2	0.11
Plots with mixed slope (%)	0.5	0.5	0.8	0.11
Semi-fertile plots (%)	0.4	0.3	0.4	0.33
Non-fertile plots (%)	0.5	0.5	0.4	0.4
Shared out land (ha)	0.64	0.46	1.15	0.73
Farm-home distance (km)	1.91	1.12	2.36	1.32
Number of parcels	2.08	0.93	1.85	0.85
Past knowledge of adaptation (yes=1)	0.62	1.34	0.48	1.62

Results of the selection and outcome models are presented in Tables 8 and 9, for the highland/midland and lowland agro-climatic zones, respectively. In both models, most of the explanatory variables and their respective marginal values were statistically significant in determining perception and adaptation in the directions that would be expected. The calculated marginal effects measure the expected changes in the probability of perception and adaptation with respect to a unit change in an explanatory variable. Results of the selection model for the highland/midland (Table 8) indicate that education level of the household head, age of the household head, changes in temperature and precipitation, number of crop failures in the past, and frequency of drought in the past significantly increased the likelihood of farmers' perception of climate change ($P<0.01$). Likewise, duration of food shortage faced in the past was statistically significant in enhancing farmer's perception of climate change ($P<0.05$).

Results of the outcome model for the highland/midland condition are also portrayed in Table 8. Accordingly, income from livestock, the gender of the household head, extension advice, and knowledge of adaptation measures strongly influenced farmers' adaptation decision ($P<0.001$). Moreover, the education level of the household head, household size, age of the household head, non-farm income, land size, climate information, the proportion of non-fertile land, and farm-home distance were significant in determining farmers' adaptation decisions ($PS<0.05$).

Table 8: Results of the Heckman probit selection model for the highland/midland

Explanatory variables	Outcome model				Selection model			
	Regression		Marginal effect		Regression		Marginal effect	
	Coefficients	P-values	Coefficients	P-values	Coefficients	P-values	Coefficients	P-values
Education of HH head	0·082**	0·022	0·016**	0·012	0·033***	0·003	0·013***	0·002

Household size	0·044**	0·012	0·014 **	0·043				
HH head sex	0·580**	0·010	0·177**	0·012				
Farming experience	0.072	0.133	0.023	0.131				
HH head age	0.138**	0.012	0.012**	0.031	0·015***	0·000	0·008** *	0·000
Crop income	0.001	0.142	0.031	0.531				
Livestock income	0.829***	0.000	0.145** *	0.000				
Non-farm income	0·126**	0·023	0·021**	0·044				
Extension advice	1·024***	0·000	0·303** *	0·000				
Cultivated land size	−0·565**	0.034	−0·009* *	0·024				
Climate information	0·255**	0·021	0·074**	0·023	0.034	0.131	0.031	0.113
Temperature					0.168***	0.000	0.044** *	0.000
Precipitation					-0.013***	0.000	-0.03***	0.000
Plots with steep slope	2.62*	0.054	0.263*	0.041				
Plots with mixed slope	2.62*	0.054	0.263*	0.043				
Semi-fertile plots	0.056	0.113	0.012	0.110				
Non-fertile plots	1.21**	0.022	0.066**	0.011				
Shared out land	-0·025	0·310	-0·012	0·310				
Farm-home distance	-0·122**	0·011	-0·033**	0·011				
Number of parcels	−0·013**	0.021	−0·011	0·012				
Number of crop failures					1.418***	0·000	0.278** *	0·000
Frequency of drought in 20 years					0·255**	0·021	0·074**	0·023

Explanatory variables	Outcome model				Selection model			
	Regression		Marginal effect		Regression		Marginal effect	
	Coefficients	P-values	Coefficients	P-values	Coefficients	P-values	Coefficients	P-values
Frequency of drought in 10 years					0·83***	0·001	0·212	0·000
Duration of food shortage					0.011**	0.028	0.003**	0.035
Past knowledge of adaptation	0.476***	0.002	0.132***	0.001				
Constant	-5·945***	0·003			-1.245***	0·000		
Total observations	367							
Censored	73							
Uncensored	294							
Wald Chi square (Zero slopes)	86·84, (P<0·001)							
Wald Chi square (independent equations)	10·29 (P<0·001)							

***, ** and * indicate significance levels at 1%, 5% and 10%, respectively.

Unlike the highland/midland condition, change in temperature and precipitation and frequency of drought experienced in the past were less important in influencing farmers' perception of climate in the lowland. However, farming experience, climate information, duration of food shortage, and the number of crop failures experienced in the past were statistically significant in determining farmers' perception of climate change (Table 9).

Table 9: Results of the Heckman probit selection model for the lowland

Explanatory variables	Outcome model				Selection model			
	Regression		Marginal effect		Regression		Marginal effect	
	Coefficients	P-values	Coefficients	P-values	Coefficients	P-values	Coefficients	P-values
Education of HH head	0.505***	0.000	0.144***	0.000	0.272**	0.014	0.070*	0.049
Household size	0.056***	0.000	0.023***	0.000				
HH head sex	0.016***	0.000	0.002***	0.000				
Farming experience	0.580**	0.010	0.165**	0.012	0.061**	0.017	0.019**	0.017
HH head age	0.058*	0.054	0.028*	0.043				

Crop income	1.022***	0.003	0.319**	0.003				
Livestock income	-0.140**	0.011	-0.042*	0.013				
Non-farm income	-0.565**	0.034	-0.019*	0.042				
Extension advice	0.015	0.143	0.045	0.141				
Cultivated land size	-2.70**	0.037	0.044*	0.041				
Climate information	0·203**	0·011	0·057**	0·023	0.155***	0.001	0.131**	0.022
Temperature					0.077	0.416	0.017	0.103
Precipitation					-1.121**	0.031	-0.123**	0.022
Plots with steep slope	0.543*	0.050	0.021*	0.056				
Plots with mixed slope	0.956	0.419	0.026	0.337				
Semi-fertile plots	0.139	0.124	0.003	0.124				
Non-fertile plots	-1.50	0.204	-0.127	0.342				
Shared out land	-0.54*	0.071	-0.149*	0.056				
Farm-home distance	-2.626*	0.046	-0.263*	0.051				
Number of parcels	-0.053	0.310	-0.016	0.310				
Number of crop failures					4.414**	0.017	0.278**	0.021
Frequency of drought in 20 years					0.238**	0.014	0.227**	0·034
Frequency of drought in 10 years					0·323**	0·032	0·044**	0·013
Duration of food shortage					2.634***	0·000	0·212**	0·001
Past knowledge of adaptation	2.662**	0.000	0.289**	0.000				
Constant	-5·032***	0·001			-1.133***	0·000		
Total observations	367							

Censored	79								
Uncensored	288								
Wald Chi square (Zero slopes)	88·43, (P<0·001)								
Wald Chi square (independent equations)	10·86 (P<0·001)								

***, ** and * indicate significance levels at 1%, 5% and 10%, respectively.

The outcome model result for the lowland condition (Table 9) revealed that education level of the household head, household size, the gender of the household head, farming experience, age, income from crop enterprise, climate information, the slope of a plot, and knowledge of adaptation options were positively and significantly related to farmers' adaptation decision. Income from livestock and non-farm activities negatively affected adaptation decision showing that income from these sources may not be invested for adaptation in the crop sector. Similarly, land size, size of shared-out land, and farm-home distance negatively influenced the adaptation decision of smallholder farmers in the lowland.

Based on the model results, the marginal effects of significant explanatory variables were compared between the two agro-climatic zones. The computed marginal effect for the education variable showed that one additional year in the educational status of the household head increases the probability of adaptation by 14.4 percent in the lowland compared to 1.6 percent in the highland/midland. The probability of adaptation increases by 16.5 percent for each additional year of farming experience in the lowland while the marginal effect of farming experience on adaptation was negligible in the highland/midland. Likewise, the probability of adaptation increases by 31.9 percent as income from crop enterprises increases by one unit in the lowland.

One unit additional income from livestock enterprise increased the probability of adaptation by 14.5 percent for farmers in the highland/midland. However, additional income from livestock decreased the probability of adaptation by 4.2 percent in the lowland implying that income from this source may not be invested for adaptation in the crop sector. Likewise, one unit additional income from non-farm activities increased the probability of adaptation by 2.1 percent in the highland/midland perhaps because it induces more investment in adaptation options. Nevertheless, non-farm income reduced the probability of adaptation by about 2 percent in the lowland showing that households who engaged in non-farm activities are less dependent on crop farming and hence less motivated to invest for adaptation in the crop sector.

Owning farm plots with steep-slope increases the probability of adaptation to climate change by 26.3 percent in the highland/midland implying that farmers were more likely to invest in adaptation measures if their farm plots are steeper. Likewise, as the proportion of non-fertile land increases by one hectare, the probability of adaptation increases by 6.6 percent in the highland/midland. However, in the lowland, the probability of adaptation decreases by 12.7

percent as the size of non-fertile land increases showing that farmers may abandon a given farm plot if its fertility status significantly declines. This could be attributed to a relatively higher per capita landholding in the lowland which can possibly offset a decline in crop yield.

As the size of shared-out land increases by one-hectare, the probability of adaptation increases by 1.2 percent in the highland/midland and by 14.9 percent in the lowland. An increase in the farm-home distance by one kilometer decreases the probability of adaptation by 26.3 percent in the lowland and by 3.3 percent in the highland/midland. This is because farm size is relatively large in the lowland compared to the highland/midland and hence less attention is given to farm plots far away from dwelling areas. Extension advice increased the probability of adaptation by 3 percent in highland/midland suggesting that extension service is instrumental for adaptation decision. Similarly, the availability of climate information increases the probability of adaptation by 7.4 percent in the highland/midland and by 5.7 percent in the lowland.

The other variable of interest which affects the probability of farmers' adaptation decision is past knowledge of adaptation options (a proxy variable for awareness). The calculated marginal effect for this variable shows that the probability adaptation increases by 13.2 percent in the highland/midland and by 28.9 percent in the lowland showing that farmers' desire to try the adaptation practices at their own cost increases when they have prior exposure to the practices. This implies that the more a farmer is exposed to adaptation technologies, the more will be the willingness and trust to implement the techniques sustainably.

Discussion on the Results of the Heckman Probit Selection Model

Climate change adaptation in smallholder agriculture is vital to reduce rural poverty and maintain ecosystem health. Besides, adaptation improves agricultural productivity and income of smallholder farmers (Deressa et al., 2011). As confirmed by the results of this study, adaptation to climate change is a two-step process that requires that farmers perceive climate change in the first step and respond to the changes in the second step through adaptation. In the study locations, smallholder farmers well perceived the problem of climate change and made adaptive responses to minimize the negative effects that compromised their farm productivity and food security. However, different socio-economic, environmental, and institutional factors affect farmers' climate change perception and adaptive behavior.

The results of this study revealed that farmers living in the lowland area perceived more change in climate than farmers in the highland/midland. This could either be associated with the repeated drought events occurring in the area in recent years or could be linked to various environmental changes that cause reduced water availability and agricultural yield in the lowland areas (Deressa et al., 2011). With regard to adaptation, better awareness and use of adaptation measures was revealed in the highland/midland condition as compared to the lowland. This difference between the agro-climatic zones may call for further heightening of intervention to facilitate the prospect for enhanced climate change perception and adaptation.

The relevance of different agronomic practices as adaptation measures was increasing over years in the study area to lessen the challenges of climate factors on smallholder agriculture. Some agronomic practices (such as adjusting planting date and early maturing crop varieties) were flattering in all agro-climatic zones of the study area in response to change in the time of onset of the rainy season, the incidence of terminal moisture stress, and early cease of rainfall. This is in line with the findings of Lobell et al. (2008) who signified adjusting planting dates and use of early maturing varieties as key adaptive responses to climate change in areas where rainfall is erratic.

Diversifying crop types was another agronomic practice emerging as an adaptation strategy in the study locations attributed to farmers' risk aversion behavior. Moreover, diversifying crop types into high-value crops (such as horticultural crops) is a related new development as an adaptation option aiming at intensifying the use of scarce farm resources (water and land) and maximizing returns thereof. This strategy is also further driven by improved access to the market and growing experience of irrigation practices in the area. This result confirms the findings of previous studies that reported crop diversification as a contemporary practice in response to climate change (Nkonya et al., 2011). However, it is contrary to Jones and Thornton (2010), who predicted that climate change would induce a shift from crop to livestock production.

Based on the results of this study, farmers are more likely to implement soil conservation measures as adaptation strategy on parts of their agricultural land that are more susceptible (steep slopes) to climate change risks. The study also showed a significant positive role of access to training, extension service, and climate information in promoting farmers' investment in adaptation measures. Providing agricultural extension services helps to increase implementation of the adaptation measures since farmers can acquire new skills and hence ensures sustainable use of the techniques. The knowledge gained through training can also capacitate farmers with the technical know-how required for implementing adaptation measures in their agricultural production system and make them far-sighted to look for long-term benefits rather than immediate gains obtained at the expense of land degradation.

As expected, education is positively associated with farmers' climate change perception and adaptation decisions suggesting that educated farmers tend to better recognize the risks associated with climate change. Education is also more likely to enhance the cognitive proficiency and awareness of farmers about new technologies and hence induces them to adopt. This is in the same line with the findings of Deressa et al. (2009).

Gender of the household head was positively and significantly related to farmers' adaptation decision in the study area showing that male-headed households better adapt to climate change. This can be associated with the fact that in rural Ethiopia, women-headed-households are usually constrained by family labor because those women are responsible for both farming and domestic activities. Moreover, female-headed households had less access to resources, information, and other socio-economic opportunities, and bear more burdens of

family responsibilities than male-headed households. This finding concurs with other empirical findings (Deressa et al., 2011; Buyinza and Wambede, 2008) who reported that male-headed households often have a higher probability of adopting new agricultural technologies.

Family members are important source of labor for any farm operation in smallholder agriculture. In line with this, household size increased the likelihood of farmers' climate change adaptation in the study area, for large family size is normally associated with a better labor endowment. The result also suggested households that are endowed with labor tend to use labor-intensive adaptation measures. This result is in harmony with the findings of Kassie et al. (2009) who stated the presence of more economically active household members favored the adoption of labor-demanding agricultural technologies.

In the study area, the incidence of adaptation to climate change decreased with cultivated land size. This may reveal that adaptation is plot-specific and it is the specific characteristics of a plot that dictates the need for a specific adaptation rather than the size. Previous studies (Deressa et al. 2011; Kurukulasuriya and Mendelsohn 2006) also reported similar findings.

Income from livestock and non-agricultural sources was positively and significantly associated with adaptation in the highland/midland agro-climatic zone. This could be attributed to the fact that the income from these sources may provide farmers with additional capacity to finance adaptation measures. However, in the lowland, income from the livestock enterprise and non-farm sources decreased the likelihood of adaptation. This may imply that as households engage more in livestock and non-farm activities, they become less dependent on crop cultivation as a livelihood source and less motivated to invest for adaptation in the crop sector. This is in agreement with the findings of Simane et al. (2016) who reported a similar result for livestock-based farming systems in the northern highlands of Ethiopia.

Size of non-fertile land was negatively and significantly associated with the likelihood of adaptation in the lowland showing that farmers may abandon a given farm plot if its fertility status significantly declines. This could be attributed to a relatively larger per capita landholding in the lowland, which can possibly offset a decline in yield through extensification. In the same line, distant farmlands received fewer adaptation measures in the lowland for the same reason of a relatively larger per capita landholding that may reduce the attention given to farm plots far away from dwelling areas. This result corroborates with the findings of Ketema and Bauer (2012) and Beshir et al. (2012).

Farmers' previous knowledge of climate change adaptation measures increases their adaptation decision in both the highland/midland and lowland agro-climatic zones. This shows that farmers' desire to implement adaptation measures at own cost increases when they have prior exposure to the practices. The more a farmer is exposed to the technologies of adaptation the more will be the willingness and trust to implement the techniques sustainably. This is in agreement with previous empirical studies (Simane et al. 2016)

Farmers' use of Climate-Smart Agricultural Practices

The most commonly practiced climate-smart agricultural practices in the study areas were portrayed in Table 10 along with the proportion of farmers that used the respective practices. Although diversified types of climate-smart agricultural practices were identified in the study areas, most of these were used only by few farmers. Changing crop varieties and/or changing crop types were common practices across the highland/midland and lowland agro-climatic zones of the study area.

Some of the new crop types/varieties were more drought-tolerant than the crops replaced, while others, notably vegetables, require more water, contrary to the expectation that farmers would move toward less water demanding crops. In all agro-climatic zones, however, the farmers switching to vegetables had some form of access to irrigation. As stated in Simane et al. (2016), the diversification into vegetables is partly a reflection of the effect of better market access and a tendency to move to high-value crops as a strategy of intensifying the use of scarce resources such as land and labor.

Adjusting planting date was practiced towards addressing the late and/or early onset of rainfall by farmers in both parts of the study area with a varying degree of intensity. The largest share of the respondents that used this practice is from the highland/midland agro-climatic zone owing to better perception about the change in the onset of rainfall. However, respondents from the lowland felt that planting dates are less flexible due to the relatively shorter growing period. As indicated in Table 10, the use of different soil and water conservation measures was a common practice in the study areas. In the highland/midland condition, the use rate of physical soil conservation measures was higher compared to the lowland implying that farmers in the highland/midland were more aware of the techniques and respond to climate change and variability through these measures.

Table 10: Commonly used climate-smart agricultural practices in the study areas

Adaptation strategy	Percent of user farmers by Agro-climatic zones		Total
	Highland/midland	Lowland	
Improved crop variety	55	34	45
Change the crop type	34	28	31
Adjust planting dates	58	22	40
Crop rotation	60	48	55
Intercropping	44	32	38
Animal manure	61	43	52
Fertilizer	65	28	46
Conservation tillage	42	22	32
Grass strips	42	28	35
Agro-forestry	38	30	34
Soil bunds	58	41	50
Check dams	34	22	28
Insitu water harvesting	39	24	32

Irrigation	17	8	13
Number of plots	558	337	915

Effect of Climate-Smart Agricultural Practices on Production Risk and Productivity

This section presents the effect of the Climate-Smart Agricultural Practices on crop production risk (derivation from conditional mean yield) and productivity. The plot-level cross-sectional data was used to compare the agro-climatic zones of the study area in terms of the estimated effect of the climate-smart agricultural practices on crop production risks and productivity.

As revealed in Table 11, the climate-smart agricultural practices helped to reduce crop production risks that may lead to yield variability in the agro-climatic zones. Of the 14 coefficients that correspond to the different climate-smart agricultural practices, 11 were negative and statistically significant indicating that the practices helped to reduce crop yield variance. The results are consistent with other studies (Branca 2010; Bationo et al. 2007), which showed that soil fertility management practices and water conservation measures increase moisture storage capacity, which in turn reduces yield variability that attributes to productivity stressing climate factors. It is expected that the synergetic effect of the climate-smart agricultural practices could be higher in reducing the crop productivity risk and hence future research should investigate the synergistic effect and possible complementarities among the practices.

Table 11: Effect of climate-smart agricultural practices on crop yield risk and productivity

Climate-smart agricultural practice	Log (variance of productivity/ha)		Log (value of crop produced/ha)	
	Highland/midland	Lowland	Highland/midland	Lowland
Manure	-2.071*	-2.308*	1.512**	0.412*
Crop residue	-0.115**	-0.102**	0.272	0.102
Inorganic Fertilizer	1.04	0.423	0.641	0.053
Crop rotation	-0.404**	-0.601*	0.703**	0.354*
Intercropping	-0.738**	-0.313	0.403**	0.344**
Conservation tillage	-2.218**	0.149	0.224*	0.186*
Water harvesting (insitu)	-0.464*	-0.881*	0.566**	0.233*
Irrigation	-0.394*	-3.23**	0.826**	0.44*
Agroforestry	-0.097	-0.076	0.806**	0.576*
Soil/stone bunds	-2.024**	-1.043*	2.342**	1.423*
Grass strips	-0.442*	-0.756*	0.542**	0.408*
Improved seed	-0.004	-0.027	1.78**	0.712*
Check dam	-0.323*	-0.412*	0.246	0.137
Conservation tillage	-0.343*	0.422*	0.224*	0.186*
Number of plots	558	337	558	337

**, and * indicate significance at 5%, and 10% levels, respectively

Table 11 also shows the effect of the Climate-Smart Agricultural Practices on crop productivity expressed in terms of the value of crops produced per hectare. Application of inorganic fertilizer had no significant effect on crop productivity in both agro-climatic zones. The insignificant effect of fertilizer on crop productivity in both parts of the study area could be attributed to the low rate of application, poor fertility status of the soil, and other biophysical characteristics of the plots receiving fertilizer. The results from FGD conducted in the two parts of the study area also revealed that farmers are applying inorganic fertilizer at a very low rate and without taking into account the fertility status of a plot, which may result in a low productivity response.

Agro-forestry practices showed a positive effect on crop productivity in both agro-climatic zones. As expected, water harvesting and irrigation had a significant positive influence on crop productivity revealing the importance of the practices in offsetting the possible risk of moisture stress. Similarly, crop rotation, intercropping, use of improved seed, use of physical soil conservation measures, conservation tillage, and manure application positively and significantly contributed to crop productivity in both agro-climatic zones.

Determinants of productivity: Results of the instrumental variable regression
Where the scope for expansion of arable land is very limited, the option to increase agricultural output is through intensification (increasing productivity per unit area). Nevertheless, several factors may affect the scope of increasing productivity. Table 12 presents the description of variables used in the IV estimation as determinants of productivity.

Table 12 Description and summary statistics of variables used in the IV estimation

Variables	Description	Observations	Mean	SD
Value of output	Value of total output per ha	915	33496	11104.1
Labor	Pre-harvest labor use (man-days)	915	211.44	112.14
Sex	1 if the household is male headed	734	0.83	0.234
Manure	1 if manure is applied, 0 otherwise	915	0.522	0.475
Fertilizer	1 if fertilizer is applied, 0 otherwise	915	0.422	0.443
Intercropping	1 if intercropping is practiced, 0 otherwise	915	0.382	0.441
Conservation tillage	1 if intercropping is practiced, 0 otherwise	915	0.321	0.612
Physical soil conservation measures	1 if conservation is practiced, 0 otherwise	915	0.431	0.427
Crop rotation	1 if crop rotation is practiced, 0 otherwise	915	0.631	0.337

Improved crop variety	1 if improved crop variety is used, 0 otherwise	915	0.461	0.342
Irrigation (dummy)	1 if irrigation is practiced, 0 otherwise	915	0.251	0.652
Oxen-pair	Draft power used (oxen-pair/ha)	915	10.22.	5.76
Parcel size	Parcel size (ha)	915	0.68	0.257
Slope : flat	1 for flat slope, 0 otherwise	915	0.355	0.544
Slope: gentle	1 for gentle slope, 0 otherwise	915	0.441	0.403
Slope: steep	1 for steep slope, 0 otherwise	915	0.201	0.406
Slope: very steep	1 for very steep slope, 0 otherwise	915	0.003	0.243
Fertility: poor	1 for poor soil fertility, 0 otherwise	915	0.321	0.423
Fertility: good	1 for medium soil fertility, 0 otherwise	915	0.278	0.386
Fertility: medium	1 for good soil fertility, 0 otherwise	915	0.401	0.446
Farm distance	Farm-home distance (kilometers)	915	2.037	1.192
Size of holding	Total size of holding (ha)	734	6.210	2.630
Livestock (TLU)	Livestock size (TLU0	734	8.52	3.48
SI index)	Land fragmentation in simpson index (SI)	912	0.34	0.102
Proportion of fruits	Proportion of earning from fruits (Br)	351	0.18	0.221
Number of crops	Number of annual crop types grown	734	3.10	2.01
Credit	1 if credit is received, 0 otherwise	734	0.231	0.388
Education	1 if no formal education	734	0.45	0.334
Adult equivalent	Family size in adult equivalent	734	4.42	1.62
Dependency ratio	Ratio of dependents to active labor	734	1.33	0.58
Female proportion	Proportion of female members in the family	734	0.44	0.131
Market distance	Distance of the nearest market (km)	734	4.47	3.121
Off-farm/non-farm activities	1 if involved in off-farm activities, 0 otherwise	734	0.411	0.213
Ago-climatic zone: HL/ML	1 if HL/ML, 0 otherwise	734	0.5	0.5

Agro-climatic zone: Lowland	1 if lowland, 0 otherwise	734	0.5	0.5

In this study, the IV estimation result revealed the effects of climate-smart agricultural practices and other factors on crop productivity. In the IV estimation, pre-harvest labor, plowing techniques, intercropping, manure application, and fertilizer application were assumed to be endogenous variables. The instrument variables used for this analysis included household characteristics (sex of the household head, level of education, adult equivalent, dependency ratio, and proportion of female members in household labor), location characteristics (market distance), and location (agro-climatic zone) dummies.

Table 13 depicts the results of the IV estimation. Different tests were made in order to evaluate whether IV model properly fits the data set. The relevance test (based on Sheas's partial R2 and the standard partial R2 obtained from the first stage regression) indicate that the instruments are significant predictors of the indicated endogenous variables. The test of over-identifying restriction of the instruments (based on Hansen's J statistic) indicates that the instruments are orthogonal (not correlated with the error term of the structural model). Based on the two tests, the instruments are valid in the IV model being used. Moreover, the Hausman and C-statistics for testing the endogeneity of potentially endogenous variables (whether OLS is preferable) indicate that the variables are endogenous. The overall test results generally confirm that the IV method is preferred over the OLS method for the present data set. Hence, only the IV estimates are presented and discussed here while OLS results could be used only for comparison purposes.

The existence of causality and endogeneity may lead to a direct or/and indirect effect of some variables on the dependent variable. In other words, a variable that may not have a direct significant effect may have an indirect effect via endogenous variables. Further, a variable that does not appear in the structural model may also have an indirect effect on the dependent variable via endogenous variable. In this paper, however, only the direct effects are explained and the indirect effects can be inferred from explanations made in recent empirical studies on the determinants of soil fertility management practices (Mihretu and Yimer, 2017; Belay et al., 2016; Branca, 2010; Mengistu, 2010; Asrat et al., 2004).

Table 13: Parameter estimates of IV regression model for land productivity analysis

Explanatory variables	**Coefficient**	**S.E**
Ln(labor)	1.134**	0.376
Manure (dummy)	0.477***	0.301
Fertilizer (dummy)	0.089	0.191
Intercropping (dummy)	0.344***	0.132
Conservation tillage (dummy)	0.342***	0.134
Physical soil and water cons. measures (dummy)	0.212**	0.207
Crop rotation (dummy)	0.101	0.122

Improved crop variety (dummy)	0.221*	0.236
Irrigation (dummy)	0.311**	0.321
ln(oxen-pair)	0.110	0.121
ln(parcel size)	0.231*	0.101
Slope (cf. flat)		
Gentle	0.033	0.210
Steep	-0.155*	0.131
Very steep	-0.312	0.222
Fertility level (cf. poor)		
Good	0.012	0.111
Medium	0.228*	0.149
ln(farm distance)	0.121	0.043
ln(size of land holding)	0.041	0.150
ln(TLU)	0.241*	0.117
Land fragmentation (simpson index)	-0.588*	0.242
Proportion of fruits	0.211	0.202
Ln(number of crops)	0.982**	0.243
Credit (dummy)	0.321*	0.434
Off-farm/non-farm activities (dummy)	-0.156*	0.178
HL/ML (dummy)	0.443*	0.240
Lowland (dummy)	-0.132	0.041
Relevance test of excluded variables (p-value)[ϕ]		
Ln(labor)	0.000	
Conservation tillage	0.000	
Intercropping	0.000	
Fertilizer use	0.000	
Manure application	0.000	
Hansen's J-test of overid. restrictions (p-value) [φ]	0.7465	
Endogeneity test based on C-statistic (p-value)	0.0302	

Notes: Productivity (dependent variable) is expressed as a natural logarithm of the value of crop output per hectare; [ϕ] Based on Shea's R^2 and standard partial R^2 for the indicated endogenous variables; [φ] Subset of instruments have also passed overidentifying restrictions based on C-statistic test; ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

The IV estimation result presented in Table 13 shows that different climate-smart agricultural practices were found to be significant and positively affecting crop productivity. Manure application positively and significantly influenced crop productivity justifying the crop-livestock complementarity in the smallholder agriculture system. Likewise, intercropping practices positively and significantly affected crop productivity implying the possibility that

the practice could help improve crop productivity in the smallholder farming system where access to external inputs and the use level is very limited. Conservation tillage also had a positive and significant effect on crop productivity signifying the role of the practice in sustaining crop productivity through conserving water and soil moisture. The findings generally infer that the promotion of climate-smart agricultural practices is vital to boost and sustain crop productivity in the face of changing climate and unreliable access to modern agricultural inputs. The role of labor input was also found significant and positive in affecting crop productivity implying the labor intensiveness of the smallholder agricultural production systems.

The IV estimation result showed that the application of inorganic fertilizer (one of the endogenous variables) had no significant effect on crop productivity, controlling for other factors that affect productivity. This can be associated with the fact that fertilizer application in the study area was generally low owing to lack of access, limited supply, and high price. This finding is in line with Mengistu (2010), who reported fertilizer to be among the most expensive farm inputs in Ethiopia and is known to have an inefficient delivery system. However, all the endogenous variables (manure, intercropping, conservation tillage, and physical soil conservation) taken together were jointly significant in affecting crop productivity based on Aderson-Rubin Wald test of joint significance. The joint significance may imply that there is an opportunity to increase crop productivity through climate-smart agricultural practices that include manure application, intercropping, conservation tillage, and physical soil conservation measures while at the same time inducing low-external input investment.

Factors such as parcel size, soil fertility status, livestock units, number of crops grown (diversification), and households' access to credit positively and significantly affected crop productivity. On the other hand, the slope category of a plot, land fragmentation, and involvement in off/non-farm activities had a negative and significant effect on crop productivity.

The positive effect of parcel size on crop productivity is/was associated with economies of scale. There is a possibility for economies of scale from an increase in a plot size particularly when the size of the plot is below minim operational level. This finding is in agreement with several studies (Mengitu, 2010; Nkonya et al., 2005; Nkonya et al., 2008; Pender et al., 2008). On the contrary, the negative effect of land fragmentation on productivity suggests that it reduces the ability to achieve economies of scale, for it makes a plot of land below the minimum operational level. The implication from the effect of these two variables is that policy measures towards land consolidation may enhance productivity in the study area as well as other locations in the country with similar socioeconomic and environmental physiognomies.

Crop diversification has a positive and significant effect on productivity confirming that increasing the number of crops grown reduces the farmers' exposure to production and price

risks as opposed to the specialization on a single crop. However, since diversification in the study area was mostly at the expense of high-value crops (based on the FGD results and key informants), it may result in less risk and more production but less income, which is a typical feature of a subsistence agricultural systems. Hence, this may call for alternative risk-minimizing options such as small-scale irrigation, drought-tolerant crop varieties, and crop insurance aligned to the major crop production risk factors (moisture stress, pest, and diseases). There is also a need to look for possible market linkages for the currently less marketable crops.

