The Impact of Regulatory Policy on the Development of Trade and Industry: A Case Study of Sierra Leone's Agribusiness Industry.

By

FOFANAH, Ibrahim

THESIS

Submitted to

KDI School of Public Policy and Management

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ABSTRACT

The research investigates the impact of governance indices and regulatory policies on agricultural production inefficiency in Sierra Leone. The stochastic Frontier Approach is used to conduct the investigation using data from 1996 to 2021. The production function consists of four main inputs, land, capital, labor, and fertilizer usage. The inefficiency determinants are governance indices and regulatory policies that impact the growth of agribusinesses in Sierra Leone. The estimation results show that all the dimensions of governance in Sierra Leone are very low in terms of quality and hence have a negative effect on technical efficiency in agriculture production. Likewise, the specific government policies have not effectively addressed the problems of the agriculture sector hence a negative impact on technical efficiency. The main inputs are land, capital, and labor have positive and significant effects on agriculture production. However, fertilizer usage is found to have a negative effect maybe because in Sierra Leone it has been used beyond optimum levels or poor quality of institutions are resulting in misappropriation of the subsidized fertilizers. The results are found to be robust using an ARDL method. This study concludes that the government should put extra effort into improving government, building effective institutions, and implementing appropriate regulatory policies to grow the agribusiness industry in Sierra Leone.

KEYWORDS: **Governance, Regulatory quality, Agribusinesses, Trade and Industry, and Development**

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1 INTRODUCTION

1.1 Background and Motivation

Of late, the significance of effective regulatory regimes has drawn the attention of many policymakers and researchers worldwide. Regulation policies are essential for governing societies and economies (World Bank, 2004). Regulation varies in form and in low-income countries the form has been changing. From the 1960s to the 1980s, governments started to intervene in productive sectors due to market failures. As market liberalization became successful in most of the developed countries (though questionable in developing countries), regulatory policies were redefined to mean ensuring an un-distortionary policy environment. In the recent past, researchers have come to the realization that a country might have the potential to develop and use advanced technology, but it may not do so if its institutions are not appropriate or sufficient (OECD, 2012). Institutional failures lead to socially inefficient outcomes, and in agricultural production, it is very common, especially in many developing countries.

In Sierra Leone, agribusinesses play a vital role in poverty alleviation through increased income levels and job creation. However, from the late 1950s to the late 1970s, the agro-industry thrived under government control of the export market but declined after the closure of the Produce Marketing Board (SLPMB) in 1989, leading to trade liberalization under the Structural Adjustment Program (SAP) in the early 1990s. Unfortunately, the implementation of SAP coincided with the onset of the country's civil war, resulting in significant challenges. There was a lack of effective regulatory frameworks and institutional capacity to oversee trade liberalization, particularly in export promotion and quality assurance. The Ministry of Trade and Industry also faced staffing shortages, hindering the effective implementation of trade policies and leading to lasting effects on the agricultural sector.

Following the civil war, subsequent governments made efforts to address these challenges by establishing institutions to oversee agricultural production, trade development, and export promotion under various agendas. Despite these efforts, Sierra Leone continues to grapple with social, economic, and political issues stemming from poor policy planning, ineffective implementation of trade policies, lack of investment and innovation in the agricultural sector, corruption, economic mismanagement, and inefficiencies in political and non-state institutions.

Therefore, these challenges brought by privatization and general liberalization of economies led to the current focus of the regulatory state. However, research on the impact of the new regulatory policies and existing institutional frameworks on agribusinesses, especially in Sierra Leone's context which has unique economic and social problems is still limited. Against the foregoing backdrop, this paper focuses on examining the impact of governance and regulatory policies on the agricultural production efficiency in Sierra Leone to close this gap in the literature.

1.2 Study context

Sierra Leone is a developing nation in West Africa. It is an agrarian economy well-endowed with valuable mineral, fishery, and agricultural resources and is also blessed with abundant rainfall, soil, and forests. The country offers great potential for investment and development. Mining, particularly iron ore, has driven economic growth in recent years. However, the economy is vulnerable to fluctuations in international prices due to its reliance on iron ore, diamonds, and rutile exports. To maintain economic growth, it is essential to diversify sources of growth and increase commodity prices (International Trade Administration, 2021).

Sierra Leone's GDP was approximately US$1.9 billion in 2009, and it has been gradually recovering from the Civil War of 2002. In 2008, its GDP ranked between 147th and 153rd largest in the world. However, in 2020, GDP per capita fell by 4%, reversing some of the recent gains made in poverty reduction (World Bank, 2022). Sierra Leone's economic development is heavily hampered by an overreliance on mineral exploitation, which has been seen as a source of foreign currency earnings and investment. Succeeding governments have shifted attention from large-scale agriculture to commodity items, industrial growth, and sustainable investments, leading to an exploitative economy based on extracting unsustainable resources (Germain, 2013). The decline in major exports, particularly diamonds, is also attributed to weak external demand and the decline in other sectors.

According to the International Trade Administration (2021), the COVID-19 pandemic worsened the economic situation. According to African Development Bank, (2021), real GDP declined by 2.7% in 2020. Measures to contain the virus were introduced and an Action Plan (QAERP) to stabilize the economy was put in place. However, the country depends on aid from countries like the US, the UK, and international institutions like the EU, IMF, and World Bank, and other development partners UN agencies, and China, the economic costs of COVID-19-related spending worsened the debt position of the country.

75% of the country's rich land is still uncultivated, and 80 percent of the food that Sierra Leone consumes is imported even though the agro-industry contributes over 60% of the country's total output and employs more than two-thirds of the labor force. Some studies have revealed the nation’s agriculture sector is being undermined by weak governance and management regimes in terms of policies that regulate the sector (e.g., International Trade Administration, 2021). The country has to a large extent adopted some modern agricultural production methods such

as the use of fertilizers and farm machinery, but without good institutional environment, these methods are more expensive to use. Therefore, the government has put in place the National Agricultural Transformation Strategy (2019-2023) which aims to diversify the agriculture sector by reviewing the laws and regulations governing it to render it more appealing (International Trade Administration, 2021). Sierra Leone National AGOA Response Strategy (2019) claims that the business climate in Sierra Leone may be greatly improved if the laws, ordinances, customs, practices, and even the agencies in charge of regulating commerce are streamlined. However, this may only be informed by an evaluation of the existing regulatory frameworks which this study seeks to achieve.

1.3 Statement of the Problem

Although it is commonly acknowledged that agriculture is the cornerstone and a fundamental component of Sierra Leone's economic growth and development over the long term (GoSL, 2009), many agricultural regulatory policies have fallen short in delivering the anticipated expansion in the agribusiness sector. This shortfall may stem from the lack of a cohesive trade and industrial policy that integrates effective planning and program implementation, innovation, and technology. Furthermore, the country's reliance on foreign aid to finance the majority of its major initiatives exacerbates the investment disparity in the agribusiness sector. Regulatory policies that are effective in low-income nations do not only entail the designing of the institutions but also the quality of the instruments of building those institutions (World Bank, 2002). To inform policy on ways of improving regulatory and institutional systems, there is a need for an evaluation of the existing regulatory frameworks, instruments, and institutions. High-quality regulatory and institutional systems will give rise to positive regulatory outcomes which increase agricultural production efficiency and ultimately increase the growth of agribusiness. Therefore, this paper explores the role of regulatory policies and governance on

agricultural production efficiency using the stochastic frontier analysis. Although previous works have looked at the effects of the quality of governance on economic growth (see Hossein et al., 2005), limited attention has been given to the effects of regulatory policies and governance on the growth of agribusinesses in Sierra Leone.

1.4 Purpose of Study and Research Questions

The study investigates the impact of governance indicators and regulatory policies on the production efficiency of agriculture production and the growth of the industry in Sierra Leone and suggests strategic actions for enhancing the business climate through regulation and the building of strong institutions. To address this objective the paper makes an effort to answer these questions:

1. What is the impact of governance and regulatory policies on agricultural production efficiency in Sierra Leone?
2. What strategies can the adopted to improve the quality of regulations and institutions within the agribusiness industry?

1.5 Research hypothesis

1. Governance has no impact on agricultural production efficiency in Sierra Leone.

1.6 Significance of the Study

Sierra Leone has plenty of arable lands with huge potential for growing the agribusiness sector and attracting both foreign and domestic investments. However, poor regulatory quality tends to weaken growth and discourage investments. Therefore, it is worth carrying out the research

to reveal the effect of regulatory policy on the development of the agribusiness industry and inform policy on ways to enhance the quality of regulation. The outcomes of the study will be helpful to politicians, and economic planners in the design, formulation, and execution of agro-related policies. The analysis will also be useful to potential investors in their decisions on whether to invest in the agribusiness industry of Sierra Leone or not. The study also contributes to current scholarship on the impact of regulation on economic progress and the growth and development of specific sectors.

1.7 Methodology

The study employs stochastic frontier analysis to investigate the effect of governance and regulatory policies on agricultural productivity efficiency at the national level. The study covers a period from 1996 to 2021. Several researchers have used this approach to investigate the factors that determine inter-farm inefficiencies (e.g., Liu & Zhuang, 2000), the relationship between macroeconomic performance and institutional quality (e.g., Adkins et al., 2002); and agricultural production technical inefficiencies (see Lio & Hu, 2008). Moreover, a qualitative approach is also adopted to examine the existing regulatory policies and other institutional arrangements in the agribusiness sector in Sierra Leone.

1.8 Research organization

The remaining part of the study is structured as follows: The second Chapter evaluates the body of existing scholarship and discusses the scholarship reviews as well as the research gap that the study attempts to close in relation to the topic understudy. The third Chapter gives an overview of the agribusiness industry in Sierra Leonne. The methods for dealing with every part of the data collecting and analysis model are discussed in Chapter 4. The findings and

analysis are covered in Chapter 4. The conclusion and the research recommendations are presented in Chapter Five.

2 OVERVIEW OF THE BUSINESS ENVIRONMENT IN SIERRA LEONE

This section summarizes the business environment in Sierra Leone to shed more light on the context in which agribusiness is being developed and the context to. Which the study is being undertaken. First, the section gives an analysis of the general trade and industry. Second, I give an overview of the Agribusiness sector. Last, I draw attention to the regulatory policies in place both for the general business environment and those specific to the Agribusiness sector.

2.1 Trade and Industry in Sierra Leone

In Sierra Leone, trade and industry have been utilized to promote investment by the private sector, industrial and economic growth, and to fulfill residents' socioeconomic requirements through employment and wealth creation. (MTI, 2020). The nation has significant opportunities through which the agrarian economy can be developed and investments can be attracted. However, according to the World Bank (2012), although the country provides investment and growth prospects, it is not self-sufficient in food production. According to MTI (2011), the performance of the industry, including mineral and agricultural processing has remained lower and underdeveloped compared to other similar industries within the region.

Over the years, the country has launched a number of policies intended to boost trade and industry. The MTNDP (2019-2023) was published in 2019, aiming to link with global and regional agendas. It focuses on improving education, enhancing governance, and infrastructural development backed by the diversification of agriculture and tourism (International Trade Administration, 2021).

In relation to the Import Substitution Industrialization (ISI) Strategy, for the first three years of work, the government provides preferential tax treatment to vital industries such as agribusinesses and people with scarce talents. For example, agribusinesses are free from corporation income tax for the first five years and from Pay As You Earn (PAYE) income tax for up to six workers with "non-available skills" for the first three years of employment. These are only a few of the attractive tax rates the government offers for important industries. Agribusiness investors can benefit from low tax rates. For the first ten years, investments in rice and tree crops are free from corporate income tax.

According to World Bank 2017, the ease of starting a business and property registration has improved significantly since 2007, with investor protection and the establishment of the fast-track commercial court. This has enabled stakeholder litigation to be undertaken more easily. Overall, the business climate in Sierra Leone is presently favorable, with the private sector acting as the country's main driver of economic expansion. The National Commission for Privatization (NCP) was launched as part of the overall plan for private sector growth. Early in 2005, Sierra Leone started implementing the ECOWAS sub-region Common External Tariff (CET), which aims to reduce tax burdens on the private sector and increase national competitiveness in private sector operations by boosting productivity in the mining, manufacturing, construction, banking, and telecommunications sectors. Further, the central authority has come up with strategic ways to encourage private sector activities, such as the Sierra Leone Investment and Export Promotion Agency (SLIEPA) establishment for investment and export promotion as a way of integrating and modernizing the legal and institutional and regulatory arrangements for investment in the country (SLIEPA, 2017). Particularly, guidelines have been developed by SLIEPA to support private sector development and promote exporting of manufactured, semi-processed, and raw commodities to ECOWAS

and other international markets. Additionally, the Sierra Leone Standards Bureau certifies the imports and exports to confirm that they adhere to global standards. (WTO, 2012).

Last but not least, Sierra Leone participates in numerous global trade initiatives, including regional ones like NEPAD, ECOWAS, AU, and MRU, as well as bilateral and multilateral trade agreements (PTA), the World Trade Organization, the European Union, and South-South Cooperation (African Export-Import Bank, 2018). In addition to giving SMEs assistance for investment promotion and making them more convenient for sustainable and long-term growth, the nation has given priority to the agriculture, tourism, fisheries, manufacturing, extractive, and infrastructure sectors (WTO, 2017). Consequently, these many cooperative projects are tied to the government's growth and development agenda. In order to strengthen the domestic market, the government of Sierra Leone is dedicated to implementing regulatory measures.