Based on the IV model result, institutional arrangements such as creating access to rural credit was found to be important in boosting crop productivity. Credit availability in the form of basic agricultural inputs could help farmers to relax their financial constraints for the purchase of the farm inputs. Similarly, implementation of long-term soil conservation measures (physical structures) on-farm plots may complement the short-run measures and the synergy may boost crop productivity in the study area.

Livestock ownership is positively and significantly related to crop productivity justifying the complementarity between livestock and crop enterprises in the context of smallholder agriculture. The role of livestock in crop production is also evident in that it serves as a source of manure (which is also significant in affecting productivity as indicated earlier), source of draft power, and transportation all of which are augmenting crop production activity. This finding is consistent with other researchers (Nkonya et al. 2005; Asat et al. 2004; Pender et al. 2004).

An increase in a slope of a plot has a negative effect on crop productivity. On steep slopes, the hazards of soil loss through erosion increases and may call for increased use of expensive external inputs and conservation measures to sustain crop productivity. The negative effect of off-farm/non-farm activities on productivity implies that these activities may compete for the family labor, which is critically important for the farm operations. This finding is in line with Mengistu (2010) who reported a negative effect of non-farm activities but in contrast with Nkonya, et al. (2004; 2006) who found a positive effect of the off-farm activities on crop productivity.

Landholding size turned out to be statistically insignificant implying that it has no direct effect on crop productivity. Hence, there was no adequate statistical evidence to argue either against or in favor of the inverse farm size productivity relationship. However, some variables which have no direct significant effect may influence crop productivity indirectly through influencing the variables which are treated as endogenous. In the IV estimation, the absence of a variable or its insignificance may not necessarily imply that the variable is not influencing crop productivity. This means the variable may exert either positive or negative indirect effect on crop productivity by affecting the endogenous determinants of productivity.

Summary, Conclusion, and Recommendations

Adaptation to climate change is a two-step process, which requires that farmers first perceive the climate change and then respond to the changes in the second step. This study employed the Heckman sample selection model to explore determinants of perception and adaptation to climate change focusing on agro-climatic zones (highland/midland and lowland). It is evidenced by the results that farmers in the area perceived climate change and devised a means to survive through implementing different adaptation strategies. In this regard, farmers in the studied agro-climatic zones were found to be similar with respect to some variables that affected perception and adaptation to climate change. They had also a considerable divergence in terms of the direction and effect of some other explanatory variables that affect perception and adaptation.

Education of the household strongly and positively affected both perception and adaptation in the highland/midland. It also strongly affected adaptation decisions in the lowland area. Farming experience had a strong and positive effect on adaptation in the lowland, while it had no effect in the highland/midland. Similarly, income from crop enterprise positively and strongly affected adaptation decision in the lowland but it showed no effect in the highland/midland.

Income from livestock enterprise positively and strongly affected farmers' adaptation decision in the highland/midland, while its effect was negative in the lowland. Likewise, income from off-farm activities had a positive influence on adaptation in the highland/midland area, while its effect was negative in the lowland. In the highland/midland condition, the temperature change was statistically significant in affecting perception of climate change while its effect was insignificant in the lowland. Slope and fertility status of farm plots positively and significantly affected adaptation decisions in the highland/midland while these variables had no effect on adaptation in the lowland.

The study result generally revealed that farmers' climate change perception and adaptation in both agro-climatic zones were commonly affected by some similar exogenous variables, which necessitate a joint policy intervention with regard to these variables. On the other hand, the two agro-climatic zones were considerably different in terms of the direction and effect of some other exogenous variables. This difference dictates the need to have location-specific intervention to enhance smallholder farmers' perception and adaptation to climate change. Comparison of the two agro-climatic zones also revealed better awareness and use of the adaptation measures in the highland/midland condition as compared to the lowland. However, further heightening of awareness in both parts of the study area may facilitate the prospect for enhanced adaptation.

Most of the factors affecting farmers' perception and adaptation to climate change in the study areas were directly related to institutions, infrastructure, and technologies. Hence, there is a need for policy intervention aiming at enhancing institutional services, infrastructural facilities and delivering effective adaptation technologies. It is evident from the results that lack of experience, lack of access to information on climate change, and lack of education limit perception and adaptation decisions of smallholder farmers. Hence, facilitating effective

and reliable access to information and improving farmers' awareness of the potential benefits of adaptation are important policy intervention measures.

In line with the findings of this study, there is a need for agro-ecology-specific readily available adaptation technologies that could help to reduce the negative effects of climate change on the already weak agriculture and the livelihood of smallholder farmers. Policies must also aim at promoting farm-level autonomous adaptation through effective participation of farmers in developing and implementing relevant adaptation measures. Parallel to this, any intervention that promotes the implementation of climate change adaptation techniques should take into account specific factors relevant to the nature of the practices. Since the adaptation process is knowledge and resource-intensive, it may not be implemented easily given the limited awareness and resource endowment of smallholder farmers. Therefore, enhancing perception and scaling up of climate change adaptation technologies require a shared vision of all potential stakeholders and public-private partnerships.

This study also used household and plot-level cross-sectional data to assess the effect of climate-smart agricultural practices on crop production risk and productivity. The production risk analysis indicated that the practices helped to reduce climate-induced yield variability. Likewise, most of the practices positively and significantly affected crop productivity. It is apparent that the IV regression is an appropriate model for the data set used as compared to the conventional OLS regression as verified by different tests. The IV estimation result shows the application of manure, intercropping, conservation tillage, physical soil conservation practices, pre-harvest labor input, parcel size, soil fertility status, livestock holding, number of crops grown, and access to credit positively and significantly affect crop productivity. On the other hand, the slope variable, land fragmentation, and the involvement in off-/non-farm activities are negatively and significantly related to crop productivity.

The results generally revealed a 'win-win' outcome of increasing agricultural productivity and reducing climate-change-induced land degradation can be achieved by improving soil fertility through the use of climate-smart agricultural practices, while at the same time increasing parcel size and reducing fragmentation. Hence, the promotion of climate-smart agricultural practices is vital to boost and sustain crop productivity in the face of changing climate and unreliable access to modern agricultural inputs. Further, there is an opportunity to increase crop productivity through these practices while at the same time inducing low-external input investment.

Farmers in the study area used crop diversification as a strategy against production and price risks. However, the decision on diversification was mostly at the expense of high-value crops and hence may induce less farm income. Therefore, there is a need either to introduce alternative risk-minimizing alternatives or to create market linkage for the crops which are less marketable but being used in the diversification. This study also indicated the need for policy attention towards land consolidation that may enhance productivity in the study area as well as other locations in the country with similar socioeconomic and environmental features.

Based on the results it is evident that the synergetic effect of the climate-smart agricultural practices could be higher in reducing crop production risk and in enhancing productivity. Therefore, future research should further gear to investigating and modeling the synergetic effect and possible complementarities among the climate-smart agricultural practices.

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Corporate Governance Practices and Performance of Consumers' Cooperative Societies in Addis Ababa City

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Abstract

The main objective of the study is to describe the governance practices and challenges of consumer cooperative societies and examine whether governance has a significant effect on the performance of consumer cooperatives in Addis Ababa City. The study seeks to analyze the effect of various corporate governance mechanisms, particularly board size, board educational qualification, board gender diversity, and board meeting frequency. It used a mixed research approach by adopting a quantitative method. Linear regression was used to quantify the strength of the relationship between the independent variables (Corporate governance practices) and the dependent variable (performance). The finding indicated that the principles of corporate governance were adequately addressed in the governance practice of consumer cooperatives. With respect to challenges, the consumer cooperatives' board of directors lacked commitment and leadership; the cooperatives suffered from the supplies of goods and services, and audit committees of the consumer cooperatives were incompetent to execute their duties. The finding also indicated that the corporate governance variables of educational qualification and board size had a high impact on the performance of the consumer cooperatives, whereas gender diversity and meeting frequency had a moderate effect on the performance of consumer cooperatives. Based on the results of the study, it is recommended that a separate cooperative governance code should be developed; the board of directors and members should be trained to improve the performance of the cooperatives, and a policy should be designed to strengthen female participation in the board.

Keywords: Consumer cooperative, corporate governance mechanisms, cooperative performance

Introduction

Corporate Governance is the relationship between a company's stakeholders such as corporate managers, directors, and the providers of equity, customers, and institutions (Mehran, 2003; Goergen and Renneboog, 2006). Cadbury (1992:14) stated that:

> *Corporate governance is the system by which companies are directed and controlled. Boards of directors are responsible for the governance of their companies. The shareholders' role in governance is to appoint the directors and the auditors and to satisfy themselves that an appropriate governance structure is in place. The responsibilities of the board include setting the company's strategic aims, providing the leadership to put them into effect, supervising the management of the business, and reporting to the shareholder on their stewardship. The board's actions are subject to laws, regulations, and the shareholders in general meeting.*

The failure of several corporations (e.g. Enron, Tyco, Parmalat, Skandia, Lehman Brothers, etc.) in the last decade gave a clear lesson for investors that companies should investigate

further the status of their governance structure to increase transparency and to guarantee shareholders' reliance on directors and managements (Hermalin and Weisbach, 2012). The major accounting failures which had been seen in various companies throughout the world have affected the investors' confidence and raised various questions on the effectiveness of a company's internal control and governance system (Lamport et al., 2011). A fair and transparent business environment is assured by good corporate governance. Good corporate governance is a good mechanism to hold companies to be accountable for their action. On the other hand, weak corporate governance exposes companies to corruption, mismanagement, and waste. Cooperative societies have a similar structure to Modern Corporation. Both have a separate legal existence from their owners (shareholders). For a cooperative to be governed and managed properly, the shareholders or members of the cooperative should elect the board of directors to whom they delegate most of their authority.

Consumer cooperatives are expected to provide essential consumer goods and services to the members. Fair prices, high-quality products, and reliable services are expected from the consumer cooperatives. In Ethiopia, there is high population growth and due to this factor, there is also an increase in demands for goods and services. The consumers are also exposed to unfair price increment from the side of the retailers. Inflation and price fluctuation are also prevalent situation in the country. Therefore, to regulate these critical problems, the establishment of consumer cooperatives is vital (Kanagaraj & Mosisa, 2015). Currently, there are 141 basic consumer cooperatives that are operational in 10 sub-cities in Addis Ababa. Initially, the cooperatives were established with a contributed share capital of birr 66.9 million and currently the cooperatives have more than 498.7 million birr in current and fixed capital. From the outset the cooperatives were established with 218,468 founding members; however, currently, the cooperatives have grown and the number of members exceeds four hundred thousand (Addis Ababa City Cooperative Agency, 2008).

Statement of the Problem
Currently, bad governance and poor economic conditions are the main challenges of cooperatives. Even though the corporate governance agenda has been given a lot of attention, the governance situation of those cooperative forms of business couldn't get the required attention and the governance problems couldn't be studied well. The cooperative businesses contribute to developing countries' social and economic development in creating employments and funds (Shaw, 2006). The Addis Ababa City Consumer Cooperative Associations are providing essential services to members and local residents; however, the cooperatives have not been able to provide the required goods and services due to internal and external problems (FCA & Addis Ababa Trade & Industry Office, 2014).

This study recognizes past similar studies conducted in the area of corporate governance in other types of organizations in Ethiopia. However, their findings were inconsistent. Moreover the studies conducted overlook the governance aspects of the consumer cooperatives and its effects on the performance of the cooperatives. There is hardly any literature that has focused on the practice of corporate governance and the performance of consumer cooperative societies and to the best of the researcher's knowledge, no study, local or international has focused on the practice of corporate governance and performance of the consumer

cooperatives in the defined area, which this study seeks to establish.

This study aims to identify the nature of corporate governance practices adopted by the consumer cooperative as well as examine its effect on the performance of consumer cooperatives. The study includes selected corporate governance mechanisms and concentrates only on consumer cooperatives established in Addis Ababa City. The relationship between corporate governance mechanisms and performance has also been further explained.

Objective of the Study

General Objective of the Study

The main objective of the study is to describe the governance practices and challenges of the consumer cooperative societies and examine whether the governance has a significant effect on the performance of consumer cooperatives in Addis Ababa City.

Specific Objective of the study

➢ To describe the governance practices adopted by consumer cooperatives societies in Addis Ababa,
➢ To examine the challenges faced by the consumer cooperative societies in practicing good corporate governance, and
➢ To examine the relationship between board sizes, board gender diversity, meeting frequency of board members, directors' educational qualification, and performance of consumer cooperatives societies.

Hypothesis of the Study

➢ H_1: Board member size is expected to have a positive relationship with the performance of consumer cooperative societies.
➢ H_2: Board member gender diversity is expected to have a positive relationship with the performance of consumer cooperative societies.
➢ H_3: Board member educational qualification is expected to have a positive relationship with the performance of consumer cooperative societies.
➢ H_4: Board member meeting frequency is expected to have a positive relationship with the performance of consumer cooperative societies

Significance of the Study

The governance of the cooperative sectors as a whole remains poorly understood. Given this context, the findings of the study will help to fill the important knowledge gap in understanding the governance of the cooperative sector in Ethiopia and this will contribute to the existing literature by providing evidence on the relationship between corporate governance mechanisms and consumer cooperatives performance. The empirical results will also be useful for regulatory, policymakers, and managers of cooperative societies. The study

may serve as reference material for other researchers who need to conduct research on this area at a more advanced level.

Scope and Limitation of the study

Damak (2013) stated that the internal and external corporate governance mechanisms are designed to monitor managers and reduce conflict of interest deemed costly. The internal corporate governance mechanism includes, in particular, the board of directors, committees, auditors, and ownership structure. The third objective of this study specifically investigates the board of directors by analyzing the independent variables of board size, board gender diversity, meeting frequency of board members, and board members' educational qualification. It would have been worth studying the practices and performances of all consumer cooperatives in Ethiopia; however, due to time, cost, and other factors, the scope of this study was limited to examining the governance and performance of the consumer cooperatives operating in Addis Ababa sub-cities. With regard to the limitation of the study, some of the board members were not willing to provide certain relevant information by claiming that the information required would be very confidential even if it was not.

Research Methodology

Research Design and Approach

Examining corporate governance practice and performance of consumer cooperatives in Addis Ababa city is the primary objective of this study. To achieve this objective, a survey and causal type of research design with a mixed research approach was employed. The survey method was used to gather data for determining and describing the relationship between corporate governance and the performance of consumer cooperatives in Addis Ababa. Moreover, a descriptive type of research was employed. Quantitative data were collected using a structured questionnaire.

Population

According to Addis Ababa City Administration Cooperative Agency, there were 141 basic consumer cooperative societies in the City (When? See the highlighted paragraph at the end of P.53 above) and they had similar stages of development and exhibited a high level of homogeneity in aspects such as structure and leadership. For this study, it was found appropriate to use census. Census was adopted since the total population was manageable for the researcher. The Board chairperson and manager of each basic consumer society were contacted to fill in the structured questionnaire. Profile of members of the board of directors was collected from secondary sources.

Source of Data and Data Collection Methods

The research used both primary and secondary data. Primary data were collected through a questionnaire. The board chairperson and manager of each basic consumer society were also contacted to fill in the structured questionnaire. The respondents were selected purposively because both the managers and board chairpersons were the right people to answer questions

related to corporate governance. Secondary data were collected from internal reports, minutes, proclamations and organization bylaws, and some other related books and the internet.

Data Analysis

The data analysis process applied both qualitative and quantitative techniques of data presentation. Statistical tools such as percentages, frequencies, and the mean scores were used to analyze the data. These had helped to determine the most prevalent corporate governance practices in consumer cooperatives and the challenges faced in practicing good corporate governance. Linear regression was used to quantify the strength of the relationship between the independent variables (Corporate governance practices) and the dependent variable (performance). The degree of influence was tabulated in order to determine the relationship between the practices of corporate governance and the performance of consumer cooperatives.

The representation of the model is given in the equation below:
$Y = B_0 + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 + Ɛ_t$
 Where:
Y = Performance, **B_0** = Constant, **B_1-B_4** = regression coefficients; **$Ɛ_t$** = error term;
Dependent variables
Y = Performance
Independent variables
X_1 = board size; **X_2** = board gender diversity, **X_3** = meeting frequency of board members; **X_4** = board members' educational qualification;
Description of Variables and Measurements

In this study, four independent variables were selected based on theories and previous empirical studies related to corporate governance and form of performance. These were board size, board gender diversity, meeting frequency, and board members' educational qualifications. In accordance with the theory and empirical studies, the independent and dependent variables of the study were identified in order to investigate the corporate governance mechanisms and the performance of consumer cooperatives in Addis Ababa.

Dependent Variable (Y)

This study took performance as the dependent variable. Performance is defined as improved product quality, productivity or technical efficiency, service capabilities of a firm, which lead to sustainable profit (Read and miller, 1990; Clark, 1991; Harrington, 1991 cited by Masuku et al., 2016). Stefanovska & Soklevski (2014) stated that in light of agency theory, particularly in the industrial area, financial ratio is used as the main measure of organizational performance. However, Masuku et al. (2016) stated that the financial ratios, which are mostly based upon efficiency measures (profit / financial resources), do not seem adequate to estimate cooperative performances. Rolstadas (1998) has defined performance as an intricate interrelationship between seven performance criteria: effectiveness, efficiency, and quality, and productivity, quality of work-life, innovation, and profitability/budget-ability.

Independent Variables

The independent variables considered for this study were used as a determinant of corporate governance of consumer cooperatives. The definition and measurements of the variables are presented as follows:

Board Size

Board size can be defined as the number of directors sitting on the board. The corporate governance literature gives inconsistent explanation regarding the board size when it is linked with corporate performance. The number of directors on the board is an important variable, though the literature does not have a consensus on the influence of board size toward increasing in firm's performance. The size of the board of directors is varied from one country to another. For instance, boards in Europe (UK, Switzerland, and the Netherlands) tend to have a small board size (fewer than 10 board members), while other countries (e.g. Belgium, France, Spain, Italy, and Germany) have a large board size i.e. between 13 to 19 members (Heidrick & Struggles, 2007 cited by Yusoff, 2010). In Australia, board size has an average of seven members (Korn/Ferry International & Egan Associates, 2007 cited by Yusoff, 2010).

Board Gender Diversity

Gender diversity of the board is measured by the percentage of the number of female directors divided by the total number of board members. Board gender diversity is helpful to increase a company's performance since it provides new insights and perspectives (Bathula, 2008). Female board members will bring diverse viewpoints to the boardroom that is not possible with all-male directors. Appiadjei et. al (2017) confirmed that when the number of women increased on the board of listed firms, the return of equity and net profit margin also increased. Lu and Bao (2018) also found that gender diversity had a significant and positive effect on firm performance. Moreover, they stated that the effect exists only when there are more than two females on a board supporting the critical mass theory.

Meeting Frequency

Board Meeting Frequency refers to the number of meetings or how much time a board meets in a year during the period under review. Akpan (2015) found that board meetings negatively and significantly relate to company performance. The study stated that while the frequency of meeting increases, the shareholder's earnings decreases because a company is compelled to incur various financial expenses such as meeting allowance, traveling, hotel accommodation and entertainment expenses during meetings. On the other hand, Ntim (2009) confirmed that frequent board meetings positively influence the performance of the company since they help to strengthen supervision and good management.

Educational Qualification of Board Members

Educational qualification is an important determinant of board effectiveness. According to Rose (2007), if the board members have a university degree/or equivalent skills, it is assumed

that the board has the adequate human capital to understand and analyze all the information presented by the company's management body. It is also believed that qualified and experienced board members can implement the strategy of the company effectively. Bathula (2008) stated that while the norms need qualified board members, the study does not show any positive link between higher education and firm performance. Rather it shows the need for firm relevant skill.

Data Presentation, Analysis and Discussion

Response Rate

From the 141 questionnaires that were distributed, 129 were returned. There was a 91.5% response rate from the basic consumer cooperative societies in providing the primary data.

Reliability Test

Reliability refers to the measurement attribute concerned with accuracy, precision, and consistency (Cooper & Schindler, 2014). Cronbach's alpha was used in the calculation to ensure the reliability of the measuring scales. Where a higher value above 0.6 indicated that the variables were reliable, the value above 0.9 was considered to be the most reliable, but anything below 0.6 was considered inconsistent with the reliability scale. As stated by George Mallery (2003), in order for the scale to be reliable, the Cronbach's Alpha value should be above 0.6.

Table 1: Reliability Analysis Result

Variables	Cronbach's Alpha	No of Items	Reliability
Board size	0.764	5	Reliable
Gender diversity	0.700	4	Reliable
Meeting frequency	0.739	5	Reliable
Educational Qualification	0.747	4	Reliable

Source: Own Survey, SPSSv20, 2019

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.699	.711	39
Inter-Item Correlation Matrix		

Source: Own Survey, SPSSv20, 2019

The above tables show the reliability test of the independent variables: board size, gender diversity, meeting frequency, educational qualification, and the internal consistency reliability test of all individual questions. Thus, all explanatory variables and all individual questions are a reliable and acceptable range of Cronbach's Alpha Coefficient. Based on the examination of the research scales and constructs, it can be concluded that each variable represents a reliable construct.

Validity

Research validity refers to the correctness or truthfulness of an inference that is made from a research study (Cooper & Schindler, 2014). Validity is the most critical criterion and indicates the degree to which an instrument measures what it is supposed to measure. The questionnaire was carefully designed and tested with a few members of the population for further improvements. Content validity of the survey questionnaire was validated by professionals and the research advisor. In order to avoid invalidity, most of the questionnaire contents were taken from different secondary documents.

Descriptive Statistics

Table 2 shows a summary of the descriptive statistics of the dependent and independent variables for 141 consumer cooperatives for a period of five years from 2013/14-2017/18. The table includes the mean, the median, standard deviation, minimum and maximum for the dependent and independent variables. These data was/were generated to give the overall description of the data used in the model.

Table 2: Summary of the Descriptive Statistics

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Mean-B Size	129	5.00	15.20	7.0595	1.52734
Board Females	129	.00	6.80	1.6638	1.27781
Boards above Degree	129	.00	11.00	1.8775	2.17878
Frequency of Meeting	122	1.00	128.00	31.4530	18.97574
Valid N (list wise)	111				

Source: Own Survey, SPSSv20, 2019

Regarding explanatory variables, there are some important statistics that have to be mentioned. The board size of the consumer cooperatives was measured as the number of directors sitting on a board. The table above shows that the average board size for the cooperatives was about 7 members (mean=7.01) with a maximum of 15 and a minimum of 5 members. The standard deviation indicates that the board size varies by 1.53 or 2 directors from the average value of 7 directors.

Regarding female participation in the board of directors, on average 2 (1.67) members were female with a minimum of 0 and a maximum of 7 (6.8) during the last five years. Zero indicates cooperatives that did not have any representation for women on their board. The standard deviation was 1.3. The result suggested that there were small number and high dispersion of women on the board during the study period. The Ethiopian Cooperative Societies Proclamation no. 985/2016 article 34/7 states that 30% of any cooperative society board of directors shall be held by female members, and article 12/7 instructs the cooperative societies to include requirements to encourage the participation of female members in the

board of directors or management committee of the society.

The educational level of directors was measured as the number of directors who had a university degree or higher. The mean value of 1.87 indicated on average directors who had a university degree or above were 2 people during the study period. The maximum and the minimum value of the statistic was 11 and 0, respectively. Zero indicates the directors that did not have a university degree or above academic qualification. The standard deviation for the educational level varied by 2.17 or 2 directors from the average value of 2 directors.

Furthermore, another interesting observation was that there was somewhat a higher variation in the frequency of board of directors' meeting during the study period. Frequency was measured as the number of directors' meetings in a year, i.e., which was on average 31.45. The maximum value was 128 times and the minimum value was 1 time with a standard deviation of 18.9. The result indicated that there was a consumer's cooperative board of directors which conducted highly frequented meetings in a year: 128 times in a year. There was also a board of directors that conducted a meeting only one time during a year. The result further stipulates that there was high variation in conducting a meeting among the board of directors during the study period by 18.9 or 19 times.

Correlation Analysis of the Study Variables

The primary objective of correlation analysis is to measure the strength or degree of linear association between two variables. The correlation coefficient examines the strength and direction of the linear relationship between two variables (Christen et al., 2014). The correlation coefficient can range between -1 and +1- the larger the absolute value of the coefficient, the stronger the relationship between the variables. Zero (0) indicates no relationship between two variables. The sign of the relationship indicates the direction of the relationship. P-value $\leq \alpha$: The correlation is statistically significant: if the p-value is less than or equal to the significance level, then we can conclude that the correlation is different from 0. P-value $> \alpha$: The correlation is not statistically significant: if the p-value is greater than the significance level, then you cannot conclude that the correlation is different from 0 (Cooper & Schindler, 2014). Accordingly, the following table shows the correlation between operational performance and corporate governance mechanisms.

Table 3: Correlations Analyses Result						
		Board Size	Gender Diversity	Education Qualification	Meeting Frequency	Performance
Board Size	Pearson Correlation	1				
	Sig. (2-tailed)					
	N	129				

Gender Diversity	Pearson Correlation	-.079	1			
	Sig. (2-tailed)	.372				
	N	129	129			
Education Qualification	Pearson Correlation	.460**	.009	1		
	Sig. (2-tailed)	.000	.922			
	N	129	129	129		
Meeting Frequency	Pearson Correlation	-.019	.071	-.032	1	
	Sig. (2-tailed)	.833	.426	.716		
	N	129	129	129	129	
Performance	Pearson Correlation	.628**	.211*	.716**	.202*	1
	Sig. (2-tailed)	.000	.016	.000	.022	
	N	129	129	129	129	129
**. Correlation is significant at the 0.01 level (2-tailed).						
*. Correlation is significant at the 0.05 level (2-tailed).						
Source: Own Survey, SPSSv20, 2019						

From the above correlation table, we can see that most of the independent constructed variables were correlated with consumer cooperative performance. Among the variables, the highest and the strong correlation coefficient was found between educational qualification and performance (r=0.716) and between board size and performance (r=0.628). A weak and significant correlation was found between gender diversity and performance (r=0.211) and between meeting frequency and performance(r=0.202). Hence, from the above table we can conclude that all constructed variables have a positive correlation with performance because the p (sig) value is less than α=.05 level. Therefore, the constructed independent corporate governance variables correlation with consumer cooperative performance was significant.

Regression Analysis Assumption Test
Before applying regression analysis, some tests were conducted in order to ensure the appropriateness of data to assumptions regression analysis as follows.

Linearity test
Linearity refers to the degree to which the change in the dependent variable is related to the change in the independent variables. It can be tested through residual plots which are usually drawn by the statistical analysis software. It may be also violated by outliers and a curve shows that a linear model may not be the best fit and thus a complex model may be necessary (Saunders et al., 2012).

To determine whether the relationship between the dependent variable (performance) and the independent variables (board size, educational qualification, meeting frequency, and gender

diversity) is linear, plots of the regression residuals through SPSS V20 software were used.
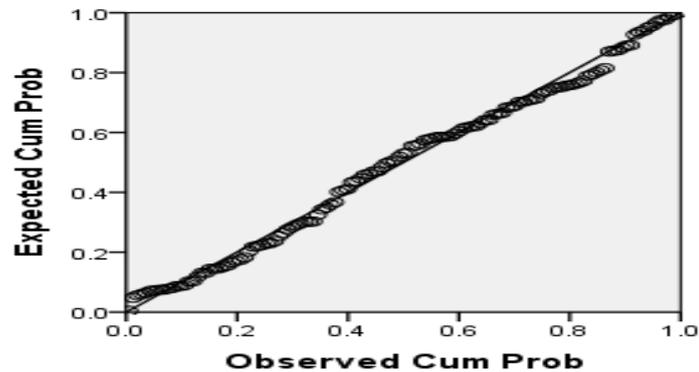

Figure 1: Linearity test

Source: Own Survey, SPSSv20, 2019

From the above figure, the scatter plot of residuals shows no large difference in the spread of the residuals as we look from left to right. This result suggests that the relationship was linear. Therefore, there was no problem of linearity.

Normality test

The linear regression analysis requires that all variables be multivariate normal. This assumption can best be checked with a histogram and a fitted normal curve or a Q-Q-Plot (Garson, 2012). As per the Classical Linear Regression Models assumptions, the error term should be normally distributed, or the expected value of the error terms should be zero (E(ut)= 0) (Kapetanious, 2014).
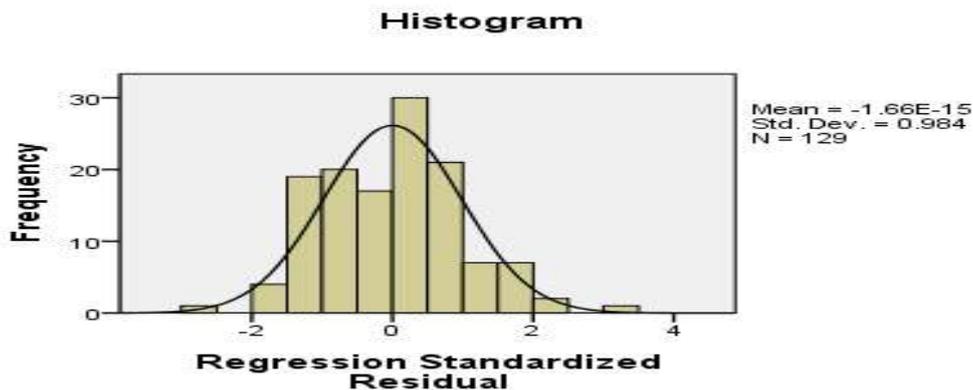

Figure 2: Normality test

Source: Own Survey, SPSSv20, 2019

The above figure shows the frequency distribution of the standardized residuals compared to a normal distribution. As we can see from the graph, although there are some residuals (e.g., those occurring around 0) that are relatively far away from the curve, many of the residuals

are fairly close to 0. Moreover, the histogram is bell-shaped which leads to infer that the residual (disturbance or errors) were normally distributed.

Multicollinearity Test between Study Variables

Linear regression assumes that there is little or no multicollinearity in the data. Multicollinearity is an unacceptable high level of inter-correlation among the independent variables (Garson, 2012). When the explanatory variables are very highly correlated with each other, this problem is known as "multicollinearity". A second important independence assumption is that the error of the mean has to be independent of the independent variables (Kapetanious, 2014). Thus, we can test using the following criteria:

1. *Correlation matrix* – when computing the matrix of Pearson's Bivariate Correlation among all independent variables, the correlation coefficients need to be smaller than 0.8 (Gregory, 2018). Thus from this research finding, correlation Table 3 indicates that all independent variables had correlation coefficient less than 0.8.

2. *Tolerance* – the tolerance measures the influence of one independent variable on all other independent variables. Thus, tolerance is calculated with an initial linear regression analysis. Tolerance is defined as $T = 1 - R^2$ for the first step regression analysis. Thus from the finding in the coefficient table, all tolerance values were less than one (Gregory, 2018).

3. *Variance Inflation Factor (VIF)* – the variance inflation factor of the linear regression is defined as $VIF = 1/T$. Similarly, with $VIF > 10$, there is an indication for multicollinearity to be presented with $VIF > 100$, there is certainly multicollinearity in the sample (Gregory, 2018). Thus from the coefficient table, all VIF values are less than 10. Simply the values are not more than 1.280(see Table 5). This confirms that there were no violations of little or no multicollinearity between independent variables.