2.2 Agribusiness Industry in Sierra Leone

Although there isn't a universal definition of what constitutes agribusiness in the literature that is currently accessible, several definitions have been put forth. Agribusiness, as defined by Davis (1955), is the culmination of all agricultural operations as well as the production, distribution, and sale of agricultural products. It has been referred to more recently as all commercial and managerial operations carried out by companies that provide inputs to the agriculture industry, produce agricultural goods, process, transport, and sell agricultural commodities (Downey & Erickson, 1987). Agribusinesses are more specifically defined as any companies or commercial organizations that produce or provide inputs, create raw materials and fresh goods, process or manufacture food or other agricultural products, transport, store, or exchange agricultural production, or sell such items in retail settings (FAO, 2012). In this

study, I adopt the definition by FAO which is more encompassing to include a wide range of related activities.

The agricultural sector is recognized as a crucial driver of economic development in many countries, employing a significant portion of the population and contributing substantially to total output and productivity. However, the effectiveness of the agribusiness sector hinges on robust regulatory frameworks and economic inputs. Various authors advocate for a cross-sectoral analysis of market conditions and regulatory frameworks to reconceptualize industrial policy and address market failures and externalities, which can vary across countries. They argue that transaction costs and regulatory compliance play significant roles in productivity and adherence to regulations.

Janvry (2010) emphasizes the importance of redesigning approaches to ensure that agriculture contributes effectively to development, highlighting a performance gap in the sector. Hafeez (2003) suggests that a comprehensive regulatory framework can enhance the effectiveness of trade liberalization and market integration. Critics caution against vague industrial policies that may lead to corruption and rent-seeking, advocating instead for strategic policies that address specific market failures. They emphasize the importance of precise targeting to prevent the capture of policies by special interest groups (Altenberg, 2011; Lippolis & Peel, 2018).

In the foregoing regard, World Bank data shows that the development of the agro-based industry in Sierra Leone has for several years remained shaky until the intervention of international funding initiatives to boost the sector. Prior to COVID-19, the World Bank estimated that Sierra Leone's GDP would rise by 5.4 percent in 2019, the highest rate since 2016 (World Bank, 2021). The sector is comprised of Agribusinesses that put into context local

content policy employing only 10% of the senior and middle levels Sierra Leonean staff (Adam Smith International, 2013). According to various research, Sierra Leone's agribusiness owners are mostly located in the provinces where the majority of the country's agricultural production is practiced (see Sankoh et al., 2016). Agribusiness operators in Sierra Leone face difficulties as they lack of understanding, perspective, and attitude, (Meijer et al., 2015). As a result, Sierra Leone was listed as the sixth-hungriest nation in the world by the Global Hunger Index 2018 with an estimated 35.7% of the population undernourished.

Consistent with the Ministry of Agriculture and Forestry, the total rice demand was 1,600,000 metric tons in 2018. In contrast, local production was only 700,000 metric tons, with the balance imported from international markets. The annual cost of rice imports (including seeds and grains) alone stands at about USD 250 million. Despite the huge potential of the country's agriculture, the sector has not yet attained the national food and nutritional security targets and generated decent employment opportunities for the country's bulging youth population.

International donors like the World Bank and AfDB recognize that there is significant opportunity for growth in the agribusiness sector across the value chain. More so, the National Strategic Agriculture Development Plan (NSADP) – Sierra Leone's internal adaptation of the Comprehensive African Agriculture Development Programme (CAADP); the Medium-Term NDP for Sierra Leone (2019–2023), and the recently launched National Agriculture Transformation Strategy (NATS) (2019-2023) are clear evidence of the commitment by the Government to promoting investments to strengthen the agribusiness sector and thereby increasing its contribution to the mainstream economy. It is argued that expanding the agribusiness sector will also assist the government to tackle the major challenge of youth

unemployment in the country (estimated at 60%) which remains an important source of fragility.

In addition, the African Development Bank (AfDB) undertook the Sierra Leone Agribusiness and Rice Value Chain Support Project (SLARiS) to assist the industry and encourage a viable upstream agribusiness to support diversification of the economy, improve food security, sustainable employment opportunities, and improved livelihoods. The total cost of the project is UA 8.52 million with an ADF Grant of UA 7.99 million (93.8%) and a Government of Sierra Leone (GoSL) contribution of UA 0.53 million (6.2%) (AfDB, 2020). The African Export-Import Bank (2018) reports that trade has given women chances to earn an income through the agricultural sector and has helped to reduce poverty by giving women jobs. Regarding this, Palliere and Cochet (2018) note that the nation has embraced sizable private agricultural projects that have been described by their proponents as synergistic collaborations to increase the creation of employment opportunities for rural dwellers, particularly women and young people without formal education. The World Trade Organization (2017) recaps that agricultural activities are the main forces behind domestic trade, and as agriculture is Sierra Leone's largest industry, it has seen an increase in its GDP contribution.

Sierra Leone's agriculture industry is dominated by SMEs. However, they have insufficient capacity to deliver competitive agricultural goods that fulfill the needs and criteria of target consumers. They also have little awareness of overseas markets and are unaware of the advantages of international standards, thereby limiting their potential for growth and expansion. To address this, the central authority has initiated some steps to expand the institutional, technical, and human resource capacity of quality infrastructure organizations, ensuring that all SMEs including those agro-based in Sierra Leone have access to dependable

and efficient infrastructure services. This will allow farmers and producers to take advantage of market possibilities (UNIDO, 2018).

2.3 Regulatory Policies

2.3.1 Local Content Policy

To establish a connection between the local economy and international businesses, the GoSL adopted Sierra Leone's first Local Content Policy in 2012. It established performance goals and emphasized the government's expectations of investors in relation to the growth of the labor force and supply chain. The Sierra Leone Local Content Agency Act of 2016 then created a Local Content Agency to implement the policy by requiring businesses to produce local content strategies to show compliance. Violations are punishable by penalties and the loss of investment benefits (WTO, 2017). However, the evaluation of local content utilization in Sierra Leone has been a major difficulty to date. A fair and equal sharing of profits from the extractives industry is necessary, even though the World Bank predicted Sierra Leone's economic growth in 2012 to be above 20%. The introduction of extensive legislative and regulatory reforms that seek to help in growing the private sector was the primary goal of the government's development justification for the introduction of the local content policy, as the local content policy simplifies several economic development measures with a view to benefitting Sierra Leoneans and local businesses (Adam Smith International, 2013).

The Local Content Policy establishes a link between the local economy and foreign companies, helping domestic small and medium-sized firms to increase their competitiveness and economic performance through knowledge and talent transfer. According to the Ministry of Finance (2012), the necessity to incorporate the domestic private sector into significant investments is critical to private sector growth, but there is no comprehensive framework for

its execution. The Policy simplifies procedures to avoid burdening investors with local content requirements. It serves as a guideline for the formulation of investment agreements based on the policy's provisions, and it applies to all companies participating in any project, operation, activity, or transaction in Sierra Leone. The policy prioritizes local content development, talent transfer, creation of employment opportunities, the usage of locally produced items, and increased local ownership rates. Nevertheless, the program was not judged to have completely benefited the local economy, since it had not met its modest objectives of, for instance, 20% of management jobs and 50% of intermediary roles across all industries being taken up by Sierra Leoneans (Adam Smith International, 2012).

2.3.2 Quality Standards for Trade in Sierra Leone

The Sierra Leone Standards Bureau (SLSB) was launched by the Standards Act No. 2 of 1996 to develop standards and provide certification and accreditation for various commodities and sectors in the country. It reviews weights and measures, calibrates equipment, and certifies and validates Sierra Leone's use of the metric system of measuring. It also collects and disseminates statistics and other information relating to standards and related issues (International Trade Administration, 2021). The SLSB oversees the inspection of all imports at the border, checking labeling and certificate of conformity requirements, and conducting field testing before granting customs authorization to release products. There are now 100 standards and 33 technical rules, but no mutual recognition agreements exist. The SLSB, in collaboration with regulatory authorities and customs, may assess all imports at the border (WTO, 2017).

The Committees - National Codex, Industrial Standards Board, Metrology, Food and Agriculture, and Engineering Technical make up the technical wing of SLSB, and each of them based its standards on international or regional organizations. These committees are entirely in

charge of formulating recommendations for the various industries they oversee in the absence of international standards for certain indigenous products (WTO, 2017).

2.3.3 Export Promotion in Sierra Leone

With a focus on agricultural and marine resources, the Sierra Leone Investment and Export Promotion Agency (SLIEPA) was established in 2007 to promote export-oriented industries. Through initiatives including exhibition, market analysis, training in export value chains, and development of non-traditional export product profiles, the agency offers exporters chances for market access as well as technical support, and it promotes their interests (WTO, 2017). The ability to export goods is growing, but there is little knowledge about regional and global markets. Inadequate physical infrastructure makes it difficult to comply with quality criteria and standards. The legal framework for land tenure, notably the customary land system in rural regions, and the limited availability of finance are obstacles to the growth of the agriculture industry (WTO, 2017).

Even though local agribusinesses are given preferential opportunities through tax exemptions and the country's Local Content Policy, another limitation is how to diversify and increase exports of goods and services in Sierra Leone due to the limited competitiveness of the firms in question. It is held that this limits the country from benefiting from trade preferences, which give the nation unlimited access to foreign markets. Furthermore, exporting from Sierra Leone is a long and complex process (WTO, 2017).

2.3.4 Agricultural Regulatory Policies in Sierra Leone

Since 1961 when Sierra Leone gained independence the country's agricultural sector has always had solid policy contents, however, previous agricultural policies have been afflicted

by a variety of issues. These include a lack of stakeholder support and commitment, the agro-industry's inability to engross and maintain proper implementation of strategic initiatives, and Sierra Leone's over-dependence on foreign funding for the majority of its development programs. Most of the initiatives created via previous agricultural programs failed due to mismanagement and corruption. The agricultural and agribusiness institutional environment has a considerable impact on the sector's productivity and performance (Ministry of Agriculture, 2019).

The 'Ten-Year Plan for Economic and Social Development' (1962-1971) served as the nation's roadmap to development upon independence. It planned to invest 7.7% of capital expenditure on agriculture, which sparked the notion of forming a cooperative bank and industrialization as a development engine. This strategy was designed to jump-start the rest of the economy and propel the country forward. Among the various initiatives, until the late 1960s, the Sierra Leone Produce Marketing Board (SLPMB) and other agro-based trading corporates were heartened to engage in agricultural processing and value addition through an industrial plantation program. The Import Substitution Industrialization (ISI) program was the main approach that aided the economic progress at that epoch (Alie, 1993).

The National Development Plan 1974-1978 was launched to revitalize the government's policy in the sector that encouraged small-scale farming. Following the demise of ISI, the Integrated Agricultural Development Projects (IADPs) was a policy prescription sanctioned by international development partners such as FAO, the World Bank, and USAID. They attempted to restore the government's small-scale farming assistance plan (Alie, 1993).

The World Bank and other development partners established the Agricultural Sector Support Project (ASSP) to restructure the agriculture industry and modify policies in accordance with SAP. This was followed by the Green Revolution Program, which sought to increase agricultural productivity. In the mid-1980s, the Economic Emergency Programme (EEP) intended to correct the nation's dire economic situation by instituting stringent exchange rate controls, devaluation of the local currency, restrictions on cross-border commerce, and price caps on essential goods (FAO, 2003).

In 2001, the World Bank's International Development Association authorized the Economic Rehabilitation and Recovery Credit (ERRC) to assist the IPRSP goal. The government adopted the appropriate option under the expanded framework for highly indebted states, and the IMF authorized a three-year funding package under the Poverty Reduction and Growth Facility (PRGF) in 2002. The National Recovery Strategy (NRS) was also implemented in 2002, with GDP increasing tremendously by 3.8% (2000), 5.4% (2001), 6.3 percent in 2002, 6.5 % (2003), and a projected 7.4% in 2004 (FAO, 2003).

However, with the recent strides, Sierra Leone was placed 160th out of 190 nations for ease of doing business in the World Bank Doing Business Index. The nation was ranked 81st internationally in terms of safeguarding investors, 83rd in terms of making it easy to establish a business, 159th in terms of making it simple to acquire credit, 178th in terms of making it simple to get energy, and 165th in terms of making it simple to register a property (Doing Business Report, 2018). The variables behind the nation's high production costs are even more restricting than the indicators for the ease of doing business. Items are less competitive than they otherwise would be (National AGOA Response Strategy for Sierra Leone, 2019–2025) In the regulatory framework, several of these elements may be found.

Finally, however, Sierra Leone is ranked in the bottom 10 out of 137 nations in the 2017 World Economic Forum Competitiveness Report. The five most difficult business challenges are lack of access to capital, unfavorable foreign exchange laws, corruption, a lack of suitable infrastructure, and inflation. In this study I argue that improving the nation's rating will stimulate and promote commerce as well as private sector growth.

3 LITERATURE REVIEW

The section focuses on the comprehensive review of the body of research on the effect of regulatory policy on promoting the expansion of the agribusiness industry from a global, regional, and country context. It discusses the theoretical foundations on which this study is built. In addition, it reviews the empirical and non-empirical scholarship on the topic in question to inform the research gap that the study aims to close.