Autocorrelation Test

Linear regression analysis requires that there is little or no autocorrelation in the data. Autocorrelation occurs when the residuals are not independent of each other. While a scatter plot allows us to check for autocorrelations, we can test the linear regression model for autocorrelation with the Durbin-Watson test. The value of Durbin Watson assumes to be between 0 and 4; values around 2 indicate no autocorrelation (Gregory, 2018). From our test, the value of Durbin Watson was about 1.731. Thus it lies between 0<1.731<4 (see Table 4 below). The value of Durbin Watson is close to 2, which indicates there was no violation of autocorrelation.

Table 4: Autocorrelation test

Change Statistics					Durbin-Watson
R Square Change	F Change	df1	df2	Sig. F Change	
.727	82.551	4	124	.000	1.731

Source: Own Survey, SPSSv20, 2019

Homoscedasticity Test

Homoscedasticity test refers to whether residuals are equally distributed, or the presence of equality of variance/homogeneity of variance, and it assumes that the variance of the error is constant(Brooks, 2014). The following test was done for testing the problem of homoscedasticity.

Table 5: SPSS output result by using Glejser Test of homoscedasticity

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.374	.110		3.413	.001		
	Board Size	.005	.030	.017	.171	.865	.781	1.280
	Gender Diversity	-.006	.023	-.025	-.284	.777	.986	1.014
	Educ. Qualif	-.028	.023	-.124	-1.235	.219	.785	1.274
	Meeting Frequ	-.008	.023	-.031	-.348	.728	.994	1.006

Source: Own Survey, SPSSv20, 2019

Using Glejser test the following output was obtained:

According to Glejser Test of Homoscedasticity, if value Sig.>.05, there is no problem of Homoscedasticity and if value Sig. <.05, there is a problem of Homoscedasticity (Lely Holida et al., 2019) Thus, from the above table 5 all corporate governance independent variables on Glejser test were greater than 5% significant level i.e. p-value>.05. Therefore, from the test it can be seen that there is no violation of Homoscedasticity.

Thus, from an explanation presented above, the entire five tests had no significant data problems that would lead to the assumptions of multiple regressions to have been seriously violated.

Regression Analysis Results and Discussion

Multiple regressions were used for testing the model and hypotheses. It provides information regarding the significance of the variables that were included in the model while the R^2 explains how much variance in the dependent variable is explained by the model (Kapetanious, 2014). It means how much the performance is explained by the constructed corporate governance variables. Statements of hypothesis were formulated based on the four variables used in this study in order to come up with the results.

Table 6: Multiple Regression Analysis Model Summary Result

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.853ᵃ	.727	.718	.354	.727	82.551	4	124	.000

a. Predictors: (Constant), Meeting Frequency, Board Size, Gender Diversity, Educational Qualification

b. Dependent Variable: Performance

Source: Own Survey, SPSSv20, 2019

Table 6 shows two important elements: R and R². In this table, R shows a significant positive relationship of 0.853 which is 85.3%. The R² value =0.727 meaning 72.7% of the variance in the model can be predicted using the independent variables: in other words, 72.7% of consumer cooperative performance was explained by the constructed independent variables(corporate governance practices). However, the remaining 27.3% change in consumer cooperative performance in Addis Ababa was caused by other variables that were not included in the model. Therefore, the constructed corporate governance variables (such as board size, meeting frequency, gender diversity, and educational qualification) were good explanatory variables of the consumer cooperative performance.

ANOVA Analysis result

Table 7: ANOVA analysis result

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	41.409	4	10.352	82.551	.000ᵇ
Residual	15.550	124	.125		
Total	56.959	128			

a. Dependent Variable: Performance

b. Predictors:(Constant), Meeting Frequency, Board Size, Gender Diversity, Educational Qualification.

Source: Own Survey, SPSSv20, 2019

The ANOVA test in Table 7, shows that the table Sig. value 0.05 is greater than the calculated sig. value of .000. This shows the statistically significant relationships between the four independent variables (board size, meeting frequency, gender diversity, and educational qualification) and cooperative performance at a 5% significance level. This means the four explanatory variables have a great impact on cooperative performance. But, it does not mean that all these variables influencing cooperative performance have an equally significant correlation with cooperative performance. Besides the F statistics (82.551) which was used to measure the overall test of significance of the model was presented, and the model was well fitted at a 5 percent level of significance.

Regression Coefficient Analysis

Table 8: Regression Coefficient Analysis of the Model

Model		Un-standardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.239	.184		-1.301	.196
	Board Size	.382	.050	.403	7.596	.000
	Gender Diversity	.181	.038	.223	4.725	.000
	Educ. Qualif.	.384	.038	.536	10.117	.000
	Meeting Frequency	.174	.039	.211	4.491	.000

Source: Own Survey, SPSSv20, 2019

In Table 8 above, coefficients indicated how much the dependent variable varies with an independent variable when all other independent variables are held constant. The Beta coefficients indicated how and to what extent the independent variables influence the dependent variable (Kapetanious, 2014). Accordingly, the result of the coefficient value of regression analysis indicated the highest influencing corporate governance variables which influenced their cooperative performance as an educational qualification (at Beta value=0.536), followed by board size (Beta=0.403), and gender diversity (Beta=0.223). Thus, the finding showed that all corporate governance variables have a positive and statistically significant influence on consumer cooperative performance because the P (sig) value in the correlation table is less than α=.05 level. Therefore, all corporate governance practices were statistically significant. Among the variables, one can infer that educational qualification and board size were the most statistically significant and more influencing consumer cooperative Performance in Addis Ababa.

Regression Equation

Based on the finding in Table 8, we can develop the following Regression equation:
Performance= *-0.239+0.382X1+0.181X2+0.384X3+0.174X4*

Where X1= Board Size

     X2= Gender Diversity

     X3= Educational Qualification

     X4= Meeting Frequency

Based on the above model result, all the explanatory variables had a significant and positive influence on consumer cooperative performance. The un-standardized B coefficient of board size was 0.382 i.e., 100% change in board size leads to 38.2% change in consumer cooperative performance; gender diversity=0.181 indicating that 100% change in gender

diversity leads to 18.1% increase in consumer cooperative performance; educational qualification =0.384 implies that a one-unit change in educational qualification leads to 0.384 unit increase in consumer cooperative performance, and meeting frequency= 0.174 signifies that a one-unit change in meeting frequency results to 0.174 unit increase in consumer cooperative performance. These findings provide significant support for the reliability, transaction efficiency, and ease of use literature, which advocates that the variables (corporate governance) influence consumer cooperative performance in Addis Ababa.

Testing Hypothesis from the Regression Result

Using multiple regression analysis results, the following hypothesis was tested:

Board Size

H1: Board member size is expected to have a positive relationship with consumer cooperative performance.

Based on standardized coefficient Beta value and P-value in regression in Table 8, the result shows that board size had a Beta coefficient of 0.403 and p-value of 0.000. Holding other explanatory variables constant, board size was found to have a statistically significant positive relationship with consumer cooperative performance. In other words, the smaller the number of board members of consumer cooperatives, the lower their performance achievement is, and vice versa. The result indicates that large boards were more effective in monitoring and controlling cooperative management. Therefore, the researcher accepted the H1 hypothesis.

Gender Diversity

H2: Board members's gender diversity is expected to have a positive relationship with consumer cooperative performance.

Based on standardized coefficient Beta value and P-value in regression in Table 8, the result shows that board members' gender diversity had a Beta coefficient of 0.223 and p-value of 0.000. Holding other explanatory variables constant, board members' gender diversity was found to have a statistically significant positive relationship with consumer cooperative performance. The descriptive analysis shows that in the board of directors women were small in number and the low number of women on the boards of the cooperatives did not necessarily contradict the notion that women's presence on boards is important in general. Therefore, the researcher accepted the H2 hypothesis.

Educational Qualification

H3: Board members' educational qualification is expected to have a positive relationship with consumer cooperative performance.

Based on standardized coefficient Beta value and P-value in regression in Table 8, the result

shows that Educational Qualification had a Beta coefficient of 0.536 and p-value of 0.000. Holding other explanatory variables constant, educational qualification was found to have a statistically significant positive relationship with consumer cooperative performance. In other words, the higher the number of directors who had higher academic qualifications sitting on the board, the higher the performance of consumer cooperatives, and vice versa. This suggests that the presence of qualified directors on the board plays an important role in performing the boards' monitoring responsibility and in improving the cooperative performance. The alternative hypothesis for board members' educational qualification predicts that there is a significant positive relation between board members' educational qualification and consumer cooperative performance. Thus, the result is in line with the proposed alternate hypothesis. Thus, there was a significant positive relationship between board members' educational qualifications and the performance of consumer cooperatives in Addis Ababa. Therefore, the researcher accepted the H3 hypothesis.

Meeting Frequency
H4: Board member meeting frequency is expected to have a positive relationship with consumer cooperative performance.

Based on standardized coefficient Beta value and P-value in regression in Table 8, the result shows that Board members' meeting frequency has a Beta coefficient of 0.211 and p-value of 0.000. Holding other explanatory variables constant, board members' meeting frequency was found to have a statistically significant positive relationship with consumer cooperative performance. Therefore, the researcher accepted the H4 hypothesis.

Summary of Finding
From the findings, the researcher derived that majority of the consumer cooperatives (72%) were established in Addis Ababa in the year 2008-2012. Up until this research data were collected, a total of 141 consumer cooperatives were working in Addis Ababa City within 10 sub-cities. A total of 414, 821 members were registered in these cooperatives. Among the 414, 821 members, 67.4 % were female and the remaining 32.6 % were male. The majority of the consumer cooperatives had no training program for the board of directors. The cooperative proclamation 958/2016 stated that cooperative societies shall provide education and training for their members, elected board of directors, management, and employees for the development of the societies, but the practice ignored this direction. It was also found out that the cooperatives had no formal guideline for how the training was offered to the members and board of directors. This had a drawback in the performance of the cooperative. Most of the consumer cooperatives did not have qualified directors and they lacked the skill needed to execute their mandate.

Based on the first objective of this study, it was found that most of the boards of directors evaluated the performance of the cooperatives extensively and they ensured the compliance of the cooperatives with the relevant laws and regulations. The members of the consumer cooperatives participated in the major decision of the cooperatives and the boards reviewed the procedures of the cooperatives to ensure the effectiveness of the internal control system,

and they ensured that the accounting system was in line with accepted accounting principles and standard.

Regarding the General Assembly, the study found that in most of the consumer cooperatives the general assembly met at least once a year, and the general assembly elected, dismissed, the member of the board, audit committee, and other subcommittees. Most of the consumer cooperatives' general assembly approved the annual work plan, gave a decision on the audit report, and decided on the distribution of annual profit. In general, the consumer cooperatives under consideration were found, in most cases adhering to the cooperative society proclamation 958/2016 and the cooperative bylaw. The boards, in their roles, adequately addressed the governance practice of the consumer cooperative societies.

Among the key challenges that this study identified while the cooperatives undertaking corporate governance practices were lacking commitment and leadership, limited supplies of goods and services, and the incompetence of the audit committee. The researcher found out that, cases of corruption and mismanagement of funds in the cooperatives were few. The boards didn't allow the transaction that benefits a few at the expense of members, and the cooperatives didn't encounter so much political pressure from external forces to implement the activities.

The last objective of the study was to examine the relationship between corporate governance practices and the performance of consumer cooperatives in Addis Ababa City. The study concentrated on the following key corporate governance practices: board sizes, board gender diversity, meeting frequency of board members, and directors' educational qualification. The Pearson correlation and regression analysis were used to find out whether there was a relationship between the variables to be measured (i.e. corporate governance and performance of consumer cooperatives) and also to find out if the relationship was significant or not. In general, the study found that all the corporate governance variables affected the performance positively and significantly. Among the variables, educational qualification and board size had a high impact on the performance of the consumer cooperatives with Beta value 0.536 and 0.403, respectively; and gender diversity and meeting frequency had a moderate effect on the performance of consumer cooperatives with Beta value 0.223 and 0.211, respectively.

With regard to the educational qualification of board members, the majority of respondents agreed that the educational qualification of directors has a significant effect on the monitoring and controlling activities of the directors. However, the analysis revealed that consumer cooperatives did not have qualified directors and, therefore, the cooperatives lacked the knowledge and skills needed to execute their mandate.

When the boards' size is considered, the majority of respondents disagreed with the idea of small board size. It means they supported the large board size to enhance the performance, and share the expertise and experience. This idea is supported by various scholars because

from the resource dependency theory perspective, large board size is very important to provide the resources to the cooperatives (Hillman et al., 2000 cited by Yusoff, 2010). This connection is grounded in the view that board size is related to the organization's ability to access critical resources (Hill man et al., 2000 cited by Yusoff). Moreover, Fema & Jensen (1989) as cited by Yusoff (2010) confirmed that from the agency theory perspective, a large board size provides effective monitoring by reducing the domination of the organization's manager.

Regarding gender diversity, consumer cooperatives have clear regulations and requirements that encourage the participation of female members in the board. The analysis in Table 2 indicated that there was a small number of females as board members of the cooperatives, and it was evident that the cooperatives had male-dominated boards. The Addis Ababa Cooperative Agency's report showed that from the total members of consumer cooperatives' board members, 67.4 % were male, whereas females constituted 32.6%. This shows that the participation of females in the boards was low. The presence of a female board of directors has a positive contribution to the performance of the cooperative. Byrnes (1999) cited by Nakusi (2014) stated that the participation of women in the board can help to avoid too risky projects as women are generally more risk-averse than men.

With regard to the board of directors' meeting frequency, the finding in Table 2 shows that, on average, 32 meetings were held in a year. The result of the descriptive statistics indicates that there was a consumer's cooperative board of directors that conducted high frequent meetings in a year at a maximum of 128 times; whereas there was a board of directors that conducted a meeting only one time during a year. From the analysis, it was found that the frequency of meetings was the least factor to influence the performance of the consumers' cooperatives. This could be due to the relevance of the meeting agenda and the nature of the meeting in relation to the performances which the boards of directors were dealing with.

Conclusion

This study considered the practice of corporate governance and the performance of consumer cooperatives in Addis Ababa city. Cooperative governance is essential in the activities of the consumer cooperatives. The principles of corporate governance were adequately addressed in the governance practice of consumer cooperatives.

With respect to the challenges of consumer cooperatives in the implementation of corporate governance, the study concluded that the consumer cooperatives' board of directors lacked commitment and leadership; the cooperatives suffered from a lack of supplies of goods and services. Moreover, audit committees of the consumer cooperatives were incompetent to execute their duties. The consumer cooperatives did not have highly qualified directors and, therefore, the cooperatives lacked the knowledge and skills needed to execute their mandate. The study established that the majority of the boards had seven members, which was small to generate good performance. Even though the cooperative proclamation encourages the participation of a female member in the board, the study concludes that there is few females involved as a board member in the cooperatives. From the analysis, we can conclude that the

frequency of meeting was the least factor that influenced the performance of the consumers' cooperatives. However, the outcome implies frequent meetings of the board of directors was beneficial to the cooperative's performance.

Recommendation

From the above findings and conclusions the following recommendations are suggested:

➢ The researcher recommends that the cooperatives should develop a separate and detailed cooperative governance code to ensure the smooth running of cooperative societies, and corporate governance practices should be implemented in all consumer cooperative societies.

➢ Regarding limited supplies of goods and services, the government in collaboration with Addis Ababa Cooperative Agency, should support the consumer cooperatives to distribute quality goods and services to the communities. The Addis Ababa Cooperative Agency should also establish a special task force to monitor and follow up on the distribution of quality goods to the communities.

➢ A Cooperative board of directors and members should be trained to improve the performance of cooperatives. This is because qualified directors have good governance and leadership skills. Members also should be trained since trained members obviously understand the cooperative goals, understand their rights, and participate fully in the cooperative's activities. The board of directors should constantly organize capacity building training for audit committee members.

➢ The female participation in the board of directors was less. Therefore, the Addis Ababa Cooperative Agency should design a policy to strengthen female participation in the board.

➢ The common board size of consumer cooperatives is seven members. The study found that a large board size is associated with better performance. Hence, the Addis Ababa Cooperative Agency should design a policy to increase the number of qualified independent directors.

  ➢ In order to increase the commitment of the board of directors, the cooperatives should provide a better incentive to the members of the board of directors. If members of the board of directors are given better incentives, they will tend to be committed to their job of supervising the management of the consumer cooperatives. If the manager also understands that the boards of directors are committed to supervising him/her, then he/she will work hard to increase the performance of the cooperative.

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Language and Politics in Sub-Saharan Africa

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Abstract

This paper deals with language and politics in the Sub-Saharan African countries with emphasis on ethnicity and nation-state discourses. It assumes the language factor to be intrinsically intertwined with politics in the region. Given the multilingual reality of sub-Saharan Africa, the paper has come to the conclusion that any African studies discourse, and more specifically, of the political one that avoids due recognition of the language factor to be mediocre. In light of this, the paper first scrutinizes the two contending explanations of multilingualism in which the one capitalizes on presenting language diversity as an Achilles' heel for all quagmire of the region, while the other stands on the contrary. Then, cognizant of the concomitance of the language factor and ethnicity, it attempts to articulate how the issue of language exacerbates 'otherness' in the pre-colonial, colonial, and post-colonial conditions of the region. Finally, it discusses how the language factors entangled with the post-colonial failed quest for a nation-state in the sub-region.

Keywords: Multilingualism, politics, ethnicity, Nation-State

Introduction

Language and politics are intrinsically related to one another. From the very beginning, Dunbar (1996) argues, language is founded in an exclusionary way as a means of distinguishing allies from enemies and of grooming allies and potential allies. Similarly, Dessales locates the origin of a language in the need to form '*coalitions*' of a critical size, representing the initial form of social and political organizations. Furthermore, He noted:

> *"We humans speak because a fortuitous change profoundly modified and the social organizations of our ancestors. In order to survive and procreate, they found themselves leading to form coalitions of considerable size. Language then appeared as a means for individuals to display their value as members of a coalition."* (2000:331-32, in Joseph, 2004).

Similarly, in an attempt of disclosing the enigma of the language factor vis-à-vis the political nature of human being, Aristotle argues:

> "… *Yet is an idea with a venerable heritage: hence it is evident that the state is a creation of nature, and that man by nature is a political animal … now, that man is more of a political animal than bees or any other gregarious animal is evident. Nature, as we often say, makes nothing in vain and man is the only animal who she has endowed with the gift of speech*" (Aristotle Politics I, 2 Jowett transl. 1885).

Such arguments show the very act of language as being potentially political in its nature. They reveal the fact that languages are a necessary part of politics. This reality of language being part and parcel of politics is also highly observed in sub-Saharan Africa. Sub-Saharan Africa is one of the most linguistically diversified regions (Batibo, 2005; Wolff, 2017). This

diversity has been coupled with cultural and ethnic variations as well. It is characterized by the highest degree of heterogeneity while homogeneity occurs in very few of them. This being the case, however, "language is seldom thought of as a problem" (Vic Webb &Kembo Sure, 2000).

The relationship between language and society is a fundamental one (Smith, 1991). Building stable national identities in the vast majority of post-colonial African states is often a problematic task mainly because of the language factor. This compelled Ndhlovu to argue that,

> "*Any African studies discourse that overlooks the role and place of language would be incomplete because language occupies an important position in any meaningful dialogue on African development and on Africa's engagement with herself and with the wider international community*" (2008:137).

Several sub-Saharan African countries, in the immediate aftermath of the colonial era, have seen the development of what we may call a 'linguistic nationalism' as opposed to a state-directed effort to linguistic homogenization. Zelealem (2012:9) observes such an attempt of linguistic homogenization or what he may call the '*one nation-one language*" motto, in two perspectives, at least from Tanzanian and Ethiopian experiences. One is that the recognition of one and only one language at the expense of others or what he may term as an '*Assimilationist Language Policy*'. The second explanation falls under the pragmatic need to promote one language that may serve as a Language of Wider Communication. He then accorded the second explanation as a rationale for their attempt.

In post-colonial situations, the choice between ex-colonial and an indigenous language is almost politically driven, though in different ways in different places. The politics of language choice become particularly difficult when institutional choices have to be made including questions of - in what language or languages the government will conduct its business and communicate with its citizens? And what language or languages of education will be? (Joseph, 2006). Furthermore, Batibo (2005:111) shows that 'non-democratic language policies*'* are linked to bloody conflicts and ethnic tensions. Willy-nilly, the post-colonial Africa witnessed the promotion of ex-colonial languages at the official level.

Bamgbose (1991) would claim that the main obstacle to the promotion of African languages was not just a result of colonialism but also the insufficient will of many African rulers to bring changes in the era shortly after independence played a great deal. African politicians were afraid of potential problems connected with the promotion of African languages in schools and at institutions and were more comfortable to keep things as they were including language policy, inherited borders, etc. But, what in fact Bamgbose might have overlooked is the insufficient will by the post-independent African leaders to bring change in their language policies cannot be seen in isolation from the colonial matrix itself. Colonialism is one of the factors, if not the only, that promoted the entrenched ethnolinguistic divide possible. Thus, it

may not be a surprise by the post-independence African leaders then, in viewing the language factor as a Pandora Box, like that of the inherited borders.

The scramble for Africa has carved sub-Saharan Africa into new political entities without paying any regard for long-standing political, cultural, and linguistic frontiers. This brought for the emergence of African states with obtaining no solid foundation: divergent ethnic groups became compatriot as the case in Nigeria, while former unitary groups were dispersed into two or more nations as it is evident in the 'Yorubas to be found in Nigeria and Benin; the Ewe in Ghana, Togo, and Benin'; the Somalis in French, British, and Italian Somaliland, etc. (Badejo, 1989: 42-43).

In the same vein, today's national boundaries as Lodhi (1993) might argue are drawn in Europe by the colonial masters in the late 19th Century that did not pay any heed to the cultural, linguistic, or historical affinity of Africans themselves. These boundaries were arbitrarily drawn at a conference in Europe where no African participant was attended. Its disastrous consequence among others is solidly reflected in the language factor. As language is one of the important factors of identity formation and given the multilingual feature of Africa, any political discourse with a sort of ethnic and nation-state issue founds the language factor as a sine-qua-non in bringing a holistic account of the case. A brief glance at how divergent conceptualizations are made with regard to multilingualism in sub-Saharan Africa enriches the discussion of language, ethnicity, and nation-state nexus.

Competing Views on 'Multilingualism'

Two diametrically opposite views have emerged with respect to the presence of many languages in various countries of sub-Saharan Africa. The first view capitalizes on the negative consequences of multilingualism, associating it with all kinds of problems as ethnic conflicts, political tensions, poverty, and underdevelopment.

This school of thought avers that "the multiplicity of African languages is a bane of African unity, whether at the national, regional, or continental level" (Zeleza, 2006:20). Multilingualism is thus regarded as a burden, particularly when considered in the context of the number of resources needed to promote the use of multiple languages in the "domains of education, media, law and administration, business and commerce, and international communication" (Ndhlovu, 2008:137-138).

Moreover, the presence of many languages is also equated with economic backwardness while the existence of one language is associated with economic prosperity and political stability. In light of such an understanding, linguistic heterogeneity is associated with poor economic performance, insufficient provision of public goods, a higher level of corruption, less social trust, and a high probability of internal conflict (Alesina 2003; Pool, 1972; Mauro, 1995; Putnam, 2007). The second perspective on language diversity, which is based on a post-modern human rights discourse, demonstrates the indispensability of multilingualism to be seen within the context of democracy and human rights whereby the right of language

choice is considered as an integral part of fundamental human rights. Rather than being a costly obstacle to development, nation-building, national unity, political integration, and social cohesion, multilingualism Buzasi argues, is "considered to be an asset" (2016:225).

The premise in the second school of thought rests on the point that every language in a multilingual society has the right to exist and to be given an equal opportunity to develop "legal and other technological limbs to flourish" (Mazuri, 1998:114). As a relatively new approach, some scholars would suggest that people have to be careful in interpreting linguistic diversity as a completely harmful societal condition that must be eliminated (Maffi, 2008). Furthermore, the school states:

> "*All the languages of Africa invoke ontological and epistemological arguments, duly buttressed with the rhetoric and rage of cultural nationalism, that language is the carrier of people's culture, it embodies their system of ethics and aesthetics, and it is a medium for producing and consuming knowledge a granary of their memories and imagination*" (Zeleza, 2006:20).

Quite contrary to the first school of thought that discourages multilingualism, the latter is more "inspired by the desire to recognize and accommodate all languages and language groups, regardless of their size and sociopolitical status" (Ndhlovu, 2008:139). Personalities as that of Lodhi would further show such ambivalence on the issue of multilingualism with an argument that says, "the abundance of languages in Africa" is attributed to be the cause for the continent's predicaments, in particular in education and politics; while this multilingualism again appears, Lodhi continues, to "have given the African a broader cultural understanding and enriched him culturally" to obtain a "tolerant and amiable personality" (1993:80).

What is more important beyond the dichotomous approach however is the need to accept the fact that the continent is linguistically well-diversified and language in and of itself is not a problem but its management plays a great deal in un(making) it a problem.

Moreover, in regions of sub-Saharan Africa, where the primordial conception of ethnicity dominates the political environment, the language factor needs special attention as being an essential marker of ethnic identity.

Language and Ethnicity: A Concomitance

The '*language-ethnic identity relationship*' discourse provides considerable insights into the link between language and culture. Each language lugs a distinct and hefty ethnic baggage. A strong emotional attachment to language and ethnicity is a norm in sub-Saharan Africa. The cultural paraphernalia as Fishman (1999:353) argues, is "shaped by its language".

Each ethnic group in the region dares to express and identify itself by the language it speaks. Sameness of a language and ethnicity serves as a basis in defining bonds of acceptance and togetherness, identity, separateness, solidarity, and brotherhood and kinship. Language,

Wolff argues, is a "reliable criterion for ethnic identity and that social identity, in its most general sense is reflected in linguistic behavior" (2000:301).

However, it is also worth considering that language and ethnic affiliation are not necessarily in every situation coterminous. There might be individuals who speak a certain language but do not necessarily identify themselves with the ethnic group that the language may represent. To put it differently, "I speak language 'X' but I do not belong to an ethnic group where language 'X' represents" is not uncommon. On the other hand, there might be others who dare to identify with a particular ethnic group even when they cannot speak the language that denotes the particular ethnic group. In other words, there are individuals who might say, "I do not speak language 'X' but I do belong to an ethnic group which this specific language 'X' represents".

Prior to the beginning of contact with the outside world, particularly with Europeans, predominantly, Africans lived in a distinct ethnic and linguistic group. One can argue thus, that the various ethnic groups lived autonomously to each other before the advent of colonialism. Each ethnic group obtained its own quasi-political and administrative structures, its peculiar language, and oftentimes its own cultural values. The various ethnic groups can be said to constitute 'states' having members speaking the same language.

In Ghana for instance, "the Akan saw themselves as a state, and the Akan language performed a dual function" (Fishman, 1999*: 354).* The language both brought the Akan people together and also set them apart from other ethnic groups. The same thing also applies to the Igbos of Nigeria (Bersselaar, 1997*).*

Each African language, therefore, served as a way of self-manifestation and intra-ethnic communication of ethnic groups. Each language effectively constituted a binding force that linked families, lineage, clans, and the entire ethnic group together. Languages in sub-Saharan Africa are said to constitute the storehouse of ethnicity basically because each ethnic group expressed and identified itself by the language it spoke. Moreover, in conditions where there is larger ethnic groups, "individual dialects of the language led to the creation of a more organic and cohesive albeit small units". Within ethnic groups, therefore, "language remained a symbol of the group's uniqueness, and the group's cultural heritage as well" (Fishman, 1984; 1999).

In sub-Saharan Africa, it was hardly possible to talk of languages short of ethnicity. The two were intricately intermingled and always pulled in the same direction. In Fishman's word "language was often passport to ethnic origin, just as ethnic background was indexical of a language" (1999:354). Ethnic roots were usually deep in the bestowing of favors in interpersonal relations and the according of privileges at the individual and group level. At the group level, being a member of a big language and ethnic group in most cases connoted power and potential for dominance of those who belonged to a relatively smaller ethnolinguistic group (Mazuri, 1980).

Ethnicity and linguistic affinity were also instrumental in strengthening the groups and in consolidating their walls against invasion by outsiders. Particularly, speakers of the same language who belonged to the same ethnic group had a feeling of solidarity and therefore stuck together in any situation of happiness or strife. But, this is not to argue as Fishman noted that an allover unity is automatically engendered through an agency of language unity. The Akan of Ghana, 'fought more times among themselves than they fought with other ethnic groups' (1999: 354-55).

Similarly, the violence and unrest in Somalia and Zanzibar in the post-Siad Barre and early 1960s respectively, Lodhi (1993:8) argues that common language is not by itself a remedy in avoiding intra-group conflicts.

Pre-colonial sub-Saharan Africa had also witnessed the immense political and economic importance of some African languages as Languages of Wider Communication. For instance,

> *"Doulala and Fulfude in Cameroon, Hausa in Nigeria and Niger, Akan in Ghana and Cote d'ivoire, Bambara in North-Western Africa, Wolof in Senegal, Sango in Central African Republic, Lingala in the Congo, Swahili in Tanzania and Kenya, Zulu and Xhosa in Southern Africa."* (Fishman, 1999:355).

These are Languages of Wider Communication. They were used beyond their original boundaries or spoken areas. These languages became instruments in tackling the boundaries of ethnicity, specifically for those individuals who, in addition to their own languages, could function in any of the languages of wider communication. Access to the culture of speakers of the Languages of Wider Communication was thus gained by other ethnic groups, who through various interactions learned other language*s*.

As a result of contact with European traders, explorers, missionaries, educators, colonial officers, and even settlers in certain areas, new and larger communities which form a conglomeration of various ethnic and linguistic backgrounds came into existence. New political frontiers entered the ethnic divide and led to a condition where inhabitants were subjected to being torn between their ethnic and linguistic allegiances and allegiances to the state. This situation had resulted in political unrest (Lodhi, 1993; Zeleza, 2006). In due course, the European languages, i.e. English, French, and Portuguese mainly, as well as "Arabic and major indigenous African languages such as Lingala, Swahili, and Hausa transcended and still surpass ethnic boundaries" (Fishman, 1999:355-356).

Boadi would argue that the practical aim of "*establishing cohesion in political units*" that the colonialist had won, led to the imposition of European languages on sub-Saharan Africa. The European languages, in view of the colonialists, were "potentially able to bring unity and nation building that facilitates pacification of the conquered territories" (1971:49).

Each colonial administration specifically thought of its language as a unifying force for the

distinct ethnic groups it obtained. Given the fact that very few people in the colonies went to school at that time, one can also challenge Boadi questioning 'to what extent that the colonial language did unify the people at all?' It could only have unified those who had formal education and were literate in those languages.

In countries like Cameroon, where two European languages- French and English competed, the relationship between language and ethnic identity, as well as between language and national identity, was extremely visible. The dichotomy between French and English speaking Cameroonians seems stranger argues Fishman, than "between the local African native and national languages" (1999:356). The majority status of French allowed for its dominance over English, and this resulted in animosity in the domain of politics, economics, and even education.