3.1 Theoretical Review

For a long time, academic studies have focused on the creation of rules to assess their effects on the targeted industries. According to Hertog (2003), regulation in this context refers to the use of legal tools to carry out social-economic policy goals. Positive theories of regulation and normative theories of regulation are the two main schools of thought that have evolved over time. These models guarantee that rules support growth that is either in the public or private interest. Every sector for which the policies are intended may more easily establish their applicability by using these concepts. The next subsections present a discussion of the theories.

3.1.1 Positive theories of regulation

The public interest category, a positive variant of regulatory theory, is concerned with figuring out the benefits and costs of regulations as well as the underlying reasons for regulation (see Hertog, 2003). The category includes theories on 1) market power, 2) interest groups, and 3) government opportunism. According to Shleifer (2005), such theories have been applied to suggest actions for governments to take in democracies as well as to describe those actions. Knieps (2015) views the emergence, change, and elimination of sector-specific regulation as what constitutes the positive theory of regulation.

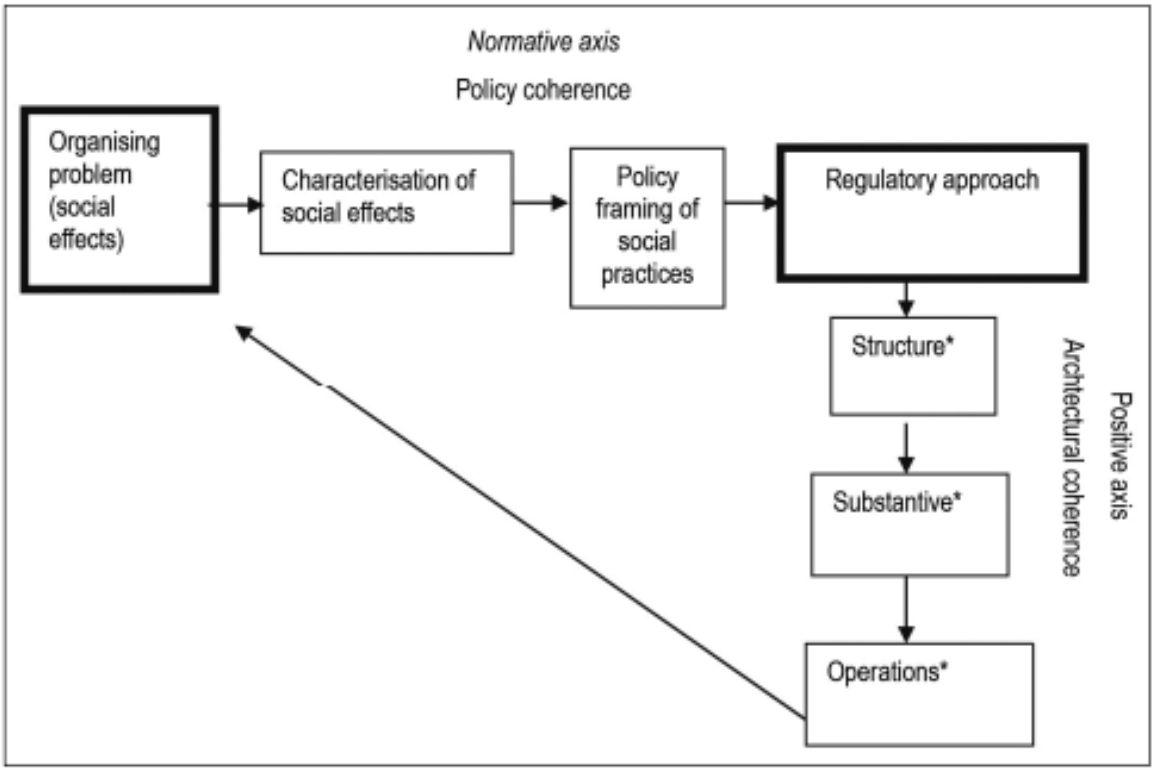
Therefore, the fundamental inquiry is, how are industries genuinely regulated? According to the generalizations drawn from these theories, regulation happens because the authorities want to deal with imperfect information with the stakeholders, and in aligning the stakeholders' interests of the government with that of the stakeholders, customers wish to be protected from market power when competition does not exist, similarly, stakeholders also want protection from rivals, and or government opportunism (Bressers, & Klok, 1988). However, the Chicago School of Law and Economics has criticized this line of theory proceeding in three intellectual steps. First, most market failures can be resolved by markets and private orderings without the need for regulation or even little government action. Secondly, in the limited circumstances when markets might not perform flawlessly, private litigation can settle whatever disagreements market participants might have. Finally, even if markets and courts cannot solve all issues flawlessly, government regulators are inept, dishonest, and captured, so regulation would make things far worse (Shleifer, 2005).

3.1.2 Normative theories of regulation

The normative theory aims to establish which style of regulation is most efficient by assuming that efficient regulation is prudent. In short, it makes a cost-benefit analysis of various regulatory instruments. Based on the normative theories of regulation promotes competition, lowers information asymmetries' costs, provides incentives to boost performance, establishes price structures that increase economic efficiency, and creates a regulatory environment that guarantees independent, transparent, transparent, legitimate, and credible regulation (Shleifer, 2005). Figure 1 illustrates the process flow for the normative theories of regulation.

Figure 1:

Normative theory of regulation process flow



Notes. Adapted from Sheehy and Feaver (2015)

3.2 Review of Past Empirical Works

3.2.1 The Relationship between Regulatory Policies and Entrepreneurship

Numerous studies investigated the forms of regulation that could determine entrepreneurship development (see Baumol, 1990; Claudia et al., 2014). Entrepreneurship in general is connected to a range of issues, including schooling levels, business environment, and sociological, legal, and political concerns. Claudia et al. (2014) find that all these elements can have an influence on how rapidly a firm expands. They further established a connection between entrepreneurship and administrative organization, governmental norms, and public policies. On the other hand, they further argue that the significant proportion of "shadow" economic activities in developing countries particularly Africa may mean that changes in legislation governing the formation of new firms in emerging and developing nations have less of an influence on entrepreneurial activity.

Baumol (1990) examined which forms of regulations are key in entrepreneurship development Baumol finds that government expenditure, investment freedom, financial freedom, entrepreneurship laws, labor rules, and employment legislation are all forms of regulations that are crucial for entrepreneurship. Without taking into account a country's degree of development, regulations have been applied to commercial operations using the "less is more" principle.

There is still no consensus on the relationship between regulatory policies and entrepreneurship development. On one hand, researchers argue that the relationship is negative (see Desai et al., 2003; Begley et al., 2005; Klapper et al. 2006; Van Stel et al., 2007). According to Begley et al. (2005), people may be discouraged from starting a business due to the need to follow too

many rules and procedures. Desai et al. (2003) discovered that entrance rules had a negative influence on company entry, showing that regulations have a detrimental impact on entrepreneurship. Klapper et al. (2006) found expensive rules as a barrier to the development of new enterprises. Likewise, Van Stel et al. (2007) investigated the nexus between business regulation and the creation of new firms in 39 countries and discovered that minimum capital and labor market requirements lowered the rate of entrepreneurship. More so, the World Bank's Doing Business Project promotes the reduction of regulations to encourage the creation of new businesses by providing simple procedures that reduce the number of rules and procedures needed to initiate business operations.

3.2.2 Impact of governance and government policies on agricultural outcomes

While there is a large body of literature on the effects of governance and regulation on economic outcomes (see Barro, 1997; Hall & Jones, 1999; Kauffman & Kraay, 2002), the literature on their impact on agricultural outcomes in developing countries is still very limited. A few studies examined the impact of governance and government policies on agricultural outcomes and found varying results (but see Sebudubudu, 2010; Bayyurt & Arikan, 2015; Khaleghifar et al., 2015). On one hand, some researchers find that good governance increases agricultural productivity and production (e.g., Lio & Liu, 2008; Bayyurt & Arikan, 2015; Khaleghifar et al., 2015). On the other hand, some scholars found a negative relationship between government policies/ governance and agricultural outcomes (e.g., Name, year; Name; year).

Although ADB (2000) and the World Bank (2001) have emphasized the need for building better institutions and improving the regulatory regimes to grow the mainstream economies, there is a dearth of literature on the effects of governance and government rules and guidelines

on agricultural outcomes in Sierra Leone. Yet the agro-industry is the backbone of the country's economy. More so several regulations that are meant to promote entrepreneurship have been put in place, but the extent to which they have lubricated the growth of agribusinesses is still not clear. Therefore, the study investigates the effects of regulation on agriculture output in Sierra Leone to close the gap in the literature.

3.2.3 Governance and Agricultural Production Efficiency

There is a burgeoning scholarship on governance and agricultural efficiency (see Krueger, 1991; Campos, 1999; Meon & Weill, 2005; World Bank, 2007). Several possible channels through which governance may impact agricultural efficiency are suggested. According to Meon & Weill (2005), one way in which bad governance can affect agricultural efficiency is when it acts as a tax on productive undertakings leading to the accumulation of unproductive resources and less intensive usage of those resources thereby reducing efficiency. World Bank (2007) asserts that another way is through corruption which encourages the diverting of efforts from productive sectors leading to agricultural inefficiencies. Third, the quantities and qualities of public goods and services may also determine the level of efficiency in the agriculture sector. On the other hand, by influencing political outcomes, governance may also determine the level of efficiency in the agribusiness industry (World Bank, 2007). However, other researchers have proffered counter-arguments arguing that in some cases poor governance may actually lead to higher economic efficiency (see Huntington, 1968; Brunetti, 1997; Harvey, 2004; Meon & Weil, 2005). Good examples of such cases are the 'grease the wheel' hypothesis and permissive intellectual property rights (Meon & Weil, 2005). Harvey (2004) identifies three political factors that can put pressure on the government to intervene and protect the agriculture sector. First, unavoidably the agriculture activities decline with economic progress. Secondly, the agriculture industry is coherent with the sympathies for electoral constituencies. Third,

producers usually find it beneficial to pursue political persuasion rather than market competition.

4 DATA AND METHODS

The section explains the research method adopted to carry out the investigation. This study uses a combination of both a quantitative approach (stochastic frontier analysis) and a qualitative approach (review of journal articles and government reports). The decision to take this course of action stems from the very nature of the subject under investigation and the research questions the study attempts to answer. In this section, I present in detail the econometric model specification, the diagnostic tests conducted, description of the data and data sources.

4.1 Econometric model

The study adopts a one-step approach pioneered by Battese and Coelli (1995) for the estimation of the stochastic frontier production function and an inefficiency equation using the maximum likelihood estimation (MLE). The aggregate agricultural production function in this study is assumed to take the Cobb-Douglas functional form. This functional form is widely used in the literature on related works (see Lio & Liu, 2008). The econometric equation is specified as follows:

$$\ln ADP = \beta_0 + \beta_1 lnGI + \beta_2 lnCAPITAL + \beta_3 lnLAND + \beta_4 lnLABOUR + \beta_5 lnFERT + \beta_6 lnEDUC + \beta_7 TEMP\Delta + \beta_7 RP + (v - u)$$

Where β is a vector of parameters which we want to estimate; the variables in the equation are as described in Table 1. Data sources and prior expectations are also specified in Table 1.

To estimate the agricultural production function, four main inputs are used including land, labor, capital stock, and fertilizer. Technical inefficiencies in this study measured by the deviances from the frontier (agriculture value added) are governance indicators and regulatory policies presented as dummy variables. Control variables include education level and temperature change (to control for climate conditions). v is the random disturbance term that is assumed to be independently and identically distributed – iid $[N(0, \sigma_V^2)]$ and independent of u. The relative inefficiency effect is represented by u with a variance of σ_u^2. The inefficiency term can be mathematically represented as:

$$u = \delta Z + \varepsilon$$

Where δ is a vector of parameters we want to estimate; Z is a vector of variables that determine inefficiency and ε is the random variable that follows a half-normal distribution. The general technical inefficiency in the production function is thus:

$$TE = \exp(-\mathrm{u})$$

World Bank(n.d.) defines good governance based on six indicators which are control of corruption, political stability and absence of violence, rule of law, regulatory quality, government effectiveness, and voice and accountability. Each of the indicators ranges from -2.5(low quality) to +2.5 (high quality). Meon and Weill (2005) categorized these 6 governance indicators into three categories which are respect for the institutional framework (rule of law and control of corruption); government action (regulatory quality and government effectiveness); and selection of authority (political stability and voice and accountability). I also follow the classification by Meon and Weill. Empirically the inefficiency equation is then specified as follows:

$$u = \delta_0 + \delta_1 Governance + \varepsilon$$

Table 1:

Variables, Descriptions, Priori Expectations, and Data Sources

Variable Name	Description	Priori expectation	Data Source
AGTP	Agriculture value added US$ constant, 2015. This is the dependent variable.		World Bank Indicators
GII	Quality of governance. (Average of 6 indices; government action; respect for institutional frameworks and selection of authority)	Positive or negative	World Governance Indicators
CAPITAL	Net capital stock in Agriculture (US$ million)	positive	Food and Agricultural Organization
LAND	Agricultural land (farming and arable) (000 hectares)	positive	Food and Agricultural Organization
LABOUR	Agriculture labor as percentage of total employment ILO estimates	positive	World Bank Indicators
FERT	Fertilizer usage (nitrogen, phosphate, and potash in tons).	Positive or negative	Food and Agricultural Organization
EDUC	Level of education proxied by government expenditure in basic education)	Positive or negative	World Bank Indicators
TEMPΔ	Climate change variable	negative	Food and Agricultural Organization
RP	dummy for specific regulatory policies on entrepreneurship; 1 if the policy exists and 0 otherwise	Positive or negative	

4.2 Diagnostic Tests

Given that there could be some potential threats that may affect the validity and reliability of the research results, the study conducts some diagnostic tests that would keep such threats minimal.