Sub-Saharan Africa, in the 1960s and 70s saw the blossoming of the ethnic revival movement. Politically, this era was marked by the peaceful as well as an armed struggle for independence. What the then politicians failed to give due consideration might be was the fact that the almost irrevocable bond between language and ethnicity had resulted in the development of enduring stereotypes of those who share a language and an ethnic identity. In Nigeria for instance, some obvious stereotypes are of:

> "the *Ebiras as noisy, the Hausas as self-loving, domineering, careless, and hating European education; the Yorubas as gullible, unreliable, and betraying; the Idomas as promiscuous, and the Igbos as lovers of money and greedy*" (ibid).

In Ghana also we have stereotypical images as of the "Ewe as hardworking, the Ga' as aggressive, and the Asante as loyal" (Amonoo, 1989; Fician, 1972).The ethnic consciousness of the time brought about a reawakening of resentful feelings. Some members of ethnic groups regarded themselves as superior to all others whereby downgrade languages other than their own and on the people who speak such languages. The ethnic revival did little to discourage resentment of members of other ethnic groups; it hardly promotes inter-ethnic understanding beyond the official level.

Many occasions witnessed that some ethnic groups became associated with a large number of discriminatory, prejudicial, and stereotypical images, and people discouraged members of their ethnic groups from anything to do with such stereotypical groups. In South Africa for instance, owing to a "*sordid apartheid and racist past, "*ethnic and language identities are socially marked and language loyalties and identities remain solid, potentially divisive, and socially rancor" (Fishman, 1999:361). Moreover, the strong ethnic feelings and hatred toward members of other ethnic groups often resulted in strife. In some stances, there were secessionist attempts as was the case in Biafra of Nigeria, or scares as was evident in the Antor secessionist scare in Ghana by the late 1950s. In other instances, strong ethnic feeling led to 'ethnic-cleansing' as was observed in Rwanda and Burundi and civil wars as in Liberia.

Although people could, with difficulty in one way or another live together as one nation and they also acquired the feeling of oneness, equivocally each ethnic group forming the state had specific characteristics, such as language, an alleged common psychological make-up, religion, etc., that distinguished them apart from other ethnic groups. Living in the same country, they continued to see themselves as distinct ethnic groups. Thus, although politicization may help change ethnicity into nationalism, in sub-Saharan Africa, what happened was the reverse.

More importantly, to make matters even worse, the ethnic revival and the accompanying strong ethnic feelings also brought with it political exclusionism and unique voting patterns during political elections. In most sub-Saharan African countries, politicians could simply win over the votes of members of their ethno-linguistic groups in spite of their professional incompetence. 'Son of the soil' discourse accompanied by common language dominates the political landscape at the detriment of meritocracy. The current Ethiopia can probably be the best example in this regard. Of the estimated close to eighty opposition parties (or the 'competing parties', as per the new Premier's terminology), very few of them are organized transcending the ethnic divide. Needless to say, the ruling coalition itself is a formation of parties organized in the ethnolinguistic arrangement. The political modus operandi makes ethnolinguistic identity and politics inseparable. Multiplying the intricacies, the country institutionalized the intermingling of the two with its drivel federal structure on the basis of an ethno-linguistic formula, which may probably cause dismemberment of the country, ipso facto.

Generally, what is not uncommon in sub-Saharan Africa is the linkage of multilingualism with ethnicity. This is so because usually, a language group coincides with an ethnic identity. The majority of the cases show the reality that an ethnic group is identified by its common name, language, and culture. Despite the emergence of a failed quest for building a nation-state in the post-independent sub-Saharan Africa, as will be discussed in the next section, ethnic identities showed resilience as members of ethnic groups display entrenched solidarity and loyalty that cannot transcend their respective ethnic groups. Thus, as Batibo argues, ethnicity remains a formidable challenge to the promotion of unity in sub-Saharan Africa "due to the fact that language is easily identifiable and more specific, appears the most conspicuous of the factors that identify an ethnic group (2005:14).

The Language factor vis-à-vis the Nation-State Discourse
A nation-state is a vague concept. Its definition remained elusive by and large. Delanty better articulates the nitty-gritties and presents nation-state as:

> "*the state is the government and its institution: the nation is best described as some kind of grouping of people who identify with each other, be it for cultural, ethnic, linguistic, or historical reasons. The nation-state is the marriage of the two ideas*" (1996:1).

However, the nation-state as the context of policy and planning operations has been

problematic in sub-Saharan Africa fundamentally for a couple of reasons. First, the nation-state narrative in Africa is marked by the arbitrariness of boundaries that attended the partitioning of Africa at the Berlin conference of the 1880s, with the consequence that ethnic nationalities were bisected and trisected by colonial boundaries and people with diverse and in some cases conflicting aspirations were lumped together in one nation. Thus, the narrative seems to have been formed to fail, or at least to face a formidable difficulty in succeeding. Second, migration and displacement as parts of the post-modern condition in Africa have diffused once homogenous communities, particularly in the urban areas whereby creates diverse aspirations. These two conditions at times jointly, at other times separately pose a challenge for the triumph of the nation-state framework (Mamdani, 1996; Fanon, 2004).

The language factor is a sine-qua-non in the post-independence sub-Saharan Africa's quest for building a nation-state. In the region, the central-government authored policies quite often do not reflect the reality of language-use needs and practices for the majority of the populous within the state which either do not have the official language of their own vernacular or possess only modest competence in those languages which are made to be official. Facing with two ideological positions, namely, what one might call the '19ᵗʰ Century European nation-state ideology and 20ᵗʰ/21ˢᵗ-century African renaissance ideology language planners and decision-makers in Africa, Wolff (2017) argues, are "caught in a complex dilemma". Thus, the academic and political discourse on the language factor in post-colonial Africa is embedded in highly ideologized and appears to find itself between a rock and a hard place. The ongoing debate suffers from a mismatch between the multilingual realities in the African post-colonies and the governing political ideology that governs the mainstream discourse on nation-building inside and outside of Africa.

The mainstream discourse on nation-building is based on ideological positions that expound official monolingualism. The crude reality that most African countries are essentially pluralistic in terms of languages, cultures, and ethnic compositions, such official monolingualism implies to opt for some kinds 'neutral' or 'unifying' language.

The idea is that such heterogeneous reality should conform to the Westphalia model of a 'nation-state' – which is characterized by factual or ideologically postulated linguistic, cultural, and possibly ethnic homogeneity, "ideally allowing the constituent of the polity to speak of one single 'nation' populating its own nation-state" (ibid:2).

The Westphalian method is displayed extremely successful and has been turned into a prototype of modern statehood. Since it is understood as being largely based on the hegemonic imposition of one 'superior' language over less vernacular or 'dialects', most post-colonial African countries have been tempted and advised to adopt such models into their own national language policies.

However, the ideology that promotes the import of such policies in Wolff's word is basically 'Social Darwinist' by a prior acceptance of the essential 'evolutionary' difference to exist

between human societies, with some being more advanced than others, and thus legitimizes colonialism (2017). As far as language policy is concerned, this policy favors 'exoglossic monolingualism'- the promotion of ex-colonial languages in the guise of 'neutrality' and 'unity'. It disregards the historically grown socio-cultural realities in Africa with roots in the continent's characteristic territorial multilingualism. Such policies foster language attitudes that target the eradication of multilingualism for all official purposes, including formal education, in the emergent post-colonial 'nation-states'. Put otherwise, the ideological presupposition is that modern statehood in Africa must be '*de-Africanized*' in order to match Western prescription. This widely shared position has been and remains under sharp criticism for its inherent racism and continued linguistic and cultural imperialism.

In its recent 2015 edition, the ethnologue (Lewis, 2015) offers 2138 language for Africa, putting aside the theoretical problem with dialect. On average, as per the data, there would be 40 languages per state. This further implies that more than 99% of all African ethno-linguistic groups do not have their own 'nation-state'. Thus, one can infer that the Western notion of nation-state makes a little, if not nil, sense in the African context.

The most-applied strategy, as far as colonial and post-colonial sub-Saharan Africa is concerned, was imposing a 'neutral' or 'unifying' language, i.e. the language of the colonial master, hoping that this automatically leads to the disappearance of Africa's received ethnolinguistic plurality and create truly Anglophone, Francophone, Lusophone, etc. countries. However, languages are, as a matter of fact, never equal in terms of their status within a given multilingual society. Furthermore, no language can be considered 'neutral' with regard to status, prestige, and power. If the political agenda is to establish hegemonic dominance of a particular language, the thing to do is to ideologically uplift it to superior status, thereby automatically degrading all other languages on the national territory to local vernaculars or dialects that are said to be unworthy, if not unequipped, "to serve in higher domains of communication which, in turn, are reserved for the imposed language of power" (Wolff, 2017:15)

The perennial argumentation that views multilingualism as threatening or blocking national unity and social coherence; therefore, and by implication, policies that would officially accept multilingualism are detrimental to socio-economic modernization and development, in Obanaya's (1999) conception is a myth based on a monistic Western nation-state ideology, not a global fact that could be empirically supported by serious economic research. One can also point to the Somali experience that perfectly matches the 'nation-state' formula stayed in political crisis for a quarter of a century. This myth, as to Obanaya is used for political propaganda in the post-colonies just for two functions. First, it is used to discredit multilingual policies that would include indigenous languages; and second, to maintain the hegemonic dominance of the language of the former colonial master and, consequently, avoid jeopardizing the quasi-natural privilege of the 'owners' of the language of power.

Conclusion

The issue of language in sub-Saharan Africa dominates the political arena in such a wide range. More specifically, the politics of ethnicity and nation-state cannot be seen without the language factor. The sense of ethnic self is created and perpetuated by language. Ethnic and linguistic identification are at the van of the sociopolitical and cultural lives of sub-Saharan Africans even to these days. Including in those countries that may constitutionally ban political mobilization along the ethnic divide, the driving force behind is ethnic identity. There is no doubt that the bond of ethnicity will continue to be created by language and vice versa.

Thus, it might be observed that sociocultural life in sub-Saharan Africa has a leading, hard-core ethnic and language to determine privileges, positions, achievable heights, goals, and aspirations. Ethnic identity is preserved through language, and ethnicity has been one of the many tools and strategies for the assertion of superiority and the denial of, or protest against, being labeled ethnolinguistically different or competent.

With the discourse of nation-state that dominated the political environment since the immediate post-independent period, one can observe in effect that although several different ethnic groups are "clumped" together in one polity, the sub-Saharan African situation points to the fact that there is the absence of a strong sense of political belonging.

In countries where a little or no emphasis was put on the African languages and the intent was to "unify" the people by promoting one or another ex-colonial language(s) in 'neutrality' disguise, the consequences were disastrous. The sustained use of the ex-colonial languages created a form of dejection in the masses, which extended to the exclusion of the large populous from participation in public activities and decisions affecting their own lives. Such a reality reinforces people to intensify their links with their ethnic groups, which were linguistically and culturally accommodating.

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Efficiency Analysis of Branches: The Case of Berhan Bank S.C.
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Abstract

Ensuring efficiency is critical for banks to continually play their role of financial intermediary in mobilizing financial resources and channeling towards productive investment ventures. Hence, this study aims at comparing the relative efficiency of bank branches in the context of Berhan Bank. The study encompasses the year from 2015 to 2017. Secondary data from the internal reports of the Bank under study were used. A non-parametric linear programing model Data Envelop Analysis (DEA) was employed on input variables (non-interest and general expense) and output variables (annual deposit) per branch focused on output-oriented comparison to estimate the efficiency. The findings suggested that mean efficiency under constant return to scale, variable return to scale, and scale efficiency were indicated as.38, .56, and .70, respectively. In range, 27(44%) of the branches were from .75 to 1; 23 (38%) of the branches were between .50 and .75; and the remaining 11(18%) were below .50. Moreover, 99 percent of the branches were increasing economies of scale. Therefore, most of the branches were operating below the best practice production frontiers and had a capacity to improve their productivity. By location, Addis Ababa and Amhara region had relatively better efficiency. In opening dates, the oldest branches had better average efficiency than the youngest branches of the Bank. Therefore, it is recommended that the Bank should design an effective deposit mobilization strategy that networking potential market segment, implement branch standardization, branch level resource allocation, invest in the managerial skill of personnel to improve branch level leadership, technology banking, design robust target setting, and performance evaluation system.

Keywords: Efficiency, Data Envelop Analysis, output-oriented, scale efficiency

Introduction

Ensuring efficiency is critical for banks to continually play their core role of financial intermediary in mobilizing financial resources and channeling them towards productive investment ventures. The socio-economic environment wherein banks are operating in Ethiopia is characterized by the existence of multitudes of unbanked population, continuously growing national economy, and expanding infrastructure necessary for banks to more operate at the branch level.

According to Mengistu (2018), the government has introduced the National Financial Inclusion Strategy (NFIS) aiming to increase the percentage of adults with a transaction account from 22 percent in 2014 to 60 percent in 2020. To achieve this objective, the National Bank of Ethiopia has directed banks to expand their branch network at a minimum threshold limit across the country[105]. These changes in branch expansion seem the order of the day in a bid to take banking service to all the niches and chinks of the country and banks pursued aggressive branch expansion as a means of resource mobilization.

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[105] National bank of Ethiopia has directed the minimum branch opening threshold limit at 25 percent of outstanding number.

On the other hand, Berhanu (2015) noted that an internal report of banks revealed that many of the branches failed to mobilize the required level of resource and negatively contribute towards the Bank's performance as opposed to others which means using the same amount of input; other branches are recording below average and serving as cost center of the bank.

Thus, its various performance levels (efficiency) of branches in the bank are observed as a problem. Hence, it is necessary for banks to study the efficiency level of the branches they open from time to time.

Literature gap: There has been very little empirical research on bank branch efficiency because branching data generally are confidential and not required by regulators. This paper tries to add to the limited information available about bank branches efficiency. It specifies the Fourier-Flexible nonparametric form for the cost function to characterize the efficient frontier for bank branches, the first application of the form in a frontier efficiency context.

Importance of the Study

For the management of entities under consideration, it is of particular importance to measure the efficiency as a basis for undertaking adequate steps to improve the performance of the inefficient units. The study is a first of its kind in its methodological approaches, conceptual approaches that compare and contrast the "intermediation" and "production" approaches to defining branch output, linking the relationship between branch efficiencies.

Statement of the Problem

Currently, the banking industry in Ethiopia is growing rapidly in terms of accessibility, asset development, capital accumulation, profitability, provision of loans and saving[106]. In particular, as NBE directed banks to address unbanked population, the banking industry was competing in branch networking over the last five years. NBE's report in 2018 demonstrated that private banks on average has increased from 1,164 in 2014 to 3,159 in 2018[107]. Nowadays, it is common to look at two banks sharing one building or working next door to each other, and it clearly indicates how they are fragmented and competing for the unnecessary cost of office rent (Abebe, 2020). Summing up, banks are inefficient unless they allocate scarce resources efficiently by applying the art of technology in their daily activity since they employ high skilled human capital. Their inefficient intermediation will crowd out the use of productive factors in other sectors that can potentially foster economic growth.

As a result, the internal report of private banks disclosing the fact that aggressive branching has been negatively affecting their long-term performance due to alarming administrative costs. In five years (2014-18) their expense budgeting was doubled four times and the highest

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[106] The total amount of the capital of banks all over the country is 103.2 billion Birr ,55.8 pc of which is held by public banks, while 44.2 pc is held by the private banks and the industry totally transacts an amount worth one trillion Birr (current exchange rate 1 USD = 32 Ethiopian Birr).

[107] Branch networking on average increased by 63 percent annually from 1,164 in 2014 to 3159 in in 2018 with one branch serving an average of 20,000 customers as of June 2018. Budgeting expense increased four **times from Birr 2.6 billion in 2014/15 to Birr 24.6 Billion in 2017/18.**

share went to general and administrative expenses to 53 percent while the remaining was interest expenses to 37 percent. Berhan Bank was also a mirror reflection of the industry, in the five years. It has doubled branching six times and the associated administrative expenses have soured (NBE,2018).

Objective of the Study
The main objective of the study was to analyze the relative efficiency of branches of Berhan Bank. To this effect, the study tries to explore the performances of branches in terms of deposit mobilization against their respective noninterest expenses.

Specific objectives of the study are:

1. To explore the efficiency of Berhan Bank branches in terms of geography, opening date, and size.
2. To benchmark the best practice and to improve the performance of relatively inefficient Berhan Bank branches.

Research Questions

1. What is the efficiency level of Berhan Bank branches in terms of deposit mobilization against their respective noninterest expenses?
2. What is the efficiency level of Berhan Bank branches using geographic location and opening period?

Methodology
The literature distinguishes different approaches in measuring banking efficiency; a traditional approach with simple ratio measurement, parametric, and a non-parametric approach in which the specification of a production cost function is required in both approaches. The nonparametric method offers a linear boundary by enveloping the experimental data points, known as" Data Envelopment Analysis" (DEA). This study used (DEA) to estimate the technical and economic efficiency of Branches in Berhan Bank.

Data
For the purpose of analyzing the trend of efficiency, branches that have been in operation for three years and above were selected for the study. The three consecutive years of annual performance report of 61 branches of the Bank were used as secondary data to analyze their efficiency.

The Variables
DEA is a deterministic methodology for examining the relative efficiency, based on the data of selected inputs and outputs of branches. In this regard, a production-type approach that considered branches as deposit and loan producers was used and it was assumed that banks use inputs such as capital and labor to produce a number of deposits and loans. Therefore, in

the analysis, the following set of inputs and outputs were applied to quantify the efficiency of branches.

- *Outputs:* outstanding deposit (branches are serving for deposit mobilization centers)
- *Inputs:* salary and benefit expense and general expense

As aforementioned, 61 branches that have been in operation for three years and above were selected as DMU. Besides, three years of noninterest expense and general expenses of branches under consideration were taken as an input. Three years outstanding deposit balances, excluding fixed time deposits of branches, were also considered as an output. The fixed time deposit balances were excluded due to the fact that in some cases fixed time deposits are mobilized at the Head Office level without the involvement of branches. Unlike current and saving accounts, fixed time deposits are mobilized in large volumes without requiring the commitment of proportionate resources.

Mathematical Specifications of the Dea Approach

Technically speaking, DEA is an approach rather than a model. Unlike the stochastic production frontier (SPF) model, where the parameter estimates represent the production elasticity, the resultant weights associated with the input variables have no economic interpretation. Models can be developed, however, to assess allocative and scale efficiencies, congestion, and overall economic efficiency (Färe, Grosskopf and Kirkley, et al. 2000). Linear programming (LP) models are developed to undertake the DEA, and for the purposes of simplicity, these can be referred to as DEA LP models. An output-oriented approach is generally more appropriate for the estimation of capacity and capacity utilization. Following Färe, Grosskopf and Kokkelenberg (1989), and Färe, Grosskopf and Lowell (1994) the output-oriented DEA LP model of capacity output given the current use of inputs is given as:

$$Max\ \Phi_1$$
$$s.t$$
$$\Phi_1 u_{j,m} \le \sum_j z_j u_{j,m} \quad \forall\ m$$
$$\sum_j z_j x_{j,n} \le x_{j,n} \quad n \in \alpha$$
$$\sum_j z_j x_{j,n} = \lambda_{j,n} x_{j,n} \quad n \in \hat{\alpha}$$
$$\sum_j z_j = 1$$
$$\lambda_{j,n} \ge 0 \quad n \in \hat{\alpha}$$

$$(1)$$

where is a scalar showing by how much the production of each firm can increase output, $u_{j,m}$

is the amount of output m by firm j, $x_{j,n}$ is the amount of input n used by boat j and z_j are weighting factors. Inputs are divided into fixed factors, defined by the set, and variable factors defined by the set $\hat{\alpha}$. To calculate the measure of capacity output, the bounds on the sub-vector of variable inputs, $x_{\hat{\alpha}}$, need to be relaxed. This is achieved by allowing these inputs to be unconstrained through introducing a measure of the input utilization rate ($\lambda_{j,n}$), itself estimated in the model for each boat j and variable input n (Färe, Grosskopf and Lovell, 1994). The restriction $\sum_j z_j = 1$ allows for variable returns to scale.

Capacity output based on observed outputs (u^*) is defined as multiplied by observed output (u). Implicit in this value is the assumption that all inputs are used efficiently as well as at their optimal capacity. From this, technically efficient capacity utilization (TECU) based on observed output (u) is:

$$TECU = \frac{u}{u^*} = \frac{u}{\Phi_1 u} = \frac{1}{\Phi_1}$$

. (2)

The measure of TECU ranges from zero to 1, with 1 being full capacity utilization (i.e. 100 percent of capacity). Values less than 1 indicate that the firm is operating at less than full capacity given the set of fixed inputs. Implicit in the above is a downwards bias because observed outputs are not necessarily being produced efficiently (Färe, Grosskopf and Lovell, 1994). As with the SPF measure of capital utilization, an unbiased measure of capacity utilization is calculated as the ratio of technically efficient output to capacity output.

The technically efficient level of output requires an estimate of the technical efficiency of each bank and requires both variable and fixed inputs to be considered. The output orientated DEA model for the technically efficient measure of output is given as:

$$
\begin{aligned}
&Max \ \Phi_2 \\
&s.t. \\
&\Phi_2 u_{j,m} \leq \sum_j z_j u_{j,m} \quad \forall \ m \\
&\sum_j z_j x_{j,n} \leq x_{j,n} \quad \forall \ n \\
&\sum_j z_j = 1
\end{aligned}
$$

(3)

Where F_2 is a scalar outcome showing how much the production of each firm can increase by using inputs (both fixed and variable) in a technically efficient configuration. In this case,

both variable and fixed inputs are constrained to their current level (i.e. the equality constraint on the output orientated model of capacity has been relaxed). Again, the restriction $\sum_j z_j = 1$ is imposed to allow for variable returns to scale. In this case, F$_2$ represents the extent to which output can increase through using all inputs efficiently. From this, technical efficiency is estimated as:

$$TE = 1/\Phi_2$$

. (4)

The measure of technical efficiency ranges from one to infinity; F$_2$ - 1.0 is the proportion by which outputs may be expanded. Some existing software and articles, however, report the value of TE as one over F$_2$ (see, for example, Coelli, Rao and Battese, 1998). Values of the ratio (Eq. 4) less than 1 indicate that, even if all current inputs (both variable and fixed) are used efficiently, the output is less than the potential output. That is, the output could increase through efficiency gains, without changing the levels of the inputs.

The unbiased estimate of capacity utilization is consequently estimated by:

$$CU = \frac{TECU}{TE} = \frac{1}{\Phi_1} \bigg/ \frac{1}{\Phi_2} = \frac{\Phi_2}{\Phi_1}$$

. (5)

As, $\Phi_1 \leq 1$ the estimate of CU ³ TECU. Dividing the level of output by the corrected measure of capacity utilization produces lower but unbiased estimates of capacity output.

Result and Discussion

As aforementioned, 61 branches that have been in operation for three years and above were selected as DMU. Accordingly, the DEA model analyzed the relative efficiency level of branches taking into account the three years data of general expense and salaries and benefits expenses as an input and the three years data of branches' outstanding balances of deposits as an output for the years 2015 to 2017.

The relative efficiency level of branches under consideration is labeled the respective efficiencies of branches between 0 and 1. i.e., efficiency score of 1 indicates as the particular branch is on the best practice production frontier, a score less than 1 shows as the branches are beneath the best practice production frontier. Within this range, the relative efficiency of branches was classified into three levels.
1. High relative efficiency of branches averaged between .75 percent and 1,
2. Acceptable relative efficiency averaged from .50 to .75 and
3. Poor relative efficiency of branches < .50.

Moreover, multi-stage DEA that enables to conduct a sequence of projected points that have mixed inputs and outputs that ultimately enables economies of scale registered by (average

increase return to scale (ir), constant return to scale (crs), and decreasing return to scale(drs) of the branches are indicated on the annexed table 2. Accordingly, table 1 (below) indicates whether a branch maximizes the output quantity given a certain quantity of inputs. This ratio is normalized according to best practical peers and efficiency is calculated to be between 0 and 1, as 1 representing an efficient unit.

Table 1: Efficiency result using geography and opening period

Branches by geography location and opening period	Efficiency Result		
	Constant to return to scale (CRS)	Variable return to scale (VRS)	Scale efficiency
Addis Ababa	0.390	0.579	0.695
Branches located outside Addis Ababa	0.375	0.535	0.692
Amhara Region	0.495	0.691	0.690
Oromia region	0.364	0.513	0.701
SNN region	0.354	0.526	0.695
Tigray region	0.318	0.400	0.798
Branch Opened (2009-12)	.55	.69	.809
Branch Opened (2013-15)	.38	.55	.69
Efficiency of All branches	**0.383**	**0.557**	**0.694**

Source: Author's computation

Efficiency of All Branches

In table 1, the aggregate mean of efficiency under constant return to scale, variable return to scale, and scale efficiency are indicated as .38, .56, and .70, respectively. In the range, 27(44%) of the branches scored scale efficiency between .75 and 1; 23 (38%) of the branches scored scale efficiency of between .50 and .75. The remaining 11(18%) scored efficiency level of below .50. (See annexed table 2). As shown in table 1, branches located in Addis Ababa and Amhara region were more efficient under all the given scenarios (CRS, VRS, and SCALE) as compared to other regions. Addis Ababa, however, had better output. On the other hand, branches selected under this study were categorized into two batches: branches opened during the period (2009-2015) and (2013-15). The result indicated that branches opened in the early period had better technical and scale efficiency compared to branches opened during the period of 2013-2015.

Conclusion

According to the DEA output-oriented production approach, the measure of efficiency ranges from 0 to 1, with 1 being full capacity utilization (i.e. 100 percent of capacity). Values less than 1 indicate that the firm is operating at less than full capacity given the set of fixed inputs. The results suggested that most branches (99 per cent) were experiencing increasing economies of scale by operating below the best practice production frontiers and they had the capacity to improve their productivity.

Branches located in the capital city were efficient as compared to branches located in another region. Furthermore, the sources of the branch's inefficiency were contributed from both technical and scale operations while the former had contributed more; the source of their inefficiency was due to lack of technological dynamism as compared to the pure technical inefficiency (i.e., managerial inefficiency).

Moreover, this study found out that branches that were opened at an early period had better average technical efficiency output-oriented efficiency measurements compared with branches opened between 2013 -2015.

Recommendations

The Bank should design effective deposit mobilization strategies that direct sources of potential deposit market segment, include a profit target for branches in the performance management system, and design branch standardization. It should also invest in technology banking and managerial skills of personnel to improve technical and scale efficiency of branches. Besides, the Bank should increase its branch networking in the regions (such as Addis Ababa and Amhara) with better efficiency. Finally, the bank is advised to improve its planning process, the target setting, and performance management system of the branches.

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ANNEX

Table 2: All branches average efficiency level

Branches information					Output Oriented			
No	Branch name	Opening Date/2009-2013	Branch Vs Sub Branch	Region	City VS Outly	CRS	VRS	Scale Efficiency	Irs,drs & crs
1	Bole	10-Oct-09	Branch	AA	City	0.965	0.983	0.982	Irs
2	Hayahulet	1-Nov-09	Branch	AA	City	1	1	1	-
3	Amedegebeya	18-Nov-09	Branch	AA	City	1	1	1	-
4	Kaliti	23-Mar-10	Branch	AA	City	0.433	0.983	0.441	Irs
5	Genet	22-Mar-10	Branch	AA	City	0.356	0.442	0.806	Irs
6	Hawassa	3-Jul-15	Branch	SNNPR	Outlying	0.298	0.338	0.88	Irs
7	Bahirdar	26-Mar-10	Branch	Amhara	Outlying	0.77	0.977	0.788	Irs
8	Adama	27-Mar-10	Branch	Oromia	Outlying	0.601	0.674	0.892	Irs
9	Legehar	18-Feb-11	Branch	AA	City	0.457	0.482	0.948	Irs

10	Hossana	23-Aug-11	Branch	SNNPR	Outlying	0.362	0.51	0.709	Irs
11	Megenagna	23-Aug-11	Branch	AA	city	0.475	0.665	0.715	Irs
12	Gonder	29-Nov-11	Branch	Amhara	Outlying	0.586	0.781	0.75	Irs
13	Dirtera	10-Jan-12	Branch	AA	City	0.607	1	0.607	Irs
14	Dessie	14-May-12	Branch	Amhara	Outlying	0.65	0.808	0.804	Irs
15	Mekelle	21-Jun-12	Branch	Tigray	Outlying	0.344	0.375	0.918	irs
16	Meshualekia	3-Oct-12	Branch	AA	City	0.303	0.39	0.776	irs
17	Shashemene	14-Nov-12	Branch	Oromia	Outlying	0.407	0.54	0.753	irs
18	Bishoftu	20-Nov-12	Branch	Oromia	Outlying	0.465	0.563	0.827	irs
19	Alemgena	5-Dec-12	Branch	Oromia	Outlying	0.401	0.518	0.775	irs
20	Jimma	12-Mar-13	Branch	Oromia	Outlying	0.501	0.639	0.784	irs
21	Teklehaimanot	11-Apr-13	Branch	AA	City	0.465	0.55	0.844	irs
22	Kera	20-Apr-13	Branch	AA	City	0.323	0.412	0.784	irs
23	Saris Gumruk	12-Sep-13	Branch	AA	City	0.389	0.533	0.73	irs
24	Wolaita Sodo	12-Nov-13	Branch	SNNPR	Outlying	0.424	0.568	0.746	irs
25	Arbaminch	12-Nov-13	Branch	SNNPR	Outlying	0.493	0.875	0.564	irs
26	Wollo Sefer	10-Dec-13	Branch	AA	City	0.334	0.428	0.782	irs
27	Meri	16-Dec-13	Branch	AA	City	0.442	0.554	0.797	irs
28	Flamingo	31-Dec-13	Branch	AA	City	0.235	0.631	0.373	irs
29	Mizan Teferi	28-Jan-14	Branch	Oromia	Outlying	0.278	0.579	0.48	irs
30	D/Markos	3-Feb-14	Branch	Amhara	Outlying	0.512	0.744	0.688	irs

31	Shire	17-Feb-14	Branch	Tigray	Outlying	0.387	0.522	0.742	irs
32	Mesalemia	19-Feb-14	Branch	AA	City	0.466	0.553	0.843	irs
33	Jemo	22-Mar-14	Branch	AA	City	0.279	0.283	0.987	irs
34	Dire Dawa	7-Apr-14	Branch	Oromia	Outlying	0.169	0.61	0.277	irs
35	Gerji Mebrat	12-May-14	Branch	AA	City	0.133	0.238	0.558	irs
36	Lafto	22-May-14	Branch	AA	City	0.153	0.245	0.624	irs
37	Bole Medhanialem	30-May-14	Branch	AA	City	0.232	0.403	0.576	irs
38	Nekemte	1-Sep-14	Branch	Oromia	Outlying	0.391	0.526	0.744	irs
39	Bethel	8-Oct-14	Branch	AA	City	0.399	0.443	0.902	irs
40	Dukem	17-Oct-14	Branch	Oromia	Outlying	0.12	0.313	0.383	irs
41	Ambo	22-Oct-14	Branch	Oromia	Outlying	0.141	0.214	0.659	irs
42	Kotebe	27-Oct-14	Branch	AA	City	0.115	0.153	0.753	irs
43	Adeyabeba	1-Nov-14	Branch	AA	City	0.208	0.276	0.752	irs
44	Shashemene Arada	17-Oct-14	Sub Branch	Oromia	Outlying	0.223	0.3	0.742	irs
45	Ayertena Girar	25-Nov-14	Branch	city	Outlying	0.251	0.298	0.845	irs
46	Meskel Flower	1-Dec-14	Sub Branch	AA	City	0.633	0.964	0.656	irs
47	Wolete	13-Dec-14	Branch	AA	City	0.699	0.947	0.738	irs
48	Welisso	20-Dec-14	Branch	Oromia	Outlying	0.674	0.798	0.845	irs
49	Emperor Tewodros	24-Dec-14	Branch	Amhara	Outlying	0.207	0.471	0.439	irs

50	Assosa	31-Dec-14	Bran ch	Beni shan gul	Outlyin g	0.2	0.3 24	0.618	irs
51	Hawassa Arab Sefer	24-Dec-14	Bran ch	SNN PR	Outlyin g	0.19 5	0.3 39	0.576	irs
52	Gulelle	10-Feb-15	Bran ch	AA	City	0.23 4	1	0.234	irs
53	Gambell a	17-Feb-15	Bran ch	Beni shan gul	Outlyin g	0.19 9	0.4 01	0.496	irs
54	Humera	17-Mar-15	Bran ch	Tigr ay	Outlyin g	0.22 3	0.3 04	0.735	irs
55	Kideste mariam	27-Mar-15	Bran ch	AA	City	0.20 5	1	0.205	irs
56	Lideta	13-Apr-15	Bran ch	AA	City	0.17 9	0.2 83	0.633	irs
57	Piassa	13-May-15	Bran ch	AA	City	0.22 5	0.3 05	0.736	irs
58	Sidest Kilo	18-May-15	Bran ch	AA	City	0.21 5	0.7 83	0.275	irs
59	Belay Zeleke	13-May-15	Bran ch	Amh ara	Outlyin g	0.24 5	0.3 66	0.67	irs
60	Balderas	9-Jun-15	Sub Bran ch	AA	City	0.16 1	0.2 08	0.773	irs
61	Autobis Tera	8-Jun-15	Bran ch	AA	City	0.17 8	0.3 93	0.452	irs
						0.38 1	**0.5 54**	**0.695**	

Table 3: Input (Non-interest expense) and Output (Outstanding deposit)

						Non- Int Expense trend			Deposit trends		
N o	Branch	Opening Date /2009-2013	Branch Vs Sub Branch	Region	City VS Outlying	2015	2016	2017	2015	2016	2017
1	Bole	10-Oct-09	Branch	AA	City	5,275,586	4,696,319	6,872,598	528,110,158	529,772,395	661,094,317
2	Hayahulet	1-Nov-09	Branch	AA	City	1,999,017	2,897,260	3,451,274	84,625,239	111,713,560	116,306,335
3	Amedegebeya	18-Nov-09	Branch	AA	City	2,772,336	3,761,626	4,271,026	238,846,591	238,845,381	210,778,616
4	Kaliti	23-Mar-10	Branch	AA	City	2,416,661	2,267,948	2,998,838	96,544,762	114,016,015	145,596,293
5	Genet	22-Mar-10	Branch	AA	City	2,118,644	2,732,470	3,580,537	134,359,394	194,614,326	132,895,628
6	Hawassa	3-Jul-15	Branch	SNNPR	Outlying	2,990,645	2,654,650	3,063,782	92,701,976	115,190,926	153,625,518
7	Bahirdar	26-Mar-10	Branch	Amhara	Outlying	3,144,706	2,958,011	3,778,735	125,681,895	154,175,573	173,295,256
8	Adama	27-Mar-10	Branch	Oromia	Outlying	2,757,167	2,384,098	2,594,465	98,199,640	101,098,433	104,557,906
9	Legehar	18-Feb-11	Branch	AA	City	2,229,637	3,055,719	3,473,577	108,603,617	104,001,109	149,502,022
10	Hossana	23-Aug-11	Branch	SNNPR	OUtlying	1,509,375	1,732,870	2,391,055	39,257,337	54,183,543	112,278,866

11	Megen agna	23-Aug-11	Bra nch	AA	city	2,562 ,223	3,116 ,102	4,805 ,238	108,86 3,434	144,30 0,089	146,48 9,084
12	Gonde r	29-Nov-11	Bra nch	Amh ara	Out lyin g	1,832 ,317	2,197 ,674	2,323 ,976	28,749 ,577	29,014 ,432	35,904 ,938
13	Dirtera	10-Jan-12	Bra nch	AA	City	1,978 ,738	2,388 ,142	3,414 ,956	50,690 ,961	95,862 ,700	146,25 4,128
14	Dessie	14-May -12	Bra nch	Amh ara	Out lyin g	1,666 ,686	2,148 ,431	2,555 ,627	21,080 ,803	33,157 ,029	32,896 ,435
15	Mekell e	21-Jun-12	Bra nch	Tigra y	Out lyin g	2,640 ,054	2,569 ,181	2,925 ,885	58,618 ,322	62,143 ,083	79,891 ,382
16	Meshu alekia	3-Oct-12	Bra nch	AA	City	2,455 ,478	2,546 ,472	3,372 ,611	156,42 6,049	194,67 8,310	209,77 6,544
17	Shashe mene	14-Nov-12	Bra nch	Orom ia	Out lyin g	1,634 ,863	1,981 ,813	2,094 ,638	37,717 ,610	38,850 ,203	35,434 ,802
18	Bishof tu	20-Nov-12	Bra nch	Orom ia	Out lyin g	1,298 ,772	1,695 ,403	2,327 ,465	27,740 ,083	35,212 ,555	54,680 ,459
19	Alemg ena	5-Dec-12	Bra nch	Orom ia	Out lyin g	1,282 ,583	2,172 ,778	2,459 ,147	28,933 ,107	41,576 ,469	54,313 ,047
20	Jimma	12-Mar-13	Bra nch	Orom ia	Out lyin g	1,856 ,031	2,368 ,438	2,785 ,775	36,466 ,855	60,353 ,393	47,622 ,667
21	Tekleh aiman ot	11-Apr-13	Bra nch	AA	City	2,564 ,541	3,051 ,156	3,828 ,032	35,426 ,818	72,639 ,608	85,693 ,538
22	Kera	20-Apr-13	Bra nch	AA	City	1,869 ,882	2,485 ,831	2,963 ,658	46,214 ,967	62,994 ,840	74,557 ,776
23	Saris Gumru k	12-Sep-13	Bra nch	AA	City	1,351 ,408	1,602 ,869	1,981 ,570	17,996 ,407	27,039 ,931	24,370 ,920
24	Wolait a Sodo	12-Nov-13	Bra nch	SNN PR	Out lyin g	1,925 ,278	2,209 ,086	2,498 ,773	27,829 ,613	44,205 ,910	67,964 ,429

25	Arbam inch	12-Nov-13	Bra nch	SNN PR	Out lyin g	1,322 ,682	1,597 ,085	2,029 ,634	11,895 ,424	22,385 ,210	36,734 ,914
26	Wollo Sefer	10-Dec-13	Bra nch	AA	City	2,370 ,255	2,112 ,440	2,519 ,293	49,793 ,130	77,301 ,086	112,25 7,343
27	Meri	16-Dec-13	Bra nch	AA	City	1,860 ,221	2,642 ,001	2,705 ,982	39,731 ,653	57,360 ,303	70,963 ,369
28	Flamin go	31-Dec-13	Bra nch	AA	City	2,011 ,148	2,630 ,119	3,178 ,775	57,153 ,478	82,469 ,357	129,34 4,799
29	Mizan Teferi	28-Jan-14	Bra nch	Orom ia	Out lyin g	1,227 ,908	1,606 ,276	1,800 ,770	22,618 ,578	35,569 ,649	49,745 ,461
30	D/Mar kos	3-Feb-14	Bra nch	Amh ara	Out lyin g	1,632 ,101	1,855 ,695	2,383 ,416	29,106 ,823	35,346 ,176	34,154 ,109
31	Shire	17-Feb-14	Bra nch	Tigra y	Out lyin g	1,522 ,215	1,770 ,085	2,277 ,102	19,265 ,189	26,804 ,746	45,898 ,375
32	Mesal emia	19-Feb-14	Bra nch	AA	City	2,030 ,513	2,511 ,780	3,030 ,080	28,676 ,661	67,839 ,473	79,918 ,546
33	Jemo	22-Mar-14	Bra nch	AA	City	1,796 ,369	2,564 ,627	3,007 ,163	31,082 ,865	68,932 ,827	95,659 ,601
34	Dire Dawa	7-Apr-14	Bra nch	Orom ia	Out lyin g	1,438 ,046	1,745 ,709	2,302 ,081	14,059 ,261	19,806 ,899	31,751 ,129
35	Gerji Mebra t	12-May-14	Bra nch	AA	City	1,761 ,059	2,496 ,080	2,835 ,334	19,642 ,715	67,006 ,288	55,491 ,134
36	Lafto	22-May-14	Bra nch	AA	City	1,458 ,329	2,007 ,854	2,551 ,976	17,907 ,650	29,991 ,714	38,199 ,342
37	Bole Medha nialem	30-May-14	Bra nch	AA	City	2,089 ,920	2,728 ,275	3,038 ,146	35,856 ,618	96,806 ,756	104,89 3,500
38	Neke mte	1-Sep-14	Bra nch	Orom ia	Out lyin g	1,212 ,676	1,642 ,009	1,967 ,615	6,883, 216	12,561 ,096	24,756 ,577

39	Bethel	8-Oct-14	Branch	AA	City	1,046,714	2,082,971	2,477,019	20,590,675	38,166,466	54,741,683
40	Dukem	17-Oct-14	Branch	Oromia	Outlying	1,054,590	1,673,259	1,843,380	6,666,032	10,457,316	23,806,464
41	Ambo	22-Oct-14	Branch	Oromia	Outlying	937,574	1,587,218	1,949,869	8,657,028	17,893,825	31,182,428
42	Kotebe	27-Oct-14	Branch	AA	City	1,083,893	1,937,017	2,203,602	18,717,366	33,632,476	48,321,383
43	Adeyabeba	1-Nov-14	Branch	AA	City	1,078,296	2,149,074	2,925,605	14,808,932	71,130,230	77,776,636
44	Shashemene Arada	17-Oct-14	Sub Branch	Oromia	Outlying	494,468	1,040,083	1,446,321	3,048,753	6,018,746	13,750,943
45	Ayertena Girar	25-Nov-14	Branch	city	Outlying	1,006,859	1,899,248	2,966,034	11,443,769	34,974,463	53,167,441
46	Meskel Flower	1-Dec-14	Sub Branch	AA	City	516,685	1,365,834	1,952,388	2,770,343	32,124,932	48,953,227
47	Wolete	13-Dec-14	Branch	AA	City	590,916	1,429,732	1,801,297	8,380,083	18,128,929	38,645,400
48	Welisso	20-Dec-14	Branch	Oromia	Outlying	715,457	1,514,447	2,080,077	9,248,792	14,049,718	41,623,634
49	Emperor Tewodros	24-Dec-14	Branch	Amhara	Outlying	537,671	1,261,514	1,559,923	2,847,707	14,015,513	12,629,216
50	Assosa	31-Dec-14	Branch	Benishangul	Outlying	907,162	1,890,862	2,386,056	6,041,178	15,132,741	25,473,220
51	Hawassa Arab Sefer	24-Dec-14	Branch	SNNPR	Outlying	400,536	1,090,764	1,314,096	3,332,139	8,542,696	13,714,396

52	Gulelle	10-Feb-15	Branch	AA	City	731,552	2,018,377	2,774,466	10,857,503	37,698,675	84,984,578
53	Gambella	17-Feb-15	Branch	Benishangul	Outlying	598,236	1,403,420	1,811,290	2,765,781	6,239,591	11,016,147
54	Humera	17-Mar-15	Branch	Tigray	Outlying	712,878	1,919,719	2,166,590	6,291,770	5,926,277	12,187,036
55	Kidest emariam	27-Mar-15	Branch	AA	City	517,789	1,675,343	2,046,671	5,285,135	20,102,378	27,720,667
56	Lideta	13-Apr-15	Branch	AA	City	308,935	2,004,839	2,784,238	1,669,598	33,965,581	68,558,332
57	Piassa	13-May-15	Branch	AA	City	352,058	2,207,479	2,963,142	9,531,242	49,083,970	77,185,574
58	Sidest Kilo	18-May-15	Branch	AA	City	234,318	1,477,224	1,893,918	2,517,047	53,734,853	31,989,213
59	Belay Zeleke	13-May-15	Branch	Amhara	Outlying	286,573	1,258,694	1,713,340	1,215,700	12,203,832	20,026,942
60	Balderas	9-Jun-15	Sub Branch	AA	City	158,544	1,076,750	1,602,632	486,322	12,688,993	19,947,954
61	Autobis Tera	8-Jun-15	Branch	AA	City	221,204	2,113,910	2,939,428	4,449,086	62,399,129	42,992,080

Effects of External Debt on Economic Growth in Ethiopia
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Abstract

The study evaluates the effect of external debt on economic growth in Ethiopia for the period 2002-2019. Time series data on the stock of external debt, external debt servicing, human capital, physical capital formation, labor force, next export as a ratio of GDP, and policy change were used as determinants for the assessment of economic growth in Ethiopia during the period (1991-2019). The research used endogenous growth model. The vector Auto regressive multivariate time series model supported by Johansen Maximum Likelihood Approach and Vector Error Correction Model (VECM) tests were used to estimate the long-run relationship and short-run estimations of the variables respectively. The empirical result suggests that stock of external debt(ED) and external debt service (EDS) had an adverse effect on economic growth both in the short-run and long-run. Similarly, labor force had a negative effect on real GDP growth both in the long run and short run. While Capital stock, human capital, and exchange rates had a significant positive contribution to the economic growth both in the long-run and short-run but net earnings from export as a ratio of GDP had a positive but insignificant relationship with economic growth. Based on the findings of the study, it is recommended that external borrowing decisions must be aligned with returns in foreign exchange earnings, external debt servicing, and repayment in foreign currency to achieve the benefit of external finance and to strengthen sustainable economic growth.

Keywords: External debt stock, external debt servicing, economic growth

Introduction

In today's expressive growth and development, it is difficult for a developing country to finance all of its development spending with its own resources. As a result, to cover up the gap between its expenditures and revenues, it has to borrow one way or another from internal and external resources. Chenery and Strout (1966) explained that the fundamental reason why developing and emerging countries involved in a mass external debt is lack of saving and investment. Prior research reports identified that accumulated external debt has been one of the most important constraints for the economic growth of many Least Developed Countries. For instance, Elbadawi et al. (1996) conducted research in 99 developing countries covering Sub-Saharan African countries, Latin America, Asia, and the Middle East using cross-section regression analysis; and concluded that accumulated external debt has a deterring effect on the economic growth of Least Developed Countries. Another is Patillio et al(2004) study that examined the impact of external debt on economic growth by taking 61 developing countries from 1969 to 1998. They found out that, a low level of external debt has a positive impact on economic growth; however beyond a certain threshold, an accumulated debt impacts negatively on the economic growth of a country.

This threshold is a point where an accumulated debt surpasses the country's debt repayment ability. In such a case, the debt is said to be overhang having adverse implications on

economic growth. Another dimension of external debt impact on economic growth is in terms of its liquidity constraint effect, which is caused by channeling out of limited export earning/fund to service external debt instead of using the fund for additional investments.

This effect has been captured as a crowding-out effect of external debt on economic growth. Meanwhile writers like Iyoha. M(1999) investigated the impact of external debt on the economic growth of Sub-Saharan African countries for the period 1970-1994 using a simulation approach. According to his finding, a rising external debt depresses investment through both a disincentive effect and a crowding-out effect on investment.

According to Krugman (1988), if external debts from creditors improve the economic growth of the borrowing nation, then the loans are considered as being beneficial that the economy of the borrowing country becomes self-sustaining, and further borrowing turns out to be unnecessary. On the other hand, the external indebtedness of African countries is an impediment to the re-establishment of the conditions desired for growth. The massive debt burden acts as a peril to the economic performance given the widespread poverty and structural rigidities in these countries (World Bank, 1988, 2000).

As revealed by the works of Alemayehu and Daniel (1998), many developing countries have been greatly exposed to external capital inflows in the past four and half decades. Such external flows are now becoming the source of external debt problems in Africa in general and Ethiopia in particular. Ethiopia's external debt has changed significantly in magnitude, structure, and composition over the last four and half decades. For instance, in 1975, it stood at about USD 343.7 million (14% of the GDP) and in 1991 raised to USD 8.86 billion (138.93% of GDP). Moreover, recently, in 2011 following the debt relief granted in accordance with development initiatives designed to benefit heavily indebted poor countries (HIPCs), it had raised to USD 7.9 billion (36.7% of GDP) (World Bank, 2011). What is worse is that the stock of external debt has increased to USD 26 Billion as of December 2017 which was 58.56% of GDP (World Bank, 2018).

The main focus of this study was to investigate the effect of external debt on the economic growth of Ethiopia using time series data from the year 1991 to 2019. This is because, in the study period, the country had experienced a high volume of external debt and also claimed high economic growth.

Apparently, the country faced the problem of debt serving as a result of high external debt which in turn reduces the capacity for an investment to further economic development. Thus, the researcher is keen to attest the extent of the above claims using current information.

Statement of the Problem

As evidenced in the introduction, empirical findings showed that external debt is one of the greatest problems facing many sub-Saharan African countries today in general and Ethiopian in particular. The huge external debt stock and debt service payments prevented these

countries from embarking on a larger volume of domestic investment, which would have enhanced growth and development (Clements, et al., 2003). This debt becomes a burden to many African countries because contracted loans were not optimally deployed, therefore returns on investment were not adequate to meet the maturing obligation and did not leave a favorable balance to support domestic economic growth conjugated with elusive macro-economic policies pursued.

Benedict et Al., (2003) suggested that foreign borrowing has a positive impact on investment and growth of a country up to a threshold level but external debt service can potentially affect the growth as most of the funds will go into the repayment of the debt rather than the investments. According to the World Bank (2017) classification of Highly Indebted Economies, Ethiopia was one of the severely indebted low-income countries challenged to sustain economic growth in the long run as a result of external debt multifaceted effects such as depressing level of economic growth by creating debt overhang effect, crowding out effect, discouraging capital formation and then reduced investments. Prior studies on Ethiopia regarding the relationship between external debt and economic growth ended up with a different conclusive result. According to Befekadu (1992) past debt accumulation related positively to economic growth whereas, a study by Hailemariam (2011) as cited in Kumar(2017), showed that past debt accumulation has a negative relationship with economic growth. Different from the above two, Jones's (2002) results showed that the external debt variable had no significant effect directly on the growth of output. Methodological variation and time span in which the studies carried out could be the reasons for divergent findings. In addition to the inconclusive findings of previous studies, the current stock of Ethiopian external debt is much higher than in previous years, thus it needs a fresh relook on its effect, and therefore, this study is aimed at filling this gap. Moreover, not only a few studies conducted on the alarming issue of external debt with emphasis on the empirical relationship of external debt and economic growth but also these few studies failed to examine the trend structure, size, type, and debt serving of Ethiopia's external debt management. Therefore, this study tries to analyze the size and structure of external debt in relation to its effect on the economic growth of Ethiopia in the period under study.

Methodology
The success of any econometric analysis ultimately depends on the availability of appropriate data. It is, therefore, essential to discuss the source and nature of the data. This research work depended mainly on secondary data which were time serious data sourced from the Ministry of Finance and Economic Development (MoFED) and National Bank of Ethiopia (NBE) among the important ones while the external sources involved World Bank Debt Tables, Global Development Finance, World Trading Economics Table, different World Bank Reports, IMF publications, United Nations Conference on Trade and Development (UNCTAD) and another relevant source from the period 1991-2019; the year 1991 was taken as breakpoint because this research to see the impact of external debt on economic growth in Ethiopia during the regime of EPRDF, particularly during the period 2002-2019 where the magnitudes of external debt in the country was growing at an alarming rate and reached ever

higher than any other regimes.

Model Specification

Empirical Model Specification

The study employed Vector Auto Regressive multivariate time series technique supported by Johansen Maximum Likelihood Approach and Vector Error Correction Model (VECM) to test cointegration in explaining in the model and long-run stability respectively between the period 1991-2019. This econometric analysis was applied by using the statistical program (STATA) on the time serious data that were collected during the period of the study.

The empirical model was preferred based on its multiple variable systems with flexibility and ease of generalization. In the system, each variable is a potential endogenous variable which is explained only by its own lags as well as those of other variables. The models provide several advantages such as having the ability to incorporate both endogenous and exogenous variables into a single system, testing for and applying restrictions as well as providing a flexible and "rich structure, implying that it can capture more features of the data" Brooks (2008).

Therefore, the functional model of the economic growth equation can be expressed as:

 GDP pc   =   (K, LF, HK, ED, EDS, NE, D)…………………………………… (1)
 Where, GDPpc   =   Real GDP per capita,
k   =   Capital stock,
LF   =   Labor force,
HK   =   Human Capital,
ED   =   External debt stock,
EDS =   External Debt Servicing,
NE   =   Net earnings from trade and
D   =   a variable for a policy change.

Thus, using equation (1) above and expressing the variables in the natural logarithmic form, an attempt was made to look at the relative contribution (elasticity) of each variable to the growth Process. The log-linear form of specification enables the researcher to interpret the coefficients directly as elasticity (Sarmad, 1988). In addition, it is also useful for accommodating the heteroscedasticity problem (Goldstein et al. 1976). Then the empirical model of economic growth can be expressed as:

In GDPpct = β_0, + β_1InKt + β_2InLFt + β_3InHKt + β_4InPEDt + β_5InPEDSt + β_6In NEt + D+Ut . . . . …… ……………………………………………………………… (2)
Where: β_o, β_1, β_2 . . . B6 = parameters to be estimated in the model
GDPpct = Real GDP per capital at time t
Kt = Capital stock proxy for private capital formation as share of GDP at time t
LFt = Labor Force as share of Total Population at time t
HKt = Human Capital proxy by secondary, tertiary and vocational, School enrollment as a

share of population but in this study only Tertiary School Enrollment as a proxy for human capital is used because of its significant proportion of share in expenditure for education.

EDt = Stock of External Debt as a percentage of GDP at time t

EDSt= External debt servicing as a percentage of export of goods and Service at time t

NEt = Net earnings form exports

D = Dummy variable for the policy change (exchange rate in the study period)

Ut = Error term

In = Natural logarithm

To estimate the model and examine the statistical significance of the explanatory variable on GDP pc, the econometric analysis was employed using time series data. There are varieties of approaches for the investigation of time series data. Unit root test, test for cointegration, vector error correction modeling, regression test, and diagnostic test were those analyzed to get the desired result.

Results and Discussions

External Debt Trends in Ethiopian Economy

As Befekadu (2001) pointed out, the poor performance of the Ethiopian economy is highly dependent on the external source inflow in the form of credit and grant aid. From the period 1970/71-1973/74, the country's external debt stock and debt service grew at an average of 13.18 and 3.11 percent per annum respectively. In 1974/75, after the Imperial regime was overthrown by the Derg government, the total debt stock stood at 372 million USD or 14 % higher than the previous year. At the beginning of liberalized regime (1991), the country's external debt had reached 8.86 billion USD, equivalently 140 percent of GDP at a constant price. Thus, during its year's tenure, the military government increased the country's total external debt by 24-fold, at an annual average growth rate of 21 percent. The foreign debt of Ethiopia during the period 1992/93-1998/99 grew by 10.41 percent, while the debt service dropped by 25.03 percent. According to the World Bank (1998), Ethiopia's long-term debt increased from 0.17 billion USD in 1970 to 8.84 billion USD in 1991. As illustrated in the table below (Table 1), the relative share of external debt out of the total public sector debt was about 54 percent in 2014/15 and consistently declined and currently it is about 50 percent. In FY 2018/19, external debt comprised 50.34% of total public debt while the share of domestic debt was 49.66%. The total public and publicly guaranteed debt for FY 2018/19 increased to USD 53,705 billion which was 49% of the GDP of which 21% was external debt and 28% was domestic. As a result of these, the total public sector debt both external and domestic debt service payment almost doubled in the past five years by twofold.

Table 1: Total Public Outstanding Debts of Ethiopia (in Billions of USD)

Years/Loans	2014//15	2015/16	2016/17	2017/18	2018/19
Total Public Debt	34,321.66	39,401.50	45,782.53	49,340.39	53,705.83
Total External Debt	18,601.91	21,276.29	23,337.24	25,799.10	27,029.38
Total Domestic Debt	15,719.75	18,125.20	22,445.29	23,541.28	26,676.45

Ministry of Finance and Economic Development Report (2018/19)

Composition of External Debt of Ethiopia by Sources and Types
The external debt stock of Ethiopia in June 30, 2018, & 2019 stood at US 18.601 billion and US 27.044 billion respectively. Out of the total external debt outstanding in June 30, 2019, USD 20,094 billion (74.4%) was owed to official creditors, of which 58% was owed to multilateral and 42% to bilateral creditors. The rest USD 6.935 billion (25.6%) was owed to private creditors, which constitute Commercial Banks and suppliers.
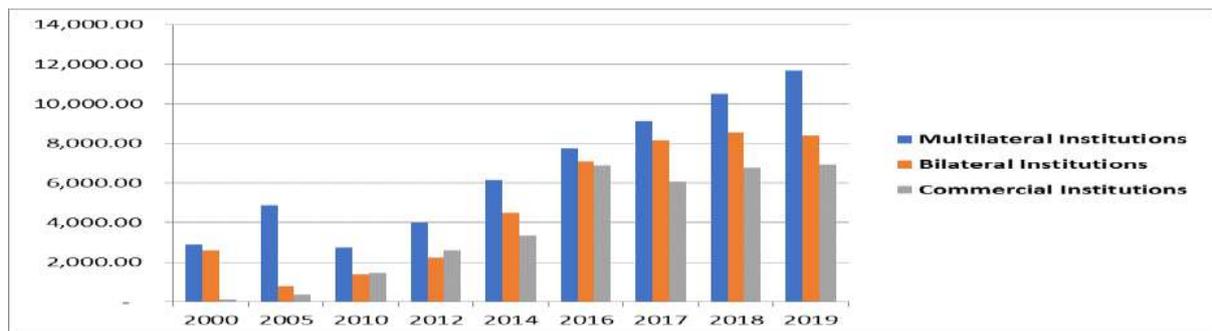
Figure 1: Composition of External Debt of Ethiopia by Sources in billions of $ (2000-2019)

Source: Computed based on different years of NBE and World Debt Indicators reports

In general, the debt-to-gross national product was beyond the sustainable level. As a result, Ethiopia is labeled as one of the Severely Indebted Low-Income Countries (SILICs) or the Heavily Indebted Poor Countries (HIPCs)

Terms and Conditions of External Debt
The terms and conditions of Ethiopia's external loans were relatively unfavorable to the economy; interests paid to creditors have grown from ten billion Birr per year to hundreds of billions of Birr. An average interest rate has declined from 45.5 billion Birr in 1991 to 37.7 billion Birr in 2009 but during 2011/12 to 2013/14 the interest was dramatically changed from 100 billion to 158 billion and peaked to be 441.9 billion Birr in the year 2017. The average maturity period before the year 2000 was less than 30 years later on the period ranged between 30 years to 40 years but surprisingly maturity period of credits on average has declined twofold and reached 17.24 years in 2013 and goes up to 22.98 years in 2016/17. The grace period of all creditors was on average less than 7.5 years where the shortest being

3.4 years in the year 2011 and the longest 11.44 years in the year 2001.

In a nutshell, analysis of the foreign debt of Ethiopia in terms of interest rate, maturity period, and grace periods, terms of conditions are more stringent to the country. On average, the maturity and grace periods are getting shorter than it was before the 1990s while the total interest rate to be paid to creditors proved to become large enough to hundreds of billions birr each year. In this case, the theoretical justification against external debt in creating crowd out effect for capital formation in the form of debt serving with billions of interest and principal repayment has seemingly suffered the Ethiopian economy.

Econometrics Results and Interpretations

Unit Root Test Results

In this work, examining the stationary of time series data using Conventional Augmented

Dickey-Fuller (ADF) test is performed with and without a trend.

Table 2: Unit Root Tests of the Variables at Level 1% and 5 %(at log transformation)

Variables	Augmented Dickey-Fuller (ADF)					
	Lag length 0		Lag length 1		Lag length 2	
	Td	Tt	Td	Tt	Td	Tt
LnRGDP	0.218	-2.508	**0.178**	**-3.261**	-0.968	-3.500
LnK	-2.184	-2.694	-2.334	-1.942	-1.865	-2.784
LnHK	-2.841	-0.859	-2.040	-0.989	-2.425	-1.011
LnED	-1.546	-1.337	-1.811	-1.637	-2.372	-2.106
LnEDS	-1.615	-1.744	-1.373	-1.585	-1.576	-1.680
LnLF	-0.787	-4.234	-2.378	-3.236	-2.039	-3.343
LnExR	1.117	-1.876	-0.422	-3.447	-0.140	-2.692
LnNEt	0.336	-1.535	0.583	-1.137	1.055	-1.169
Critical	**1%**	-2.567	-4.380	**-2.602**	**-4.380**	-2.650
Values	**5%**	-1.740	-3.600	**-1.753**	**-3.600**	-4.380

Source: Output from STATA

The Augmented Dickey-Fuller test results, as indicated in Table 2 above, show that all variables are non-stationary at levels (i.e. it is not possible to reject the null hypothesis of the unit root). Thus, the ADF test works that if the trace statistics or estimated ADF value is greater than the critical values (in absolute terms) we reject the null hypothesis. However, at this level, since results are opposite it is not possible to reject the null hypothesis, therefore, it is important to go to the next step of conduct differencing.

Table 3: Unit Root Tests of the Variables at First Difference

Variables	Augmented Dickey-Fuller (ADF)					
	Lag length 0		Lag length 1		Lag length 2	
	Td	Tt	Td	Tt	Td	Tt
DlnRGDP	-3.859 **	-3.766 **	-1.995 *	-1.879*	-4.383**	-3.898**
DlnK	-5.970 **	-6.429**	-2.148 *	-2.306**	-1.784*	-1.981
DlnHK	-2.862**	-3.488**	-2.178**	-3.203*	-1.188	-2.551
DlnED	-3.485**	-3.494*	-2.267*	-2.406	-2.311*	-2.613*
DlnEDS	-4.516**	-4.702**	-2.249*	-2.188	-1.474*	-1.636
DlnLF	-1.777**	-0.600	-1.950*	-0.677	-2.166*	-0.674
DlnExR	-1.778*	-1.717	-2.500*	-2.346	-2.352*	-2.145
DlnNEt	-4.550 **	-4.772**	-2.971**	-3.324 *	-0.642	-0.874
Critical Values	1%	-2.583	-4.380	-2.624	-4.380	-2.681
	5%	-1.746	-3.600	-1.761	-1.600	-1.782

Source: Output from STATA

Where; ** and * *indicates rejection of the null hypothesis at 1% and 5% significance level respectively.*

Td *is estimated value of test statistics when a drift term (constant) is included in the regression for unit root test.*

Tt *is estimated value of test statistics when a drift term and trend are included in the regression for unit root test.*

At this stage, the results indicated in Table 3 above confirms that the Augmented Dickey-Fuller test applied for the same variables in the first difference are stationary at the conventional level of significance. Therefore, all variables have become stationary at the first difference in different lags (i.e. it is possible to reject the null hypothesis of the unit root), consequently, it is now possible to proceed to the next steps of the estimation process.