4.2.1 Test for perfect collinearity

This is when a perfect linear relationship exists among the independent variables (Gujarati, 2004). This causes some challenges in t becomes difficult to separate the impact of one explanatory variable from the other explanatory variable on the dependent variable. *Stata 17* presents the *collin* command for testing multicollinearity.

4.2.2 3Unit root test

The *Levin-Lin-Chu test*; *Im-Pesaran,-Shin test* and *Fisher test* in STATA 17 are used to test for stationarity. Before estimating the models all the variables are tested for stationarity.

4.3 Qualitative Method

The qualitative part of the study extensively reviews reports from international organizations and development partners such as the World Bank, UNDP, OECD, and ADB to gain insights on the topic in question. Reports from the key Ministries in Sierra Leone such as the Ministry of Agriculture, Ministry of Industry and Commerce, and other line Ministries like SMEs are also analyzed to identify the key regulatory policies in existence. Past empirical works from journals and other refereed publications are also taken into consideration to shed light on the global and regional context.

4.4 Data analysis plan

To analyze how regulation has affected the growth of trade and industry in Sierra Leone, an econometric equation has been modeled using the stochastic frontier analysis. A statistical software package STATA version 17 is used to do the diagnostic tests and run the regressions. The results are then presented and analyzed in the next Chapter Five.

5 RESULTS PRESENTATION AND DISCUSSION

The estimation results are presented and discussed in this section. First, the section presents the results of the diagnostic tests. After the diagnostic test results, the quantitative research results are presented and analyzed. The chapter also includes a discussion of the study's key findings in relation to the findings of the literature reviewed.

5.1 Summary Statistics

Table 2:

Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
AGP	26	1.965e+09	6.790e+08	9.097e+08	3.095e+09
GII RQGE	26	-1.188	.219	-1.589	-.96
GII CCRL	26	-.9107328	.1517049	-1.118254	-.5950163
GII PSVA	26	-.5320657	.5312959	-1.652953	-.0797722
GII ALL	26	-.877	.28	-1.401	-.592
CAPITAL	26	741.34	257.885	505.369	1232.711
LABOUR	26	61.667	9.384	42.714	70.39
LAND	26	3612.197	463.642	2804	4029.88
FERT	26	11733.898	8744.607	90	30257.7
EDUC	26	19.595	6.698	12.411	35.006
TEMPΔ	26	1.064	.317	.533	1.728
CC	26	-.789	.18	-1.085	-.396
RQ	26	-1.082	.284	-1.57	-.711
PS	26	-.633	.718	-2.173	-.039
GE	26	-1.294	.175	-1.629	-1.063
RL	26	-1.032	.212	-1.382	-.794
VA	26	-.431	.366	-1.335	-.063
RP1 SLSB	26	.5	.51	0	1
RP2 SLIEPA	26	.5	.51	0	1
RP3 PMB	26	.346	.485	0	1
RP4 SMEDA	26	.269	.452	0	1
RP5 SLLCA	26	.231	.43	0	1

5.2 Regression Results: Effect of Governance on Agricultural Production Inefficiency

The study aims to explore the interaction between the quality of governance and government policies and agricultural growth in Sierra Leone from 1996 to 2021. The summary statistics of the data are reported in Table 2. They give the overall overview of the variables' status. For instance, the data on the governance indicator indices (GII), shows that the country is still grappling with poor quality of institutions on average.

Tables 3 to 6 show the results of models 1 to 9 which include each of the three dimensions of governance (government action, respect for institutional frameworks and selection for authority). Each dimension comprises of an average of two indices as explained in the previous chapter according to the categorization of Meon and Weill (2005).

The coefficients of the agricultural inputs (capital, labor, land, fertilizer) are fairly stable across the models 1-9. Land and capital exhibit the expected positive signs and are highly significant which is consistent with literature. Labor also exhibits a positive sign in most of the models (1, 3, 5 and 6) as expected with high statistical significance except in model 2 when we introduce respect for institutional frameworks as the governance indicator; when we control for education in model 5; and when we control for climate change in models 7, 8, and 9. The coefficient of fertilizer is negative and significant in all models which is also expected especially in Africa where fertilizer is being used beyond the optimum level.

The coefficients of the control variables are also consistent with literature. Education exhibits a positive and significant effect in all the models. Temperature change is fairly stable across the models exhibiting a negative and significant effect in models 8 and 9 except for model 7 where it exhibits the correct sign but insignificant.

Table 2:

MLE Estimates of the Frontier and determinants of technical efficiency with no control variables.

	(1)	(2)	(3)
	Log Agriculture Output (Value Added)	**Log Agriculture Output (Value Added)**	**Log Agriculture Output (Value Added)**
Frontier			
Log Agriculture Labour	0.251***	-0.709***	0.534***
	(0.00687)	(0.00116)	(0.0000423)
Log Net Capital Stock	0.788***	0.0231***	0.968***
	(0.00299)	(0.000983)	(0.0000321)
Log Land	0.281***	0.847***	0.555***
	(0.00718)	(0.00128)	(0.0000668)
Log Fertilizer Usage	-0.0670***	-0.00602***	-0.0712***
	(0.00143)	(0.000103)	(0.00000277)
Constant	13.64	17.39	9.062***
	(.)	(.)	(0.000387)
Mu			
Government Action Index	-1.620***		
	(0.312)		
Respect for Institutional Frameworks Index		-4.031***	
		(0.892)	
Selection of Authority Index			-0.636**
			(0.205)
Constant	-1.878***	-3.858***	-0.423
	(0.457)	(0.928)	(0.294)
Usigma			
Constant	-4.010***	-4.199***	-3.273***
	(0.448)	(0.364)	(0.566)
Vsigma			
Constant	-24.60	-24.15	-39.17
	(32.29)	(18.92)	(574.9)
Observations	26	26	26

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 3:

MLE Estimates of the Frontier and determinants of technical efficiency controlling for investment in education.