Cointegration Analysis Using Johansen Procedure

The Johansen procedure sets out a maximum likelihood procedure for the estimation and determining the presence of cointegrating in the Vector Auto Regression (VAR) system.

Table 4: Test for number of co integrating vectors

Ho: rank = r	Trace statistics	1% critical values	Eigen values
Ho: r = 0	205.1873	168.36 **	0.99069
Ho: r ≤ 1	182.5100	133.57 **	0.94998
Ho: r ≤ 2	126.3390	103.18 **	0.90474
Ho: r ≤ 3	81.6670	76.07 **	0.85478
Ho: r ≤ 4	45.0063	54.46	0.63668

Ho: r ≤ 5	25.7694	35.65	0.51003
Ho: r ≤ 6	12.2147	20.04	0.42911
Ho: r ≤ 7	1.5642	6.65	0.07903

Source: Output from STATA

** denotes rejection of the null hypothesis at 1% level of significance.

As pointed out in table 4, the trace statistic test confirms that there are four co-integrating equations at a 1% level of significance. The null hypothesis of no cointegration (r = 0), one cointegration (r <1), two cointegration (r< 2), and three cointegration (r<3) are rejected at 1% level tested against the alternative hypothesis of one cointegrating vector (r = 1), one cointegrating vector (r = 2) and more than two cointegrating vectors (r ≤ 3) respectively, since trace statistics indicated above in the table are greater than their respective critical values. Additionally, the evidence for the existence of four cointegration equations is also supported by the p-value of the unrestricted cointegration rank test (trace). Hence, it is possible to conclude that the series are co-integrated, related, and combined in I (1) form of linear fashion which shows the existence of four cointegrating vectors in the estimated model. This suggests that there exists a stable long-run relationship.

Long Run Normalized Co-integration Estimates
The following table shows the selection order criteria of lag length and endogeneity for VAR estimation.
Selection-order criteria
Sample: 2002 - 2019
Number of obs = 18

Table 5: Selection-Order Criteria

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	128.312				2.2e-16	-13.368	-13.3135	-12.9723
1	315.465	374.31*	64	0.000	5.4e-22	-27.0517*	-26.5606*	-23.4902*
2	.	.	64	.	-5.e-131*	.	.	.

Endogenous: lnrgdpc lnkt lnhkt lnedt lnedst lnlft lnnet lnexr
Exogenous: _cons
Source: Output from STATA

*indicates lag order selected by the optimal criteria AIC, HQIS and SBIC are recommended for the estimation of the autoregressive lag length.

From table 5 above, our optimal using the Akaike information criterion is lag 1 because the number of AIC = (-27.0517), HQIC = (-26.5606) and SBIC = (-23.4902) has the smallest number than others lag length, hence the autoregression is estimated using lag length 1.

Table 6: Long run Normalized Cointegration Estimates

lnRGDPC	lnKt	lnHKt	lnEDt	lnEDSt	lnLFt	lnNEt	lnEXrt
Lag 1	-0.9999973	**-1.370245**	0.1386643	0.0182328	0.412522	-0.0239896	0.6967603
Standard	(0.1213972)	(0.0308975)	(0.0070462)	(0.004455)	(0.445965)	(0.001765)	(0.013941)
t-static	**[19.84]**	**[7.69]**	**[21.98]**	**[4.21]**	**[12.14]**	**[13.33]**	**[38.17]**
P-Value	0.000	0.002	0.000	0.015	0.044	0.089	0.000

Source: Output from STATA

In the above table, the normalized co-integration coefficient with the standard error, t-statistic p-value in parentheses ( ) and [ ] respectively.

 As we can observe from the long-run regression result (see Table 6) that, there is an elastic relationship between lnRGDPC and lnEDt, lnEDSt, lnLFt and lnEXrt. That is a unit change in lnEDt, lnEDSt, lnLFt and lnEXrt will bring about a more than proportionate change in lnRGDPC affecting the dependent variable negatively.

Similarly, there is also a positive elastic relationship between lnRGDPC and lnKt, lnHKt, and lnNEt. A unit change in lnKt, lnHKt and lnNEt ratio will bring about more than proportionate change in lnRGDPC affecting GDP per capita positively. In both cases, the p-value is significant at 1% and 5% significance level. Note that although there is a positive relationship between lnRGDPC and net export (lnNEt) the result is insignificant. The existence of linearly combined I (1) variables that cointegrated in a stable long-run relationship permits writing relevant growth equation in which lnRGDPC as a function of explanatory variables.

The vector of cointegration indicates that the long-run elasticity of growth with respect to Capital stock (Kt) as GDP ratio, human capital (HKt), and (lnNEt) are found to have positive as expected. However, the long-run elasticity of growth with respect to external debt to GDP ratio (EDt), debt service export ratio (EDSt), Labor forces (LFt) and exchange rate (EXr) were found negative.

In this study, an examination of the long-run relationship between independent variables using VAR technique was undertaken. The variable of Human capital in this study only considered Tertiary School Enrolment (lnHKt) and had a positive effect on labor force (lnLFt) and external debt service (lnEDSt) both at 1% & 5% significance level respectively while the same variable affected external debt (lnEDt) and foreign exchange (lnEXr) negatively at 5% significance level. Also, capital stock (lnKt) has a positive effect on

exchange rate (lnEXr) at a 5 % significance level. Whereas, external debt service (lnEDSt) had a negative effect on capital stock (lnKt), on external debt (lnEDt) and on labor force (lnLFt) at 1% significance level and on net export (lnNEt) at a 5% significance level. Finally, external debt affected net export (lnNEt) positively but negatively the exchange rate at 1% significance level. The labor force had a negative effect on human capital (lnHKt) at 5 % significance level. Hence, capital stock, human capital, external debt, external debt service, labor force, net earnings from export, and foreign exchange rate had asymmetric effects on economic growth (RGDP) in the long run, on average ceteris paribus.

Regression Results and Interpretations

The study used multiple regression analysis to measure the strength of association between capital stock, Human Capital, External Debt, External Debt Service, Labour Force, Net Export, Exchange Rate, and Economic Growth (RGDPC). Table 7 below shows the findings.

Table 7: Regression result

LnRGDPC	Coef(β)	Std.Err	T	P-Value
LnK	0.2805783	0.0771626	3.64	0.003**
LnHK	0.6888629	0.1111372	6.20	0.000**
LnED	-0.0215773	0.0257641	-0.84	0.021*
LnEDS	-0.0706770	0.0162982	-0.43	0.035*
LnLF	-11.24202	1.581604	-7. 11	0.000**
LnNEt	0.0047349	0.0058513	0.81	0.434
LnExR	0.2615445	0.0492325	5.31	0.004**
Constant(β=0)	30.92406	6.785143	7.51	0.000

Source: Output from STATA

*Where, ** and * denotes rejection of the null hypothesis at 1% and 5% significance level respectively.*

*R^2 = 0.9604 Adj R^2=0.9287 DW = 2.48 F (8, 10) = 2.21[0.0000] ***

Diagnostic Test as indicated in table 7 above

Vector Normality test: Chi^2(1) = 2.0152[0.3152]

Vector AR 1-2 test: F (2, 29) = 0.19526[0.43256]

Vector ARCH1_1 test: F (1, 28) = 2.98562[0.19526]

Regression results presented in table 7 indicate that the long-run cointegration parameters of all explanatory variables were found to be significantly different from zero. That is, all variables were statistically significant in explaining the long-run growth in Ethiopia. The rule of thumb for R-squared value was strongly fitted for predicting the dependent variable economic growth (lnRGDPC) at 96.04 % which is greater than 0.50.

The F-statistics (prob>F) value or ANOVA test is 0.000 which is less than 0.001. Therefore, all independent variables together were significant at a 1% significance level, which indicates the model was significantly better at predicting using the mean as a "best guess" Field (2006)

cited by (Daniel, 2017).

The ANOVA test result of lnRGDPC indicated in the table, showed that F value 19.15 is significant at p<0.000 levels. Therefore, from the finding it can be concluded that 96.04% of the variance (R-Squared) in lnRGDP was significant and the model had appropriately measured the effect of the independent variables.

Based on regression analysis and coefficients weight (Betas)) for each of the predictor variables, the result found that Capital Stock (β= 0.280, p<0.01), Human Capital (β=0.688, p<0.01), and Foreign Exchange (β=0.261, p<0.01) proved significant positive relationship with dependent (β= -0.07, p<0.05) and Labor Force (β = -11.27, p< 0.01), which had significant negative relationship. That is, all variables except Net Export earnings were statistically significant in explaining the long-run economic growth in Ethiopia. Therefore, the long-run growth equation with the corresponding signs and significance is presented as follows:

LnRGDP= 30.92 + 0.280lnKt + 0.688lnHKt - 0.0215lnEDt - 0.07lnEDSt - 11.27lnLFt + 0.261lnER + e

There is a positive relationship between the constant parameter and RGDP since RGDP at zero level of the explanatory of all independent variables is found 30.92.

Capital Stock (lnKt): The long-run elasticity of Economic growth (lnRGDP) with respect to Capital Stock (lnKt) is 0.280 indicating a 1% increase in capital stock as a share to overall growth induces a 28% increment in RGD keeping other things being constant. This result is significant at 1% level of significance and found to be consistent with the basic growth theory.

Human Capital (lnHKt):- The variable human capital showed a significant positive effect on economic growth in the long-run. The coefficient of human capital on average was positively and statistically significant at 1% significant level. The long-run elasticity of lnGDPC with respect to lnHKt was 0.688, indicating a one percent increase in student's enrollment in tertiary level which was used as a proxy for human capital induces 68.8% increment in economic growth (lnGDPC), keeping other variables constant.

External Debt (lnEDt):- In this study, external debt stock had a significant and negative relationship with real GDP growth. That is, the coefficient of External Debt Stock (lnEDt) 0.021 indicates a one percent increase in external debt stock resulted in a 2.1% decrease in real GDP growth at a 5% significance level, keeping other things constant. Thus, the external debt stock on economic growth implied that the greater the level of external debt stock, the more the economic growth deteriorates.

This result somewhat reflects the use of external borrowings on non-productive activities and sectors or in ill-managed investments and projects where investment return vanishes. In addition, a significant portion of external debt proceeds to repay other past external debts rather than to boost capital investment in domestic. This result support also the finding that

high external debt levels are associated with low growth as a higher tax burden on capital is required to service this stock of public external debt, leading to a lower rate of return on capital and hence lower investment, lower capital formation, and lower economic growth.

External Debt Service (lnEDSt):- The other debt burden indicator i.e. debt service as a percentage of export of goods and services had also a negative and significant relationship with economic growth. The result shows that a one percent increase in external debt servicing in form of interest paid to externally indebted would lead to a decrease in 7% Real GDP, keeping other things constant. The finding was in line with prior expectation of this study that external debt service has a negative influence on the RGDP. The result revealed that the level of Ethiopia's External debt was beyond the capacity of the country to its servicing requirements (existence of debt overhang problem) making sustainable economic development difficult.

Labour Force (lnLFt):
Labour force as a share of the total population has a negative but significant effect on economic growth. The study result shows that a 1% increase in the labor force as a share of the total population would lead to a decrease in the economic output by 11% keeping other things constant. We should note that labour force includes both the employed and unemployed labour force. Ethiopia is labour abundant country where most of the labour force is also characterized as less skilled and with limited opportunity of making it productive. Thus, the unexpected finding of this study showed that labor force in long-run has a negative effect on GDP of Ethiopia, which entails further study to look into and verify workforce quality in terms of productivity.

Exchange Rate (lnERt):
The coefficient of foreign exchange rate indicated that there is statistically a positive relationship significant at a 1% significance level. The result of the study shows that 1% increase in the value of Ethiopian Birr in the global market would lead to a positive effect on economic growth or Real GDP by 26% keeping other things constant. This that increase in the value of Ethiopian birr at global market implies that devaluation of Birr, a presupposition of classical trade theory of comparative advantage that the country's export items would become more competitive at global market and volume of export increases and hence inflow of export proceedings too. However, taking precaution is important to this finding with respect to a high volume of imports with foreign currency and on non-foreign currency denominated debts as it automatically pushes the curve upward.

Net Earnings from Export (lnNEt):- Net earnings from export have a positive but insignificant effect to explain the Ethiopian economic growth. However, at the initial stage, the study hypothesized that net export has a positive and significant effect on economic growth, unfortunately, the empirical evidence result showed that it is insignificant at the standard level of test.

Error Correction Estimates Using Vector Error Correction Model (Short Run)

The next step is estimating the Vector Error Correction Model (VECM), which captures both the long-run and short-run relationships that have important policy implications.

Table 8: Table Showing Vector Error Correction Estimates

Dependent variable DlnRGDP

Variables	Coefficients	Std. error	t-value	t-prob.
Constant	0.0941979	0.0028111	33.51	0.000**
DlnK_1	0.2803745	0.0315599	8.88	0.000**
DlnHK_1	0.6878774	0.0688163	10.00	0.000**
DlnED_1	-0.0216302	0.0114327	-1.89	0.048*
DlnEDS_1	-0.1240743	0.0097441	-16.97	0.021*
DlnLF_1	-11.23763	1.035061	-10.86	0.000**
ECT_1	-0.8268678	0.0776408	-10.65	0.042**

Source: Own estimation

Estimations in *and ** indicate level of significance at 1% and 5% respectively.

*$R^2 = 0.9604$ Adj $R^2 = 0.9287$ DW = 2.48 F (8, 10) = 2.21[0.0000] ***

Diagnostic Test as indicated in table 5.7 above

Normality test: $Chi^2(1) = 2.0152[0.3152]$

AR 1-2 test: F (2, 29) = 0.19526[0.43256]

ARCH1_1 test: F (1, 28) = 2.98562[0.19526]

The estimated coefficient of the error-correction term (ECT) in the equation is statistically significant at 5% level and has a negative sign, which confirms that there is no problem in the long-run equilibrium relationship between the dependent and independent variables, but its relative value (-0.8268), for Ethiopia shows the rate of convergence to the equilibrium state per year. Precisely, the speed of adjustment of any disequilibrium towards a long-run equilibrium is that about 82% of the disequilibrium or errors in economic growth are corrected each year (annually) in the long run. The ECT has a correct negative sign and it is also significant, suggesting that previous years' errors (deviation from long-run equilibrium) are corrected for within the current year at a convergence speed of 82.6%.

The short-run model result implies that at lag one; both capital stocks (DlnK_1) and human capital (DlnHK_1) have a significant and positive effect at a 5% of significance level. On the contrary, estimated short-run growth equation also revealed that the current flow of external debt (DlnED_1) and debt servicing (DlnEDS_1) have a significant negative effect on economic growth. Similarly, labor force (DlnLFt_1) has a negative effect in the short run on the dependent variable of economic growth. The findings were in line with Mulugeta (2014) and Akshaya (2017) findings. The short-run model result also indicated that net earnings from export (DlnNEt_1) have a positive effect on stimulating economic growth while the exchange rate (DlnEXr_1) has a negative effect on economic growth.

Diagnostic Test Results

The results obtained from the various diagnostic tests above are interpreted in such a way that the goodness fit of the above model (Adjusted R^2) shows that 92.87 % of the total variation

in the dependent variable (LRGDPG) is described by the totality of all independent variables in the model. While the remaining 7.13 % is accounted for by factors not specified in the model not related to the included explanatory variables. In this study, the DW result is 2.48, so we can concluded that there is no autocorrelation problem. On the other hand, the Jacque Berra test for normality tests was conducted and the result of pro > chi (2) = 0.3152, shows that we cannot reject the null hypothesis because the p-value is more than 95% confidence interval. Therefore, this points out that the error term is normally distributed.

Finally, autoregressive heteroskedasticity (ARCH) test was performed. In The Breusch-Pagan / Cook-Weisberg test for heteroskedasticity, there is a constant variance in the model and we could not reject the null hypothesis which is greater than the 5% significance level. Moreover, Breuch-Godfrey tests for autocorrelation test conducted and we could not reject the null hypothesis which is greater than 5% significance level. Therefore, there was no serial correlation problem in the model. However, The F statistics rejected the null hypothesis that all the coefficients of explanatory variables in the model were jointly insignificant. The F statistics value confirms that the variables in the model sufficiently explained the effect of external debt on economic growth in Ethiopia. Moreover, the various diagnostic tests did not detect any problem about the regression analysis.

Result of Autocorrelation Test

. estat durbinalt, small lags (1/2)

Table 9: Durbin's alternative test for autocorrelation

lags(p)	F	df	Prob > F
1	1.265	(1, 10)	0.2869
2	1.129	(2, 9)	0.3653

H0: no serial correlation, estat archlm

Table 10: LM test for autoregressive conditional heteroskedasticity (ARCH)

lags(p)	chi2	df	Prob > chi2
1	0.001	1	0.9796

H0: no ARCH effects vs. H1: ARCH (p) disturbance

. estat dwatson

Durbin-Watson d-statistic (8, 19) = 2.315108

. estat hottest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of L.lnrgdpc

chi2 (1) = 3.18

Prob > chi2 = 0.0746

. estat archlm

Table 11: LM test for autoregressive conditional heteroskedasticity (ARCH)

lags(p)	chi2	df	Prob > chi2
1	0.001	1	0.9796

H0: no ARCH effects vs. H1: ARCH (p) disturbanc

. estat bgodfrey

Table 12: Breusch-Godfrey LM test for autocorrelation

lags(p)	chi2	df	Prob > chi2
1	2.134	1	0.1441

Conclusion

In many developing countries in general and Ethiopia in particular, export of primary goods with the least market price as compared to expensive import leads to a current account deficit. As a result, the need for external borrowing becomes necessary so as to supplement the internal resource gaps for promoting economic growth. Unfortunately, this approach of promoting economic growth has caused the federal fiscal budget deficit to widen and the accumulation of massive external debt.

The finding of descriptive analysis showed that the term, structure, and magnitude of external debt changed from traditional sources to more commercial sources with strict trade elements of terms and periods. This creates a challenge on the ability of the country to meet its debt service obligation and to sustain its development.

The empirical analysis carried out showed that there was a significant relationship between real GDP growth rate and stock of external debt, external debt service, capital stock, human capital, labour force, and exchange rate whereas real GDP (lnRGDPC) and net export was insignificant in the long run in the Ethiopian economy. This study also affirmed the existence of "debt overhang effect" and "crowding out effect" in the country under the study period. The negative sign on both stocks of external debt and external debt service was indeed a very serious problem facing the country's economy, which led to difficulty in sustaining growth, low capital formation, and downgrading credit rating of the country at the global market. While capital stock and human capital were found to have a significant positive contribution to the economic growth, both in the long-run and short-run, but net earnings from export as a ratio of GDP had a positive but insignificant relationship with economic growth. On the other hand, the variable labour force (both employed and unemployed labour force) as a share of the total population was found to have a negative effect on economic growth. A positive relationship between labour force and economic growth output depends most importantly on the employed labour force.

Finally, both the long-run and short-run growth equation indicated a positive and significant relationship between exchange rate and economic growth. The result suggested that

devaluation improves competitiveness in the global market and volume of export. However, precautionary note is important in this finding with respect to the high volume of imports with foreign currency and on non-foreign currency denominated debts as it automatically pushes the curve upward and can affect negatively growth at a high level.

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Agricultural Trade and Regional Integration: The Case of Common Market for Eastern and Southern Africa (COMESA)

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Abstract

Various empirical studies in the past used aggregate trade performance to assess the effects of regional integration on agricultural trade. Previous studies revealed their findings by examining few selected agricultural commodities. Besides, the existing evidence on the effectiveness of regional integration in promoting intra-regional agricultural trade in Africa is equally mixed. But these studies did not examine comprehensively the effect of COMESA regional integration on agricultural trade using disaggregated data. This study investigates the effect of regional integration on agricultural exports for COMESA economies. The research employed an augmented gravity model of bilateral trade for the period covering 1997-2018. The empirical evidence was based on panel data analysis and random effects model estimation. The structure and flow of agricultural commodities trade in COMESA was also analyzed using a descriptive approach. Tea, coffee, spices, vegetables, animal and vegetable fats and oils, cereals, and live animals have emerged as the major exported products accounting for nearly 60 percent share of agricultural exports from COMESA countries to the world. The empirical findings showed that real GDP of both exporter and importer countries was a robust predictor of agricultural export trade performance in the region. Other significant factors that positively affected intra-COMESA agricultural exports included the population of importing country, common border, and common official language. The estimation results also indicated that intra-COMESA agricultural exports had an inverse relation with population size of the exporter country, exchange rate devaluation, and distance between bilateral trade partners. The predicted coefficient for exchange rate revealed unexpected negative sign. This result was contrary to the widely held opinion that currency devaluation generates more exports. Also, the empirical evidence indicated that COMESA regional integration had both trade diversion and trade creation effects on agricultural trade. However, the net effect showed the existence of trade diversion, which was a little higher than the trade creation coefficient. To mitigate the trade diversion effect observed in the empirical finding, the study recommends strategic interventions by undertaking full implementation of harmonizing trade policies and calling for deeper integration of COMESA. This would be crucial not only to tackle major trade barriers but also to expand the low level of intra-regional trade in agriculture. Finally, to address the findings related to the negative effects of exchange rate devaluations and to promote intra-COMESA agricultural trade, the study suggests a reduction of currency disparities among member states and the adoption of a common currency regime.

Keywords: Regional integration; COMESA; free trade areas; agricultural export, gravity model; trade creation; trade diversion

Introduction

Over the past decades, the emergence of regional integrations has transformed the global trading system. Several regions across the world witnessed advancements in the level of

regional integrations. Recent studies revealed that about 50 percent of the global trade is now carried-out under the auspices of free trade agreements enforced among member countries in various regional economic blocs (Douglas, 2016). Regional integration has been viewed as a major policy apparatus to ascend the ladder of industrialization and economic growth, and attain better social welfare. This principle, besides other dynamics, has led to the rise of Regional Trade Arrangements (RTAs) all over the world in the past few decades.

There is a long history of Regional Trade Arrangements (RTAs) in Africa, dating back over forty years. Regional integration has been regarded as a tool for promoting economic growth and sustainable development and improving the living standards of the African people. African countries have enforced many different RTAs that differ in their degree of integration, going from free trade areas to common markets, to customs unions, and finally to monetary unions (Candau et al, 2018). Demographic changes and economic growth are leading to rising demand in African markets, reinforcing the rationale for deepening economic integration across the continent, which is also important for the diversification of production and value addition in Africa. Recent efforts in the African continent give priority to broader continental integration than offered by current Regional Economic Communities (RECs). African governments are multiplying initiatives in support of greater regional integration. The African Continental Free Trade Area (AfCFTA) is a particularly important initiative worth noting here. The AfCFTA agreement aims to create the largest free trade area in the world with 1.2 billion people in 55 countries and a combined GDP of US$2.5 trillion (Bouet et al, 2019).

COMESA is one of the largest Regional Economic Communities (RECs) in Africa encompassing 21 member states. This regional trading bloc was created in 1994 as a predecessor of Preferential Trade Area for Eastern and Southern Africa to help the member states achieve maximum benefits of regional integration. The COMESA regional economic bloc works to attain sustainable economic and social development in all member states capitalizing on greater co-operation and integration in all fields of development. In the COMESA region, 16 of 21 member states are already participating in the established Free Trade Area (FTA). DRC, Eritria, Eswatini, Ethiopia, and Uganda are the five member states that have not so far joined the FTA in the COMESA. The COMESA FTA member countries are Burundi, Comoros, Djibouti, Kenya, Madagascar, Malawi, Mauritius, Rwanda, Seychelles, Somalia, Sudan, Zambia, Zimbabwe, Egypt, Libya, and Tunisia. The FTA offers duty-free and quota-free markets access for goods exported from COMESA member countries (Bouet et al, 2019).

There are varied discourses regarding the importance of regional integrations and welfare effects of regional economic blocs in promoting agricultural trade. Despite the importance of free trade agreements, numerous debates have also emerged regarding the welfare effects of the regional free trade agreements. One of the key arguments is the presence of low-level of intra-regional trade and trade diversion from member states to non-members. Other views are based on the notion that regional integration has welfare effects through trade creation within

member countries and urge for expanding regional integrations. Further claims point that free trade agreements may hurt small countries and it may benefit large countries in terms of gain on trade. Overall, past and recent findings on the effects of regional integrations on promoting intra-regional trade are mixed and inconclusive. Therefore, this empirical study investigates the effect of COMESA regional integration on agricultural exports and examines the causes of intra-regional trade in agricultural commodities.

Statement of the Problem

Numerous studies, some of which are cited below, were conducted on the effect of regional integration and economic growth across different regional economic communities. However, most of these studies focused on assessing the overall impact of regional integration on economic growth. Also, different researchers employed diverse methodologies to analyze the effects of regional integrations on trade flows and they came up with mixed results. These studies failed to consider disaggregated data for analyzing the effects of regional integration on trade. Moreover, other studies attempted to determine the impact of regional integrations on trade and economic growth by investigating only a few selected agricultural commodities such as livestock products, wheat, maize, and rice. However, a comprehensive study that employs disaggregated data and explores agricultural commodities trade and COMESA regional integration remains unexplored. Therefore, it is imperative to investigate the structure of agricultural commodities trade, determinants of intra-COMESA agricultural exports, and the effect of COMESA regional trade agreement on promoting agricultural exports. This could provide empirical evidences for policy action and further exploration.

For instance, Binyam (2019) analyzed the impact of live animal production and trade on the economic growth of COMESA countries. The researcher used a standard panel data model to determine the relationship between livestock and livestock products trade with economic growth in COMESA member countries. The finding of the study indicated the presence of a positive correlation between COMESA FTA membership and economic growth as well as trade in livestock products. Furthermore, Albert (2012) conducted a comparative study on the effect of regional trade agreements on intra-trade in COMESA, EAC, and SADC for three selected agro products (i.e., maize, rice, and wheat). The author used a Gravity model and the empirical results for COMESA region showed a positive and significant effect of the intra-regional trade. However, the study results lack conclusiveness as the analysis was based on three commodities only. On the other hand, Tessema (2014) examined the trade effects of COMESA regional trade agreements on aggregate export volume of member countries using a Gravity model. The results of the study showed that the regional economic bloc has significant trade effects on its member countries and urged for expansion in economic integrations. Likewise, Adane (2014) employed a standard Gravity model to assess the effect of regional economic integration in COMESA member states. Unlike the previous studies, the empirical finding revealed that trade diversion was more powerful than trade creation in COMESA.

Despite having a number of recent empirical research contributions, the effect of regional integration on agricultural trade in COMESA regional bloc at disaggregated data level has

not been investigated thoroughly. One of the major gaps is that the various empirical studies conducted earlier focused on assessing the effects of regional integration on trade and economic growth by analyzing aggregate trade performance. In addition, these studies examined few agricultural commodities in order to investigate the effect of regional integration. Moreover, past studies employed Gravity Model using standard variables. However, the standard Gravity equation ignores many other variables that could have either positive or negative effect on bilateral trade, which could result in misspecification bias. Besides, available evidence on the effectiveness of regional integrations in promoting intra-regional trade in Africa is equally mixed. Thus, a comprehensive study that examines the effects of COMESA regional integration on agricultural trade using disaggregated data remains undocumented(?). The existence of these research gaps motivated the current study. Therefore, this study empirically investigates the effects of COMESA regional integration on agricultural trade, analyzes the causes of intra-COMESA agricultural trade, and explores the patterns and flow of intra-COMESA's agricultural[108] trade.

Research Methodology

Research Design
The study employed a quantitative research design, which primarily used an econometric analysis. A panel data were used to investigate the causes of intra-COMESA agricultural trade and the effect of COMESA FTA on the region's agriculture trade. In addition, a descriptive statistics and trend analysis were conducted to examine the patterns and flow of agricultural commodities trade.

Data Types and Sources
The study used secondary data gathered from various international institutions. Panel data for bilateral trade in agricultural commodities were sourced from the UNCOMTRADE and COMSTAT databases. The panel data covered the period 1997 to 2018 for selected COMESA countries. Exporters' and importers' real GDP, population, real exchange rate were obtained from IMF and the World Bank, World Development Indicators (WDI) databases. The data for bilateral distance, common official language, and common border (adjacency) were derived from CEPII database.

Selection of COMESA Countries for the Purpose of the Study
The selection followed a non-random sampling based on a set of factors such as trade data availability, geographical location, and size of the economy. Thus, seven countries namely Burundi, Ethiopia, Egypt, Eswatini, Kenya, Rwanda, and Sudan were selected for the analysis based on the following criteria: trade data availability, geographical location, and economy size.

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[108]The agricultural commodities analyzed in this study are based on Standard International Trade Classification (SITC) system. The products include food and live animals (HS Code 0), beverages and tobacco (HS code 1), animal vegetable oils and fats (HS Code 4), oilseeds and oleaginous fruits (HS Code 22), and hides and skins (HS Code 21). Please refer annex 2 for details of the product groups by HS code at two digits level.

Data Analysis
The study used both descriptive and inferential econometric analyses to investigate the effect of COMESA regional trade area on agricultural exports of member states. For the econometric analysis, the model was transformed into a log-linear form to estimate the regression equation. Using the log-linear model, one can easily comprehend the slope coefficient, which measures the elasticity of the dependent variable with respect to the independent variable.

Model Specification and Estimation

Gravity Model
The research used augmented gravity model to assess the effect of the COMESA FTA on agricultural commodity exports. The standard gravity equation tends to ignore many other variables that could have either a positive or negative impact on trade volumes between the trading partners, which results to misspecification bias (Vinaye, 2009). To address this problem, the standard approach was used to specify an augmented gravity model by the addition of relevant variables to the traditional model, most of which are inspired by theory and motivated by various testable hypotheses (Vinaye, 2009). Based on trade theories and reviews of literature, the augmented gravity model used in this study takes the following form:

$$EXP_{ij} = f\ (GDP_i,\ GDP_j, POP_i, POP_j,\ EXRT_{ij},\ DIS_{ij},\ CL_{ij}, AD_{ij})\ldots\ldots\ldots\ldots[1]$$

We can rewrite the model equation using a log-linear form:

$$lnEXP_{ijt}=\beta_0 + \beta_1 ln(GDP_{it}) + \beta_2 ln(GDP_{jt}) + \beta_3 ln(POP_{it}) + \beta_4 ln(POP_{jt}) + \beta_5 ln(EXRT_{ijt}) + \beta_6 ln(DIS_{ij}) + \beta_7 ln(CL_{ij}) + \beta_8 ln(AD_{ij}) + \beta_9 ln(COMESA\text{-}one_{ij}) + \beta_{10} ln(COMESA\text{-}both_{ij}) + \varepsilon_{ij}\ldots\ldots\ldots\ldots[2];\ where:$$

i= represents the exporter country; j represents the importer country; and t represents the year;
EXP_{ijt}= represents the value of bilateral agricultural export from country i to country j in year t; GDP_{it} = is the GDP level of the exporter country in year t;
GDP_{jt} = is the GDP level of the importer country in year t;
$EXRT_{ijt}$ = is the real exchange rate between the exporting country and that of the importing country;
POP_i= is the population level of the exporter country in year t;
POP_j= is the population level of the importer country in year t;
DIS_{ij}= is the distance between the exporter and importer;
CLA_{ij}= is a dummy for common language (taking value of 1 for common language, and 0 otherwise);
AD_{ij}= is a dummy representing adjacency between any pair of trading partners (taking value of 1 for common border, and 0 otherwise); and
ε_{ijt} = is an error term.

Definition and Measurement of Variables

Based on the theoretical and empirical literature, major variables explaining bilateral trade flow between trading partners were selected. The variable definition, measurement, and justification for use in the empirical analysis are discussed below.

Table 1: Summary of Variables, Definition, and Expected Association

S/N	Variables	Variable Description	Expected Association (Sign)
1	Agricultural Exports (EXP_{ijt})	- The annual value of agricultural exports from country i to country *j* in year *t* (in US $). - Agricultural commodities in this study were grouped into four major product groups based on SITC system. These include food and live animals, beverages and tobacco, animal, vegetable oils and fats, and hides and skins.	- Dependent Variable
2	Gross Domestic Product (GDP_{ij})	- The annual real GDP of a country measured in constant 2010 US dollars.	- Independent variable Positive association with agricultural exports.
3	Population (POP_{ij})	- Total number of people in a country, measured as the annual estimates in millions.	- Independent variable - Positive association with agricultural exports.
4	Exchange Rate ($EXRT_{ij}$)	- The real exchange rate between the currency of the exporting country and that of the importing country.	- Independent variable - Positive association with agricultural exports.
5	Distance (DIS_{ij})	- The geographical distance between the capital cities of two trading partners measured in kilometers	- Independent variable - Negative correlation with agricultural exports.
6	Common Official Language (CLA_{ij})	- A dummy representing common official language between trading partners (taking value of 1 for common language, and 0 otherwise)	- Independent variable - Positive association with agricultural exports.
7	Adjacency (ADJ_{ij})	- A dummy denoting common border between any pair of trading partners (taking value of 1 for common border, and 0 otherwise)	- Independent variable - Positive association with agricultural exports.
8	COMESA-one$_{ij}$	- A dummy variable representing COMESA membership. It takes value of 1 if *i* belongs to COMESA FTA and j does not or vice versa, and zero otherwise.	- Independent variable - Negative association with agricultural exports.

9	COMESA-both$_{ij}$	- A dummy variable representing COMESA membership, takes value of 1 if both i and j belong to the COMESA FTA and zero otherwise.	- Independent variable - Positive association with agricultural exports.

Results and Discussions

Agricultural Trade Performance of COMESA

Figure 1 depicts the percentage share of agricultural trade in GDP for the selected COMESA countries. This ratio is one of the frequently used indicators in international trade to measure trade openness among different economies. According to OECD (2011), tariff and non-tariff barriers to trade, size of the economy, and distance among trading partners may affect the trade openness ratio. Understandably, a low ratio does not necessarily imply the prevalence of barriers to trade in a particular economy. Over the past decade, Eswatini had the highest trade to GDP ratio among the COMESA countries under study. On the contrary, the annual average ratio for Sudan was found to be the lowest. This pattern again attests the fact that Eswatin's relatively small sized economy and Sudan's trade embargo that has stricken the nation for decades could have created a diversion in either total trade or GDP, which could possible affect the ratio. In general, Figure 1 shows trends of the agricultural trade-GDP ratio, which also depicts the volatility trends in agricultural trade.
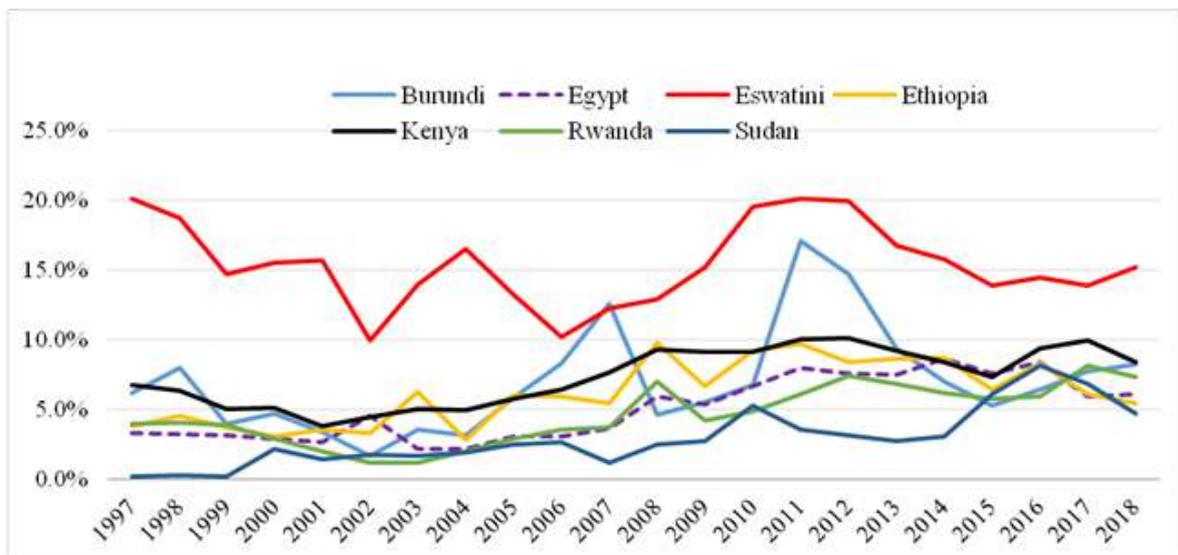

Figure 1: Percentage share of total agricultural trade in GDP in COMESA Countries

Source: Computed by author, data from WDI and COMSTAT

Table 2 below presents performance of selected COMESA countries' and all member states' total trade with a dichotomy of agricultural trade situation. The table summarizes total export-import trade and analyses the state of agricultural trade in the regional trading bloc. During 2018, COMESA member states exported and imported total merchandise goods valued at US $110.7 billion and $196.1 billion, respectively. In the same period, these member states

registered total agricultural exports and imports worth of US $49.7 billion. Among the COMESA economies, Egypt accounted for the lion's share in world total trade as well as world agricultural commodities trade. The proportion of agricultural commodities trade in the total trade indicates the relative predominance of the economic sector across the member countries. At aggregate level, the agricultural trade embraced 21 percent share in the overall trade from the COMESA region. A further investigation shows that agricultural commodity exports contributed to 17 percent of the total merchandize exports recorded from all COMESA member states. This share varied between 89 percent for Ethiopia and 16 percent for Egypt among the countries selected for the study. For other countries like Kenya and Sudan, the agricultural commodities export sector accounted for about half of the total trade from both these countries.

Table 2: COMESA Countries' Total Trade Vs Agricultural Trade with the World (In 2018, values in million US$)

Country	Total Exports	Total Imports	Total Trade	Agr. Exports	Agr. Imports	Total Agr. Trade	Share of Agr. Exports from Total
Burundi	122	793	915	71	123	194	58%
Egypt	27,759	72,478	100,237	4,426	12,888	17,314	16%
Eswatini	1,827	1,823	3,650	475	347	822	26%
Ethiopia	1,279	14,897	16,176	1,134	2,227	3,361	89%
Kenya	5,345	17,375	22,720	2,736	2,418	5,154	51%
Rwanda	740	2,626	3,366	245	494	739	33%
Sudan	3,545	8,851	12,396	1,731	1,899	3,630	49%
Sub-Total	40,617	118,843	159,460	10,818	20,396	31,214	27%
COMESA Total	110,680	196,145	306,825	18,490	31,213	49,703	17%
Share of Selected Countries in COMESA Total	37%	61%	52%	59%	65%	63%	

Source: COMSTAT

Also, if we quantify the trade deficits, COMESA members in overall had a total trade deficit of US $80 billion by the end of 2018. Out of this total trade deficit, agricultural commodities trade alone accounted for nearly US $13 billion. The analysis of total and agricultural trade of COMESA economies showed that all the COMESA countries were net importers as far as the total trade is concerned. However, COMESA was a net exporter in case of agricultural trade. The three biggest economies of the COMESA Free Trade Area— Egypt, Kenya, and Sudan

had relatively contributed to this trade development, as these countries together accounted for about half of the share of agricultural exports from COMESA. Egypt was the leading economy contributing the highest share to the total trade as well as agricultural trade in COMESA, followed by Kenya and Sudan. Please see Table 3 for details on the share of aggregate trade and agricultural trade for each COMESA country.

Table 3: Share of Selected Countries in Total Trade vs Agricultural Trade (In 2018)						
Country	Total Exports	Total Imports	Total Trade	Agri. Exports	Agri. Imports	Total Agri. Trade
Burundi	0.1%	0.4%	0.3%	0.4%	0.4%	0.4%
Egypt	25.1%	37.0%	32.7%	23.9%	41.3%	34.8%
Eswatini	1.7%	0.9%	1.2%	2.6%	1.1%	1.7%
Ethiopia	1.2%	7.6%	5.3%	6.1%	7.1%	6.8%
Kenya	4.8%	8.9%	7.4%	14.8%	7.7%	10.4%
Rwanda	0.7%	1.3%	1.1%	1.3%	1.6%	1.5%
Sudan	3.2%	4.5%	4.0%	9.4%	6.1%	7.3%
Sub-Total	36.7%	60.6%	52.0%	58.5%	65.3%	62.8%
COMESA Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: COMSTAT

Intra-COMESA Agricultural Trade Pattern

In analyzing the effect of regional trading blocs like COMESA, it is highly imperative to examine the level and pattern of intra-regional trade performed within the economic bloc. As the main interest of this paper is agricultural trade, the status of agricultural commodities trade in COMESA was further investigated. Table 4 provides a summary of intra-COMESA agricultural trade vis-à-vis total agricultural trade with world partners. From the table, one can discern that between the periods 2015-2018, COMESA agricultural trade (with world partners) registered a total trade deficit of US $16.6 billion. However, during the same period, the intra-COMESA agricultural trade revealed a surplus of US $89.0 million. Furthermore, the annual average share of intra-COMESA agricultural exports in total export trade was 19%. This figure ranged from as little as two percent in Eswatini to as high as 45 percent in Rwanda. Similarly, the share of intra-COMESA agricultural imports from the total COMESA import trade stood at 9%.

As Table 4 below shows, when trade with world partners is considered, COMESA member states were net importers of agricultural commodities. On the other hand, when intra-COMESA agricultural trade is considered, COMESA countries were net exporters. If we further examine, we can observe that COMESA agricultural trade with the rest of the world has grown faster than intra-regional trade within the COMESA economic bloc. COMESA total agricultural exports to the world increased to US $18.8 billion during 2015-2018 from US $4.6 billion in 2000-2002. Over these periods, the total agricultural exports to the world had more than quadrupled. Further analysis revealed that intra-COMESA agricultural exports grew up to US $3.3 billion from US $810 million. Overall, the below results indicate that

COMESA countries traded more with the rest of the world than within the member states in the regional bloc.

Table 4: COMESA Agricultural Trade Indicators (Annual Average Value in Million US$)

Description/Year	2000-2002	2003-2005	2006-2008	2009-2011	2012-2014	2015-2018
Total Agri. Exports to World	4,629	6,146	9,595	14,712	17,897	18,865
Total Agri. Imports from World	8,821	9,473	16,738	25,784	34,310	35,442
BoT- Total Agri. Trade - World	(4,192)	(3,328)	(7,144)	(11,072)	(16,413)	(16,577)
Intra-COMESA Agri. Exports	772	945	1,826	3,113	3,477	3,403
Intra-COMESA Agri. Imports	810	865	1,610	2,817	3,708	3,314
BoT- Intra-COMESA Agri. Trade	(38)	79	216	296	(231)	89
Share of Intra-COMESA Agri. Exports	13%	17%	15%	19%	21%	19%
Share of Intra-COMESA Agri. Imports	6%	9%	9%	10%	11%	11%

Source: COMSTAT

Empirical Framework

Using panel data for the period covering 1997-2018, the research attempted to analyze causes of intra-COMESA agricultural trade, and effects of COMESA free trade area in agricultural trade in the COMESA region. The dependent variable was agricultural exports from COMESA member countries with respect to bilateral trading partners. Quantitative explanatory variables in the model included GDP, population, exchange rates, and distance between the trading partners. Other categorical explanatory variables estimated in the model were common official language and common border or adjacency. Furthermore, additional dummy variables (COMESA-one$_{ij}$ and COMESA-both$_{ij}$) that represent status of membership in COMESA free trade area were included in the above equation to measure the effects of COMESA regional trade agreement.

Model Estimation

The study attempted to apply two conventional model estimation techniques for analyzing the panel data. The panel data models examine fixed and/or random effects of group of time. Hence, our data should have individual effects or time effects. In order to examine the presence of individual effects and/or time effects, it is required to perform tests of either fixed or random effects.

Fixed Effects Model (FEM): is used whenever there is an interest in analyzing the impact of variables that vary over time. It explores the relationship between predictor and outcome

variables within an entity (country, person, company, etc.). When using FEM, we assume that something within the individual may influence or bias the predictor or outcome variables and we need to control this. This is the rationale behind the assumption of the correlation between entity's error term and predictor variables. FEM removes the effect of those time-invariant characteristics from the predictor variables so that we can assess the predictors' net effect.

Random Effects Model (REM): the rationale behind random effects model is that, unlike the fixed effects model, the variation across entities is assumed to be random and uncorrelated with the predictor or independent variables included in the model. The crucial distinction between fixed and random effects is whether the unobserved individual effect embodies elements that are correlated with the regressors in the model, not whether these effects are stochastic or not (Greene, 2003).

The Hausman Diagnostic: is applied in order to decide between Fixed Effects model or Random Effects model estimation. The Hausman method tests the null hypothesis of no difference in coefficients estimated by the two distinct methods against its alternative hypothesis. The result of the Hausman test is presented as follows.

Table 5: The Hausman Specification Test

	------Coefficients------			
	(b)	**(B)**	**(b-B)**	**sqrt(diag(V_b-V_B))**
	fixed	**random**	**Difference**	**S.E.**
lnGDPi	2.051724	1.926214	0.12551	0.1648591
lnGDPj	1.478759	0.997326	0.481433	0.1225749
lnPOPi	-0.3225999	-0.46747	0.144865	0.4285961
lnPOPj	0.5801956	0.107138	0.473057	0.213507
lnEXRTij	0.0541935	-0.14625	0.200446	0.0418825
lnDISij	-4.696747	-1.14927	-3.547475	3.551007
1.CLAij	-4.53373	0.604309	-5.138038	4.878254

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg
   Test: Ho: difference in coefficients not systematic
chi2(7) = (b-B)'[(V_b-V_B)^(-1)](b-B)
         = 578.53   Prob>chi2 = 0.0000

The result of the Hausman test suggests not to reject the Fixed Effects since its probability is 0.0000. However, since the Fixed Effects model estimation dropped our key variables of interest (COMESA-one$_{ij}$ and COMESA-both$_{ij}$), the study applied the Random Effects model. The application of this model is in line with the work of Adane (2014) and Tessema (2014).

Model Estimation Results

This section presents the estimation results of the regression model (Random Effect) employed in the study. The regression results are/were obtained by running bilateral

trade data sets for the standard gravity variables using STATA 15.0. The model used is in a linear-log form and bilateral agricultural exports (EXP_{ij}) is the dependent variable. While GDP of exporter (GDP_i), GDP of importer (GDP_j), population of exporter (POP_i), population of importer (POP_j), exchange rates between importer and exporter countries ($EXRT_{ij}$), and bilateral distance (DIS_{ij}) were independent variables, their respective coefficient values were interpreted in terms of elasticity or percentage changes. The other explanatory variables entered in a dummy form were adjacency (AD_{ij}), common official language (CLA_{ij}), and COMESA membership ($COMESA\text{-}one_{ij}$ and $COMESA\text{-}both_{ij}$). Interpretations for these dummy variables were in terms of level of trade.

The statistical significance and sign of these coefficients or estimated parameters revealed how these variables affect agricultural trade between bilateral trading partners. If a coefficient is statistically significant and if it is positive, the variable it represents has a strong direct relationship with agricultural trade between the economies. If a statistically significant coefficient is negative, the variable it represents has a strong inverse relationship with the bilateral trade, which may impede trade. If a coefficient is statistically insignificant, it shows that the factor it represents has a trivial impact on the bilateral trade. The model estimation attested that, except population of importing country (POP_j), all predictor variables were found to have a statistically significant effect on agricultural export trade. As the "p" values were less than one percent (0.000), the explanatory variables were significant at 1% significance level.

Real GDP: First, the coefficients or parameter estimates of real GDP of exporter (GDP_i) and real GDP of importer (GDP_j) were 1.926214 and 0.9973263, respectively. Both the estimated real GDP coefficients had the expected positive sign, which implies the size of exporter's economy and importer's economy directly affects the size of agricultural commodity exports from COMESA countries. In fact, in our case, the effect of real GDP of the exporting country was higher than that of the import trade partner. All other things held constant, on average, one percent increase in real GDP of exporting country would result in US $1.926 increase in value of agricultural trade between the exporting country and its trading partner and vice versa. Likewise, one percent increase in real GDP of importing economy would result in US $0.997 rise in value of export trade flows between exporting country and its trading partner and vice versa.

Population size: Second, the parameter estimates of population size were found to have the expected signs. Here, the coefficients for exporter country (POP_i) and importer country (POP_j) were -0.4674651 and 0.1071382, respectively. The negative sign for the exporting country implies that higher population size unfavorably affects agricultural exports by diverting into domestic market. On average, one percent increase in population size could result in a US $0.467 decrease in the value of agricultural export trade between COMESA countries and vice versa. There are mixed evidences regarding this finding. Population of the exporting country can have uncertain effect on the country's exports. It may provide more labor force leading to more output, hence, more exports. However, it can also provide a ready

market for the agricultural products at home, hence, leading to fewer exports (Vinaye, 2009). The coefficient for the importing country was positive but it was found to be statistically insignificant (with a "P" value of 0.255). This could mean that the higher the population size of importer countries, the higher the demand for imported agricultural commodities, all other factors being constant. This empirical result is interesting to discern that in economies with a relatively higher population size, agricultural exports are undesirably affected as exports could be diverted into domestic markets. This is evident in COMESA member countries like Ethiopia where major agricultural exports (such as coffee and oilseeds) fetch a higher price in local markets due to larger domestic demand that creates incentives for diversion of these agro-commodities to domestic consumption.

Real exchange rate: Third, value of real exchange rate between the trading partners would play a significant role in determining the value of agricultural exports in the COMESA region. In this study, real exchange rate is denoted by the ratio of the value of the exporter's currency to importers' currency in US dollars. Therefore, an increase in the exchange rate indicates devaluation of the exporter's currency relative to the importer's currency. This is believed to generate more export trade as agricultural exports could be relatively inexpensive to foreign trading partners. Hence, exchange rate was expected to have a positive sign. Nevertheless, the estimation results showed the exchange rate ($EXRT_{ij}$) had an unexpected negative sign (-0.1462526), which was significant at one percent level. This finding may entail further study across individual member states of COMESA.

For member countries like Ethiopia, the above empirical result confirms the ground fact where Ethiopia's currency devaluation could not generate more exports. Following a series of exchange rate devaluations in Ethiopia, its annual exports were in fact sliding down year-on-year over the last five years. Researchers such as Geda (2017) had strongly argued that devaluation does not induce export growth in Ethiopia. The researcher claimed that the fundamental problem for Ethiopia's exports was not a "rise in price" but binding constraints related to "production, supply, and exporting." In any case, the outcome of the estimated coefficient in our empirical finding suggests that, on average, one percent devaluation in exchange rate between the exporting and importing countries could result in a US $0.146 decrease in the value agricultural exports from the COMESA states.

Distance: Fourth, distance between exporting and importing economies play a significant role in influencing bilateral agricultural trade between them. Distance between the capital cities was used as proxy variable to represent costs of trading between the exporter and importer. In most cases, the longer the distances between the trading partners, the higher trading costs. As expected, the parameter estimate for the distance variable (DIS_{ij}) was negative (-1.149272) and was statistically significant at one percent level. The result again suggests that, one percent increase in the distance between the capital cities of the trading partners will on average decrease the value of agricultural exports from the COMESA region by US $1.149, ceteris paribus.

Adjacency (AD_{ij}): Fifth, the other important explanatory variable is adjacency (AD_{ij}) or

common border. It is generally true that economies are expected to have more trade with their neighbors, which share a common border. This could result in lower transaction costs. Therefore, adjacency is expected to have a positive sign. The regression results show that coefficient of adjacency (i.e., 2.14318) was highly significant at one percent level. Hence, having common border between COMESA trading partners could result in an increase in the value of agricultural exports by US $2.143.

Common official language: Sixth, the other dummy variable estimated in the model is common official language (CLA_{ij}). This factor indicates the presence of socio-cultural bonds that could enhance bilateral trade between economies. Presence of a common official language between trading partners is expected to have a positive influence on exports. The estimated coefficient (0.6043086) shows that common official language had positive effects on the intra-COMESA agricultural exports. The coefficient is significant at five percent level. Therefore, the empirical result suggests that COMESA member countries that share common official language could witness an increase in value of agricultural exports by US $0.604.

Trade Creation vs Trade Diversion: Finally, the results of dummy variables COMESA-both$_{ij}$ and COMESA-one$_{ij}$ would enable us to investigate the effects of COMESA regional trade agreement on the region's agricultural exports. In other words, these variables of interest would help us understand whether the COMESA regional free trade agreements enhance agricultural exports within member states (i.e., trade creation) or diversion of trade from members to non-members. The estimated model captured agricultural exports of selected COMESA member countries destined to trading partners. The regression estimation result of COMESA-both$_{ij}$ dummy variable had the expected positive sign with a coefficient value of 1.465459, which was highly significant at one percent level. This suggests that the COMESA regional trade area was influential in creating intra-COMESA agricultural trade by 333% more within the regional members than trading with the rest of the world. This further implies that COMESA membership boosts agricultural exports and attests that the trading bloc has a trade creation effect. On the other hand, the estimation result for COMESA-one$_{ij}$ shows the expected negative sign with a coefficient value of -1.493254. The estimation points that the result was highly significant at one percent level. In addition, it indicated the presence of trade diversion from COMESA members to non-members by 345%. This would mean that the COMESA free trade area did not play a significant role in generating extra-COMESA trade. This is evident as the result shows the COMESA free trade area expanded trade between members and non-members more than trade within members (i.e., intra-COMESA).

Conclusions

The study examined agricultural commodities trade and the effects of regional integration in COMESA. First, the study assessed the structure and flow of agricultural trade in COMESA regional trading bloc. Second, the research empirically investigated the causes of agricultural trade among the COMESA member countries. Lastly, the paper analyzed the effect of COMESA regional free trade agreement on promoting agricultural exports to member countries.

With regard to the first objective, the study analyzed the structure and direction of agricultural trade in COMESA. Over the study periods, agricultural exports from COMESA economies to the world increased from US $5.5 billion to US $18.5 billion. The proportion of intra-COMESA trade from total COEMSA trade also increased from 8% to 18%. This was mainly explained by the launch of a customs union in 2009. A similar increase was also witnessed on agricultural imports of COMESA, which had increased from US $7.8 billion to US $31.2 billion. The study revealed that COMESA member states were net importers when both total merchandise trade and agricultural commodities trade are considered. Also, COMESA members overall had a total trade deficit of US $80 billion by the end of 2018. Out of this total trade deficit, agricultural commodities trade alone accounted for nearly US $13 billion. Egypt, Kenya, and Sudan had relatively contributed to this trade development, as these countries together accounted for about half of the total agricultural exports from COMESA. In general, we can conclude that intra-COMESA trade in agriculture remains small, although it showed an upward growth pattern. During the study period, the annual average share of intra-COMESA agricultural exports in total export trade was 18%. Most of this intra-trade in agriculture happened largely between states that share a common border. Despite various initiatives launched to advance regional integrations, performance of COMESA, intra-regional trade in agriculture laged behind other similar regional trading areas in Sub-Sahara Africa. The share of intra-COMESA agricultural trade was also much lower compared to the proportion of total trade within the region.

In order to answer the second objective, the study explored the determinants of agricultural trade among the COMESA member countries using an augmented gravity model to estimate the predictor variables. The empirical findings of the study pointed out that intra-COMESA agricultural exports were positively influenced by real GDP of exporter and importer countries, population size of importer country, adjacency (common border), and common official language. However, intra-COMESA agricultural exports were found to have an inverse relation with population size of exporter country, exchange rate devaluation, and distance between bilateral trade partners. The results were statistically significant at one percent significance level. Interestingly, the estimation results for exchange rate showed unexpected negative sign. Devaluation of exchange rate was thought to generate more exports since agricultural goods could be relatively cheaper to foreign trading partners. Hence, this finding deviates from the widely held view and it may entail further study by type of agricultural products and across COMESA member states.

Lastly, the third objective of the study was to assess the effect of COMESA regional free trade agreement on the region's agricultural exports. The empirical study investigated key interest variables related to COMESA membership. The empirical findings indicated that COMESA regional integration had both trade diversion and trade creation effects. The trade creation effect in agricultural commodities was expected as the COMESA regional trade agreement enabled its members of the free trade area to obtain duty free access and removal of tariff barriers. Nevertheless, the trade diversion effect on agricultural exports was found to

be a little higher than its trade creation effect. Thus, the net effect showed some degree of diversion of agricultural trade from members to non-members. Based on the empirical findings, it can be concluded that COMESA regional integration was not instrumental in expanding agricultural exports from the selected countries during the study period. Additionally, it can be said that COMESA as a regional trading bloc had not utilized its full capacity to enhance intra-COMESA agricultural trade. This could be because of trade policies put in place by individual member countries, differences in implementation stages and economy size of member states.

Recommendations

- The study revealed the existence of a low level of intra-COMESA trade in agricultural goods and a net effect of trade diversion. This suggests that, as COMESA was not usi ng its full potential, there is a need for the COMESA regional free trade agreement to build much deeper regional integration to expand intra-COMESA trade in agricultural commodities. This could be well fostered through the following measures:
  - ➢ There is a need for more progress in coordinating trade policies within the COMESA trading bloc to ensure full implementation. Particularly, member states should fully implement all signed treaties and commitments related to harmonizing trade policies such as customs, tariffs, exchange rates, taxes, etc.
  - ➢ Member countries have to remove protectionist policies such as non-tariff trade barriers and lengthy customs procedures that impede intra-regional trade.
  - ➢ COMESA has to encourage all the five member countries that have not yet joined the Free Trade Area (FTA) to be full members by joining the COMESA FTA.
- The empirical evidence showed that the relationship between agricultural exports and real GDP of COMESA trading partners was positive and significant. Therefore, the study recommends that COMESA member countries should expand agricultural productions and exports to increase aggregate GDP.
- The empirical finding related to bilateral distance, which is a proxy of transportation, information, and search costs was found to have a significant effect of decreasing intra-COMESA agricultural exports from all member states. This suggests that COMESA states need to enhance investments in transportation and communication infrastructures in order to reduce bottlenecks related to trading costs.
- Adjacency or common border was found to have a significant effect of increasing agricultural exports within the COMESA region. Hence, COMESA countries should fully liberalize their borders with member states to expand intra-regional trade in agriculture.
- The findings of the study indicated that currency devaluation did not induce agricultural ex port growth in COMESA member countries. Thus, the COMESA regional market should i mplement measures that could reduce exchange rate disparities among the member countri es. The proposed implementation of currency convertibility and adoption of a common cur rency, which lags behind schedule, would help minimize the observed negative effects of e xchange rate, reduce transaction costs, and boost intra-regional trade.

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Effectiveness of Market Price Dissemination Channels in Ethiopia Commodity Exchange

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Abstract

The purpose of the study was to examine the effectiveness of Ethiopia Commodity Exchange's market information dissemination among Ethiopia Commodity Exchange members. It has been licensed to trade in Ethiopia Commodity Exchange by representing many clients. More specifically, the objective of the study emphasized exploring the kind of market information dissemination channels of Ethiopia Commodity Exchange, most frequently used by trade members in the study area. It also investigated the effectiveness of ECX's market information for members to make decision about production, pricing, place, and promotion and identified the challenges that members faced in using market information disseminated by ECX. In order to achieve those objectives, an attempt was made to answer the following research questions: which market information dissemination channels of ECX are most frequently used by members in the study area? How much Ethiopia Commodity Exchange's market information is effective to make decision? What are the challenges members are facing using Ethiopia Commodity Exchange's market information dissemination in the study area? The study employed descriptive research design. Both primary and secondary data were collected using a questionnaire, interview, and document analysis. The questionnaire was used to collect data from 80 members using simple random sampling technique. In addition, interview was administered with four employees of ECX Business Information System Division. A Multiple Regression model was used to assess the effectiveness of market price dissemination channels in the case of ECX. The analysis of quantitative data was made using descriptive statistics; correlation coefficient and t-test. The result of data analysis showed that Market Information Kiosks, Interactive Voice Response and Radio were the information dissemination channels most frequently used by ECX members, followed by Short Message Service. However, Electronics Price Ticker was not frequently used as intended. Moreover, the effectiveness of Market information for ECX members was found at a moderate level. The challenges ECX members faced in using market information were associated with infrastructure, language used for production, and dissemination of the information and knowledge of users to understand and analyze. Based on the findings, a conclusion was made, recommendations like promotion of information kiosks, Utilization of solar energy source and conducting annual stakeholders meeting and action research for feedback were forwarded.

Keywords: Market information channel, market information effectiveness, challenges, ECX members

Introduction

Agriculture is the mainstay of the Ethiopian economy, contributing 41.4% of the country's gross domestic product (GDP), 83.9% of the total exports, and 80% of employment in the country (Matousa, Todob, & Mojoc, 2013). Coffee, tea, cotton, cereals, oilseed products, fruit

and vegetables, and animal products are the significant farming products utilized for domestic use. The country's development approach is based on Agriculture Development Led Industrialization (ADLI) and depends on the transformation of the sector (Ministry of Information Ethiopia Report, 2004). Nevertheless, Ethiopia's customs bound development has failed to give food to the developing people in spite of the fact that it acts as the engine of industrialization and financial advancement. The sector tackles several problems. For example, all-natural diathesis, traditional technology, and limited promoting plants are there to market the product.

Based on World Bank's 2008 report, three from every poor people in developing countries live in outlying areas with over 85%, and 65% of those relied upon agriculture for sustenance and work, respectively. With poverty, being relatively direr in rural Africa (including Ethiopia), progress efficient farming marketing is believed to be vital to improve the contribution of smallholder farmers on the market. This implies that the reliable marketplace information program is important to provide updated price information. In order to have a well-organized marketing system, the report presented by FAO in 2007 suggested that a commodity exchange could fill this critical need by generating market information for both producers and consumers. Based on the report, the Ethiopian government tried to address one of these issues by setting up a national farming commodity exchange system. Based on the trend in lots of other Africa countries, Ethiopia has established a nationwide commodity exchange known as the Ethiopian Commodity Exchange (ECX), in the year 2008.

The ECX signifies a major advancement in the development of the Ethiopian agro-commodity market to promote the commercialization of major agricultural commodities. The ECX serves as a central marketplace where trade is funneled through a single, well-defined mechanism. The scope of the ECX is to promote the commercialization of major agricultural commodities, such as coffee, grains, and pulses. A commodity exchange is a central marketplace where sellers and buyers meet to transact in an organized fashion, with certain clearly specified and transparent. The market was designed in such a way so as to build upon the pre-existing agro-commodity market. Agricultural commodities flow from surplus markets mainly confined in the western highland regions, through the central market to the deficit markets throughout the country (Addisalem, 2009).

ECX is established as a wholly state-owned market institution having its own legal personality. The exchange shall be governed by ECX proclamation No. 550/2007. Following the proclamations, ECX launched its membership recruitment in January 2008 and commenced trading operations in April 2008. ECX membership is made up of a mix of cooperative unions, industrial processing enterprises, commercial farmers, private exporters, and domestic trading firms engaged in the agricultural commodity business. ECX represents a new way of doing old business, bringing international standards of efficiency and reliability to the age-old domestic agricultural trade and, in the process, transforming Ethiopia (Gabremadhin and Goggin 2005).

The ECX is expected to increase trust among buyers and sellers. Making use of modern information and communication technology, the ECX is also expected to increase the concentration of buyers and sellers over a single trading floor, improving effective market competition and reducing transaction costs. ECX uses modern data technologies to produce access to marketplace information to all or any of its stakeholders including the public. The organization carries out rural-based market information Tickers, Mobile phone messaging service (SMS), Interactive Voice Response (IVR), Mobile phone, Mass media (TV, Radio, Newspapers), and the internet to disseminate market information (Fikru, 2010).

This study tries to examine the effectiveness of market price dissemination channels in the case of Ethiopia Commodity Exchange; whether it has a contribution on Ethiopia's economy or adverse and to what extent. The research will show the trends analysis of the dissemination channels users from year to year.

Statement of the Problem

Communication permeates all areas of human relationships, and trade is no exception. Before modern media channels came to be used in the area of business transactions, market information was widely disseminated through a word–of–mouth. Now a days, with the advent of modern media outlets such as newspapers, television, and lately the internet, the transmission of information becomes smooth. However, these various genres of media do not totally replace the way information is transmitted in the preceding times. People have often relied on the modern media as well as the interpersonal, age-old means (Dereje, 2011).

Cognizant of the importance of media for marketing activities, marketing managers in the new millennium face a broad and diverse choice of media significantly through which to send marketing communications to customers. These include TV, radio, Internet, and mobile phone communications, such as text–messaging (SMS), Interactive Voice Record (IVR), Electronic Price Tickers, Market Information Kiosks (MIKs), and print. When we look at marketing communication from a consumer perspective, the issue of media effectiveness is challenging. In this regard, Danaher and Rossiter (2006) found out the relative effectiveness of media, including traditional mass media like television, mail, and radio, and new digital media such as the Internet and cellular phones. Their results exhibited that receivers of direct-response marketing communications continue to be most receptive to traditional media, such as mail and television. The Internet and mobile phones are much less useful as channels for generating a response to marketing communication in Australia in which the study was conducted.

On the other hand, Heinonen and Strandvik (2008) explored consumer responsiveness to mobile marketing, and their study was conducted in Finland. The findings of the study indicated that responsiveness to mobile marketing communication varies among consumers. Compared to traditional direct mail and commercial email communication, the responsiveness to mobile marketing was considerably lower.

Similarly, Leppaniemi (2008) studied mobile marketing communications in consumer markets. His study was also conducted in Finland. The results suggest that consumers'

intention to receive mobile advertising messages is related to the relevance of the message, permission to receive mobile advertising messages, the benefits of receiving the message, and the privacy of personal data. While the use of media technologies for market information dissemination is a recent phenomenon in the Ethiopian context, as ECX has entered into the market with the intent to disseminate market data, some glitches would somehow surface in the overall endeavor. Given the fact that the level of literacy of the people and the destitution hinder the use of new media technology in day-to-day life.

The issue of market information disseminated by ECX was not obtained proper attention among researchers. Particularly, effectiveness of market information disseminated by ECX for rural areas was not sufficiently studied. As far as the researcher's knowledge is concerned, there is no independent study focused on Ethiopia Commodity Exchange's market information disseminated for rural areas at a national or regional level. However, the researcher came across two researches related to ECX's market information disseminated to rural areas (Mesay, 2007 and Asegid, 2010). But, the studies took place to propose a market information system that could link farmers to the market; and they did not focus on the effectiveness of ECX's market information and the challenges ECX members faced in using the market information disseminated by ECX.

Therefore, this initiated the researcher to carry out this study with the attempt to investigate the effectiveness and challenges of market information disseminated by ECX among ECX members who have licenses to trade in ECX since they represent many clients.

Methodology
This research used descriptive research method in order to describe and specify the effectiveness of market price dissemination channels through Ethiopia's Commodity Exchange. Descriptive research is concerned with conditions and relationships that exist; practices that prevail; beliefs, points of view, and attitudes that are held; processes that are going on; effects that are being felt; or trends that are developing. At times, descriptive research is concerned with 'how, what is or what exists' related to some other events that influence or affect the present condition or event.

The study used both quantitative and qualitative approaches. It used both quantitative and qualitative data to be gathered and analyzed using their respective quantitative and qualitative techniques. Moreover, this study is a cross-sectional survey design. According to Zikmund, cross-sectional survey design is the type of survey in which necessary data is collected at one point in time from a particular set of population. This research design was used because of resources and time limitations to undertake a longitudinal survey.

Data Types, Source and Method of collection
The study used both quantitative and qualitative data which were collected from both primary and secondary sources. The reason for using mixed methods was to keep the validity and reliability of the finding. To generate valuable and relevant data, the primary sources were the exchange's trading members and ECX employees working in Business Information System

Division from the IT department. In addition, the secondary data were gathered from reports and from ECX's published and unpublished materials and electronic sources.

The researcher used a close-ended questionnaire as a primary data-gathering instrument. The questionnaire has two parts: the first part consists of individual-level basic information such as age, level of education, employment status etc. and part two consists of operation and customer satisfaction issues. Generally, the questionnaire contains a broad range of information on the operational performance of Ethiopian commodity exchange (ECX) and its effect on customer satisfaction.

Population of the Study

To achieve the research's main objective, which is to assess the market price dissemination channels of the Ethiopian Commodity Exchange, it was necessary to focus on marketing members that had a license to trade in ECX. The population size was determined based on the number of members at the ECX Headquarters as of July 30, 2019, which were 346. Considering the manageability of data, budget, time, and resource availability, the target population was only limited in Addis Ababa.

Sampling Technique

A simple random sampling technique was employed for the study since it gives an equal chance for each member of the population. The basic reason for choosing this technique was random sampling is a set of items that have been drawn from a population in such a way that each time an item was selected, every subject in the population has an equal opportunity to appear in the sample (Hoffman,2002). In addition to the purposively selected members, all Business Information System Division team members who were 4 in number and working in market price dissemination channels and related tasks were included in the study. Since those employees were small in number and they were directly engaged in market information dissemination tasks of the organization, they had detailed information about the issue under study. This helped the researcher to get significant information for the study.

Method of Data Collections

In this study, the researcher used both semi-structured questionnaires and unstructured interview and more specifically a self-administered one. Due to the fact that the study is descriptive in nature, both quantitative and qualitative data were collected from primary and secondary sources. To develop a questionnaire for the study, model questionnaires with a standardized format were reviewed. Primary data required for assessing the effectiveness of market price dissemination channels used by ECX to transfer market data were collected from sample customers. The data were collected using a structured questionnaire. The questionnaires were developed both in Amharic and in English. Both open-ended and close-ended questionnaires were employed. The close-ended ones required respondents to specify the extent of their agreement to a particular statement while the open-ended ones were used to gather attitudes, beliefs, preferences, perceptions, and wider views of the respondents. The questionnaires were distributed to the target customers to survey their preferences and

perceptions towards the dissemination channels used by ECX for transferring market data and to find out the dominant channel.

Method of Data Analysis

Descriptive Analysis
Descriptive statistics such as trends, percentage, mean and standard deviation were used. In addition to these, descriptive tools such as tables and charts were used to present the data.

Econometric Analysis
In the econometric analysis, a Multiple Regression model was used for the effectiveness of market price dissemination channels in the case of the Ethiopia Commodity Exchange. The research methodology is based on statistical analysis, which, in this paper, includes multiple regression analysis. This type of analysis is used for modeling and analyzing several variables. The multiple regression analysis extends regression analysis by describing the relationship between a dependent variable and several independent variables (Constantin, 2006). The multiple regression models can be much more realistic than the uni-factorial regression model (Goschin and Vatui, 2002). In this study, the dependent variable was the effectiveness of the market price dissemination channels, while the independent variables were: SMS, IVR, MIK, Radio, TV and EPT.

The study aims to determine socioeconomic and demographic factors for the effectiveness of market price dissemination channels in the case of the Ethiopia Commodity Exchange. A number of dissemination channels were related to the effectiveness SMEs. The dependent variable was the market price dissemination channels in a specific period of time. For the measurement of the effectiveness of market price dissemination channels of MSEs which is the dependent variable, dissemination channels the regression analysis multiple linear models was used.

The effectiveness was addressed by dividing the weighted output of six market price dissemination channels namely Electronic Price Tickers, Mobile Phone Short Messaging Service (SMS), Interactive Voice Response (IVR) service, Market Information Kiosks (MIK), Radio, TV, Website.

Multicollinearity test: - among the variables to precisely gauge the individual effect of the independent variables on the dependent variables was ruled out. Multicollinearity is a possible correlation that may exist among explanatory variables, making the coefficient estimates unreliable. Variance of Inflation Factor (VIF) and Tolerance are two important measures that can detect multicollinearity in a regression model (Wooldridge, 2002).

Heteroskedasticity test: - In regression analysis, Heteroskedasticity is a systematic change in the spread of the residuals over the range of measured values. Ordinary Least Squares (OLS) regression assumes that all residuals are drawn from a population that has a constant variance (homoscedasticity). The paper will test the variables' Heteroskedasticity.

Normality test

On the residuals disclosed the fact that the residuals were not normally distributed. Without the assumption of the normal distribution of error terms (residuals) statistics derived for testing the hypothesis would be misleading**.**

Result and Discussion

Demographic, socio and economic characteristics

The complete 80 respondents out of the 80 contributors that have been traded in ECX participated in the study. The questionnaires were distributed to 80 members and all of them filled out and returned the questionnaire. Hence, the analysis and interpretation of the facts were carried out using the responses of these respondents. Furthermore, records received via interviews were used in the analysis.

The demographic information of the respondents which includes gender, age, and level of education were presented and analyzed below.

Table 1: Demographic characteristics of the respondents

Variables	Frequency	Percent
Sex		
Male	51	63.8
female	29	36.3
Education		
secondary	30	37.5
Graduate	50	62.5

Source: Own survey, 2020

From the total 80 respondents in the above table, 63.8% were males and the rest 36.3% were female. Since the trading system in ECX is an e-Trade and e-auction system, it needs to be the member with an education level of secondary and graduate, and from the table above 62.5% of the respondents were graduates and the rest of respondents completed a secondary education.
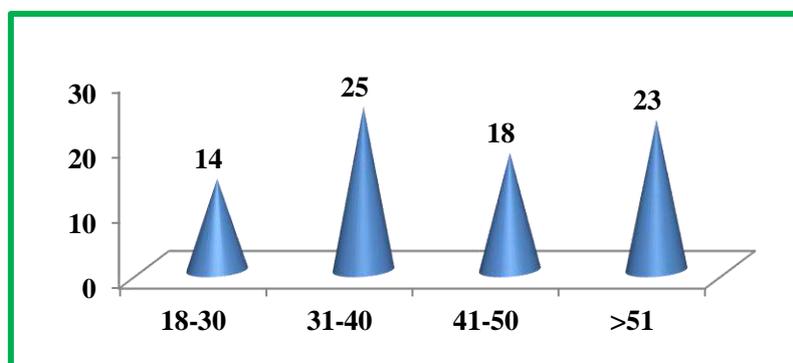

Figure 1: Respondents by Age Source:
Own survey, 2020

Concerning the respondents' age, as can be seen from Figure 1, the majority of the respondents(31.3%) were between the age of 31-40 years; followed by 28.8% of the respondents found in the age group of >51 years. Moreover, 22.5% of respondents were in the age group of 41-50 the rest 17.5% were under the youth age group (18-30 years old).

Results of market information dissemination channels

From Table 2 below, 78.75% of the members who transacted in ECX used market information which was disseminated through ECX dissemination channels whereas the rest 21.25% of the respondents got market information from traders. This denotes that, ECX members that traded in ECX mostly used ECX's market information disseminated through different market price dissemination channels. Therefore, market information disseminated from Ethiopia Commodity Exchange remained as a source of agricultural market information for members that traded in ECX, who were representatives of many other clients for commodities that were traded in ECX like coffee, Sesame, Haricot Bean, Green Mung Bean and Soya Bean respectively.

Table 2: Source of Market information for Members

Source of Market information	Frequency	Percent
ECX Channel	63	78.75
Traders	17	21.25

Source: Own survey, 2020

Table 3: ECX's frequently used Market price dissemination channels

Parameters of Market Dissemination	AN	S S	S	F	AA	Mean	St. dev.
Electronic Price Ticker	0	16	10	0	54	1.45	0.71
Short Message Service		16	8	40	16	3.8	0.88
Interactive Voice Record	0	0	0	33	47	4.59	0.50
Market Information Kiosk	0	5	0	17	58	4.67	0.59414
Radio	0	22	0	31	27	4.06	0.79
Television	2	27	21	26	4	3.11	0.94
Website	9	27	34	8	2	2.5	0.914

NB: AA= Almost Always; F=frequently; SS=Sometimes; S=Seldom; and AN=Almost never

Source: Own survey, 2020

Market information is, at first, disseminated by word of mouth, as market users travel from the market to other locations, especially from essential market location and all merchants travel collectively which is convenient to share ideas. As the market evolves, market information is often passed by newspapers that are disseminated within the market's catchment area; today such information can also be disseminated by radio, telephone links, and via the web.

In this study, ECX members choice of a channel via which ECX currently disseminates

agricultural market facts for them. The mean score and t-tests results presented in table 3 confirmed statistically full-size differences at $P<.05$ level. Among the respondents, 5 percent said they never used, 20 percent said they used seldom and the rest 12.5 percent of the respondents replied that they sometimes used EPT. [

The parameter identified the type of market information dissemination channels that ECX members were using SMS. The overall summarized result revealed that 10 percent seldom, 20 percent sometimes, 50 percent frequently and the rest 20 percent of the respondents said almost always use SMS.

The parameter identified the type of market information dissemination channels that ECX members were using IVR. The overall summarized results revealed that 41.25 percent frequently and the rest 58.75 percent of the respondents reported that almost always use IVR to get market information.

The parameter identified the type of market information dissemination channels that ECX members were using Market Information Kiosk. The overall summarized results revealed that 6.25 percent sometimes, 21.25 percent frequently and the rest 72.5 percent of the respondents said almost always use Market Information Kiosk to get market information from ECX.

The parameter identified the type of market information dissemination channels that ECX members were using Radio. The overall summarized results revealed that 27.5 percent sometimes, 38.75 percent frequently and the rest 33.75 percent of the respondents reported they almost always use Radio to get market information from ECX.

The table evidently indicated that all the channels were frequently used by more educated members. This was particularly high regarding the utilization of Radio, Mobile, Interactive Voice Service, and Electronic Price Ticker by educated members and share to their clients that were not a member of ECX. This could indicate the influence of the educational status of the rural client's in the utilization of channels through which ECX disseminates market information for them. This study identified that preference of market information dissemination channel of ECX showed statistically significant differences by members who were traded in ECX and shared the information to their clients.

Result on effectiveness of market information dissemination channels

Table 4: Effectiveness of ECX's market information in terms of evaluating criteria

Parameters of Effectiveness of ECX market information	VL	L	M	H	VH	Mean	St. dev.
Comprehensiveness	0	0	0	55	25	4	0.47
Accuracy	0	0	0	55	25	4	0.47
Usability	0	0	0	45	35	4	0.50
Timeliness	0	0	0	55	25	4	0.47

Accessibility	0	6	39	26	9	3	0.80
Relevancy	0	0	37	40	3	3	0.57
Economic	0	0	3	54	23	4	0.52

NB: VH= Very High; H= High; M=Moderate; L=Low; and VL=Very Low

Source: Own survey, 2020

It is believed that the major purpose of disseminating market information is to provide pertinent information up to the expectation of major users (IFPRI, 2012).

To measure the extent of achievement of market information objectives, comprehensiveness of the information, the following are usually used as criteria by professionals and practitioners. These are accuracy and trustworthiness, usability, timeliness, accessibility, economic, relevance, and clarity. In light of this, ECX members were asked to rate the effectiveness of market information disseminated by ECX using the criteria listed in table 4. As can be seen from the table, the highest rating result (M=4.44, SD=.499) was identified for usability so that market information of ECX is transmitted to members who represent thousands of clients where the information is very important and helped them to make marketing decision related to their commodities. Moreover, accuracy and timeliness were the second highest criteria with a mean of 4.31 and S/D of 0.166 respectively. Economical, that is, receiving ECX's market information is cost-effective for members, was rated with 4.25 mean score (SD=.516) and ranked as the third criteria with highest effectiveness rating result. The fourth and fifth highest criteria with a 3.575 mean score (SD=.569) was the relevance of market information disseminated by ECX for ECX members. The result in table 4 above helps to measure the effectiveness of market information dissemination channels regarding comprehensiveness of the information. The overall summarized results revealed that 68.75 percent of the respondents said high and the rest 31.25 percent of the respondents said very high.

The parameter to measure the effectiveness of market information dissemination channels was about the accuracy of the information that the respondents get from ECX dissemination channels. The overall summarized results revealed that 68.75 percent of them said high and the rest 31.25 percent of the respondents said very high.

The parameter to measure the effectiveness of market information dissemination channels was about the usability of the information that the respondents get from ECX dissemination channels, and the overall summarized results revealed that 56.25 percent of the respondents said high and the rest 43.75 percent of the respondents said very high.

The parameter to measure the effectiveness of market information dissemination channels was about the timeliness of the information that the respondents get from ECX dissemination channels. The overall summarized results revealed that 68.75 percent of the respondents said high and the rest 31.25 percent of the respondents said very high.

As the parameter to measure the effectiveness of market information dissemination channels

was about the accessibility of the information that the respondents get from ECX dissemination channels, the overall summarized results revealed that 7.50 percent said very low, 48.75 percent said it was moderate, 32.5 percent of them said high and the rest 11.25 percent of the respondents said very high.

As the parameter to measure the effectiveness of market information dissemination channels was about the relevancy of the information that the respondents gets from ECX dissemination channels, the overall summarized results revealed that 46.25 percent said moderate, 50 percent of them said high and the rest 3 percent of the respondents said very high.

As the parameter to measure the effectiveness of market information dissemination channels was about the economic impact of the information that the respondents gets from ECX dissemination channels, the overall summarized results revealed that 3.75 percent said it was moderate, 67.5 percent of them said it was high and the rest 28.75 percent of the respondents said it was very high. Thus, it is below 'High' level of respondent's ratings and above 'Low' level of their responses. However, the overall results in figure 4.3 indicated that the effectiveness of ECX's market information was found at moderate level.

Evans and Berman (2001), portrait that market information, especially charge facts, will help the marketer to take selections on how lots to cost and the place to sell the product. Once the marketer gets entry to market, facts related to the variety of products wanted by means of the target market, price, distribution channels, etc., it becomes simpler to make marketing decision.

Challenges of ECX Members in using ECX's Market Information

ECX members faced various problems in utilization of market information disseminated from ECX. Respondents were asked to rate the degree of the challenges using rating scale.

Table 5: Factors that influence ECX members using Market information disseminated by ECX

Variables	Mean	Std. Dev.
Shortage of adequate electricity service in the area	4.275	0.502525
Insufficiency and interruption of telecommunication service in the area	4.425	0.522288
Poor roads that link the rural areas to the place where ECX's market information is to be obtained	4.25	0.51558
Lack of rural clients knowledge to understand and analyze market information disseminated by ECX	4.25	0.51558
Absence of market information receivers in the area (like Price Board, TV, Radio, Mobile, …) in person or group	1.8375	0.48896

Obsolesce of the information disseminated by ECX with current market	1.8375	0.48896
The language used to disseminate ECX's market information is not known by rural clients in the area	1.8	0.43283
Frequent disruption of electronic price board found around the area	1.8	0.43283

Note: 5=Very High; 4=High; 3=Moderate; 2=Low; and 1= Very Low.

Source: Own survey, 2020

As presented in table 5, frequent disruption of electronic price board, the language used to disseminate market information, insufficient telecommunication and electric services, lack of knowledge to understand and analyze market information, distance from where electronic price board is located, poor roads that link the rural areas and absence of market information receivers were among the problems encountered.

According to e-forum held via World Bank 2012, information developed in accordance to need of the end customers (e.g. farmers), and furnished in neighborhood languages, in simple, interactive form. Farmers lack pertinent records to enhance their productivity and claim that excessive degrees of illiteracy keep them from making use of written sources of information, besides incapability to use the services owing to the low ranges of pc literacy.

Market facts can be affected via a number of factors related to disseminator, channel, person or any different external factors. Particularly the effectiveness of market facts can be affected by the user's facet variables in phrases of their literacy level, monetary reputation to have the receivers, understanding transmission language, attitude toward market records and the like.

Considering these facts, ECX Members were asked to rate major factors that hinder their utilization of ECXs' market information effectively. In relation to these, nine factors were identified by the respondents and as shown in table 5. According to their responses, top five factors currently affecting utilization and significance of market information disseminated by ECX are:

1. Insufficiency and interruption of telecommunication (M=4.425, SD=0.522)
2. Shortage of adequate electric services (M=4.275, SD=0.503)
3. Poor roads that link the rural areas to the place where ECX's market information is to be obtained (M=4.25, SD=0.516)
4. Lack of rural clients knowledge to understand and analyze market information disseminated by ECX (M=4.25, SD=0.516) and
5. Frequent disruption of electronic price board (M=1.8, SD=0.433),

The mean score of the top five factors (above 4.00 mean score) clearly indicated that those factors had high level of influence on members that were representatives of many clients to use the information effectively.

On the other hand, absence of information (M=1.84, SD=0.488) was identified as a least factor by respondents. This means ECX members were not strongly affected by obsolescence of information as the remaining eight items listed in table 5. However, the calculated mean result for this item shows the extent of its influence was above moderate level.

Econometrics Model Result

Multiple Linear Regression Model Assumptions
Multicollinearity
Multicollinearity is one of the assumptions that need to be fulfilled to have a suited parameter estimate of OLS regression coefficients. Multicollinearity is a problem that takes place when the unbiased variables have a linear relationship with every other. In order to check this assumption, Variance Inflating Issue (VIF) takes a look at used after running the regression. The interpretation was executed as if there was any variable that has a VIF value greater than 10. It is the indication of the existence of collinearity among explanatory variables. Hence, as we can see from table 6, all variables have/had much less than 10 which point out that there is no problem of Multicollinearity.

Table 6: Multicollinearity test result

Variable	MIK	TV	IVR	EPT	SMS	Radio	Website	Mean VIF
VIF	1.59	1.31	1.28	1.17	1.14	1.13	1.09	1.24

Heteroskedasticity
The researcher conducted Breusch Pagan / Cook-Weisberg test for Heteroskedasticity to test whether a systematic pattern in the errors existed and whether the variances of the errors were constant or not. The results shown below displayed that there was no Heteroskedasticity problem.

```
Breusch-Pagan / Cook-Weisberg test for heteroskedastic
> ity
        Ho: Constant variance
        Variables: q6_where_do_we_get_info

        chi2(1)     =     0.09
        Prob > chi2 =   0.7621
```

Normality
On the residuals disclosed the fact that the residuals were not normally distributed. Without the assumption of normal distribution of error terms (residuals) statistics derived for testing hypothesis would be misleading. However, given the large sample (347) used in the study, the distributions of F, t would approach normal distribution, making the inference reliable. Moreover, the values inferred under these distributions were mere approximations, not precise estimates. Approximations approach actual values as the sample size increases. An 'F Test on joint significance of co-efficient estimates gave a p-value of zero indicating the significant.

Overall model goodness

The overall model goodness or wellbeing of the multiple linear regression model result is indicated by a combination of both ANOVA or F statistics result and R- square. As shown in table 24 below, ANOVA or F statistics with (7, 72) result with a value of 43.28 which was statistically significant at 1% level. This indicates that the wellbeing of the model was good or well fit in representing the actual empirical data. In addition, coefficient of determination or R-square explained 82.14 percent of the variation in the level of effectiveness of market information dissemination channels was explained by the selected explanatory variables and the remaining 18.86 percent were not explained in the model. Therefore, based on a combination of both ANOVA and F statistics result and R- square results, the overall model well fit and should be interpreted.

Table 7: Multiple Linear Regression Model result

Variables	Coef.	Robust Std.	t- ratio	p-value
EPT	0.098***	0.063956	1.48	0.0067
SMS	0.140**	0.528403	2.66	0.01
IVR	0.044	0.101238	-0.45	0.0045
MIK	0.025	0.080176	2.69	0.009
Radio	0.158**	0.053464	2.68	0.0049
TV	0.087**	0.053805	1.65	0.039
Website	0.015**	0.046201	0.3	0.038
Constant	-0.978***	0.604031	-2.01	0.048
Number of	80			
F(7, 72)	.4328*			
R-square	0.8214			

Based on table 7 model result, EPT had positive and significant effect on market price dissemination channels at a 1% statistical significance level. The positive coefficient of EPT services shows that as EPT market information dissemination channel service increased by one unit keeping other variables constant, the level of effectiveness of market price dissemination disseminated through EPT decreased by 0.098 units. The result of the study was consistent with Dereje (2011) and Solomon (2015) findings on their respective similar studies conducted at various institutions.

As described in the table described above, SMS had positive and significant effect on market price dissemination channels at a 1% statistical significance level. The result implies ECX members could easily get market information through the dissemination channel of SMS. The result of the study was consistent with Dereje (2011) and Solomon (2015) findings on their respective similar studies conducted at various institutions.

As described in the table above, IVR had positive and significant effect on market price dissemination channels at a 1% statistical significance level. The positive coefficient of IVR services shows that as IVR market information dissemination channel service increased by one unit keeping other variables constant, the level of effectiveness of market price dissemination disseminated through IVR increased by 0.044 units. The result implies ECX

members could easily get market information through the dissemination channel of IVR. The result of the study was consistent with Dereje (2011) and Solomon (2015) findings on their respective similar studies conducted at various institutions.

As described in the table above, MIK had positive and significant effect on market price dissemination channels at a 1% statistical significance level. The positive coefficient of MIK services shows that as MIK market information dissemination channel service increased by one unit keeping other variables constant, the level of effectiveness of market price dissemination disseminated through MIK increased by 0.025 units. The result implies ECX members could easily get market information through the dissemination channel of MIK. The result of the study was consistent with Dereje (2011) and Solomon (2015) findings on their respective similar studies conducted at various institutions.

As described in the table above, Radio had positive and significant effect on market price dissemination channels at a 1% statistical significance level. The positive coefficient of Radio services shows that as Radio market information dissemination channel service increased by one unit keeping other variables constant, the level of effectiveness of market price dissemination disseminated through Radio increased by 0.158 units. The result implies ECX members could easily get market information through the dissemination channel of Radio. The result of the study was consistent with Dereje (2011) and Solomon (2015) findings on their respective similar studies conducted at various institutions.

Conclusion

Based on the research a findings, the frequency of market information utilization practice of the respondents was found at a moderate level. The reason for this result was that the majority of ECX members that represent many clients for commodities that had been traded in ECX were graduates.

On the other hand, ECX members frequently obtained agricultural market information disseminated from Ethiopia Commodity Exchange (ECX) through MIKs, IVR and Radio followed by Mobile Phone Short message service (SMS) and TV. However, Website and EPT were not frequently used because these were not accessible for them, this may be associated with technical failures, and frequent disruption of electric and telecommunication service. However, as stated by ECX (January, 2020) the basic purpose of installing EPT was to disseminate agricultural market information for rural clients in real time to fulfill their information need. However, the actual practices were very much different from the expected once. Accordingly, it is possible to conclude that EPT was not achieving its intended objectives. As a result, ECX members were forced to use mostly IVR service and Radio as a means to get market information disseminated from Ethiopian Commodity Exchange.

Basically the effectiveness of any market facts is expressed via its significances and contributions it gives for key customers of the information. Once the marketer has access to market information regarding the kind of product needed by the target market, price, dissemination channels, etc., it becomes easier to make marketing.

The effectiveness of any market facts should be mirrored via the output of end-users. However, the information transmitted for them should be evaluated to check whether they fulfill required standards specially accessibility, clarity timely, and the like. The findings of this learn about tested that for ECX participants the problem of clarity and time was not a problem. Moreover, trouble associated with relevance and clarity, usability, and accuracy of the market information were no longer a collection issue. However, the difficulty of accessibility and the contribution of market information for participants was not satisfactory.

It is generally concluded that the ECX members still faced problems accessing essential market information that could help them in making timely and accurate decisions. In general, ECX members were not sufficiently benefited from the market information disseminated by ECX as intended with all its quality.

Thus, it is safe to conclude that the challenges of ECX members to use market information effectively was highly associated with production and dissemination of the information rather than receiving and utilizing the information.

Recommendation

The findings of the study confirmed that, although progress was being made in using ICT, like using MIK, SMS and IVR, to provide a wide range of information comparatively was low. Innovative approaches such as Market Information Kiosks (MIK) that serve as centers for providing a range of market information were not yet available in the country. In rural parts of Ethiopia, where access to information on individual basis may be costly and also unavailable, such arrangements are believed to have the potential to bring the required market information to the users in the most cost effective way.

To increase accessibility to market information, information kiosks should be promoted in the rural areas. It is recommended if linkage is created between ECX and regions. Linked information kiosks with regions make accessible provision of market information to the rural clients. Rural clients might take the form of short-term practical skills training about how to operate and utilize channels of ECX used to disseminate market information. It could be through inviting TVET instructors as a guest in addition to the information that has been provided through ECX members.

Just like other electronic tools, all ICT tools/facilities require power to function. However, as identified, ECX members were usually not with a regular supply of electricity. Thus, this study suggests the utilization of solar power supply system especially for Electronic price tickers installed in rural areas. This can be facilitated by ECX in collaboration with local authorities. In addition, the outcomes of market information disseminated by ECX did not get proper attention. ECX gave more attention for dissemination of the information than follow ups and getting feedback about the results of market information.

Finally, although the findings of this study identified principal challenges that had effects on ECX members to use market information of ECX, there might be other influential factors that were not assessed in this study. So, it is really helpful to investigate such factors in-depth and find out other problems associated with utilization of market facts at all levels and branches of ECX.

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