	(4)	(5)	(6)
	Log Agriculture Output (Value Added)	**Log Agriculture Output (Value Added)**	**Log Agriculture Output (Value Added)**
Frontier			
Log Agriculture Labour	0.644***	-0.656***	0.692***
	(0.0139)	(0.00166)	(0.0252)
Log Net Capital Stock	0.767***	0.0120***	0.826***
	(0.00874)	(0.000903)	(0.0168)
Log Land	2.224***	0.857***	1.865***
	(0.0145)	(0.00140)	(0.0269)
Log Fertilizer Usage	-0.0868***	-0.00625***	-0.0665***
	(0.000856)	(0.0000940)	(0.00150)
Education investment (% of total expenditure)	0.00532***	0.00120***	0.00431***
	(0.000118)	(0.0000199)	(0.000237)
Constant	-3.771	17.14	-1.563
	(.)	(.)	(.)
Mu (Inefficiency)			
Government Action Index	11.33		
	(.)		
Respect for Institutional Frameworks Index		-4.073***	
		(0.855)	
Selection of Authority Index			-0.815
			(1.489)
Constant	-3.749	-3.887***	-1.810
	(8.966)	(0.888)	(3.932)
Usigma			
Constant	0.785	-4.239***	-1.714
	(0.528)	(0.355)	(1.989)
Vsigma			
Constant	-17.68*	-24.65	-15.18***
	(7.407)	(20.83)	(4.487)
Observations	26	26	26

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 5

MLE Estimates of the Frontier and determinants of technical efficiency controlling for climate change.

	(7)	(8)	(9)
	Log Agriculture Output (Value Added)	**Log Agriculture Output (Value Added)**	**Log Agriculture Output (Value Added)**
Frontier			
Log Agriculture Labour	-2.370***	-0.0825***	-0.782***
	(0.502)	(0.00472)	(0.00172)
Log Net Capital Stock	-0.350	0.503***	0.116***
	(0.266)	(0.00275)	(0.000988)
Log Land	0.396	1.437***	1.954***
	(0.476)	(0.00480)	(0.000616)
Log Fertilizer Usage	0.0463	-0.0397***	-0.0660***
	(0.0378)	(0.000266)	(0.0000588)
Climate Change (Temperature Δ)	-0.123	-0.0230***	-0.0563***
	(0.189)	(0.000683)	(0.000111)
Constant	29.86	7.105	8.543***
	(.)	(.)	(0.0147)
Mu			
Government Action Index	4.176		
	(.)		
Respect for Institutional Frameworks Index		-3.837*	
		(1.916)	
Selection of Authority Index			-8.403
			(13.89)
Constant	0.418	-3.859	-22.27
	(13.76)	(2.061)	(35.70)
Usigma			
Constant	-3.595	-3.543***	0.583
	(7.976)	(0.648)	(1.596)
Vsigma			
Constant	-3.329***	-20.92	-23.97*
	(0.287)	(10.92)	(10.89)
Observations	26	26	26

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The six governance indices are highly correlated which may cause some bias in the regression results. Therefore, first, I split the governance into three categories namely government activity (average of government effectiveness and regulatory quality), respect for the institutional framework (average of control of corruption and rule of law) and selection of the authority (average of political stability and voice and accountability). Second, I introduce each category into the equation separately. From the results, these three dimensions of governance suggest that good governance decreases technical inefficiency in agricultural production. The coefficients are highly significant. These results agree with previous literature (see Kaufmannetal. et al., 2006; Lio & Hu, 2008). However, when we control for climate change and education, government action becomes insignificant while respect for institutional framework and selection of authority remain significant.

5.3 Effect of Regulatory Policies on Agricultural Production Inefficiency

The study also examined the impact of specific regulations and institutions that either directly or indirectly target the agribusiness industry and other related sectors. These are SLSB, SLIEBA, PMB, SMEDA, and SLCA. These policies are introduced as dummies whereby 1 is when the policy was in place and 0 otherwise. The results suggest that even though the government has introduced these policies, the government has not fully addressed the problems of the agriculture sector hence the increase in technical production inefficiencies.

5.4 Robustness Checks

The study employs the ARDL to identify the short-term and long-term impacts of regulatory quality. In estimating the impact, the ARDL (1,1,1,2,2) model is the automatic lag selection based on the Akaike information criteria (AIE). Results showed there are significant impact of

the lags of some selected macroeconomic variables on agriculture output (value added). In the short run, coefficient regulatory quality significantly influences agriculture output (value added). The result shown in Table 1 indicates that in the short run, a unit increase in regulatory quality will cause an increase in the value of agriculture output by 24.7%. This confirms the findings of Moenius 2004, which state that regulatory quality has a significant effect on the development of agribusiness. This is also consistent with the results of the SFA analysis. However, in the long run employment in agriculture and regulatory quality have a negative effect on AVA. As units increase in EIA and DEV, AVA will reduce by 0.22% and 78.6% respectively. The adjustment rate of the model implies that the dependent variable will adjust back to its equilibrium in the long run at -1.189.

The results on agricultural land and employment in agriculture in the short run are negative which could be explained by inappropriate use of modern technology and advanced farming techniques or lack of a conducive regulatory environment to promote agriculture production. Also, a unit increase in human development will reduce agriculture output by 121%. This result is opposite to the findings of Shleifer (2005) and Smith (2012), which include that human development and employment in agriculture worked towards improving the agricultural value added of nations. In the long run, however, agricultural land and human development have a statistically significant positive effect on the agriculture output of Sierra Leone of 1.26% and 71.3% respectively. Also, an increase in agricultural output is caused by a 1% increase in agricultural land and human development respectively.

5.4.1 ARDL Bounds Test

The co-integration and long-run relationship between DEBT, GROWTH, GFCF, OPEN, RIR, EX_RATE, and GOV_EFF are examined using the ARDL bound test. The table below presents the estimation results of the ARDL bound test. The findings demonstrate that the F-value is greater than the upper bound value, demonstrating a long-term link and co-integration between the explanatory factors and the public variables. Therefore, the null hypothesis is rejected by this study.

Table 7:

ARDL Results

Pesaran/Shin/Smith (2001) ARDL Bounds Test
H0: no levels relationship F = 11.702
t = -6.382

Critical Values (0.1-0.01), **F-statistic**, Case 3

	[I_0] L_1	[I_1] L_1	[I_0] L_05	[I_1] L_05	[I_0] L_025	[I_1] L_025	[I_0] L_01	[I_1] L_01
k_4	2.45	3.52	2.86	4.01	3.25	4.49	3.74	5.06

accept if F < critical value for I(0) regressors
reject if F > critical value for I(1) regressors

Critical Values (0.1-0.01), **t-statistic**, Case 3

	[I_0] L_1	[I_1] L_1	[I_0] L_05	[I_1] L_05	[I_0] L_025	[I_1] L_025	[I_0] L_01	[I_1] L_01
k_4	-2.57	-3.66	-2.86	-3.99	-3.13	-4.26	-3.43	-4.60

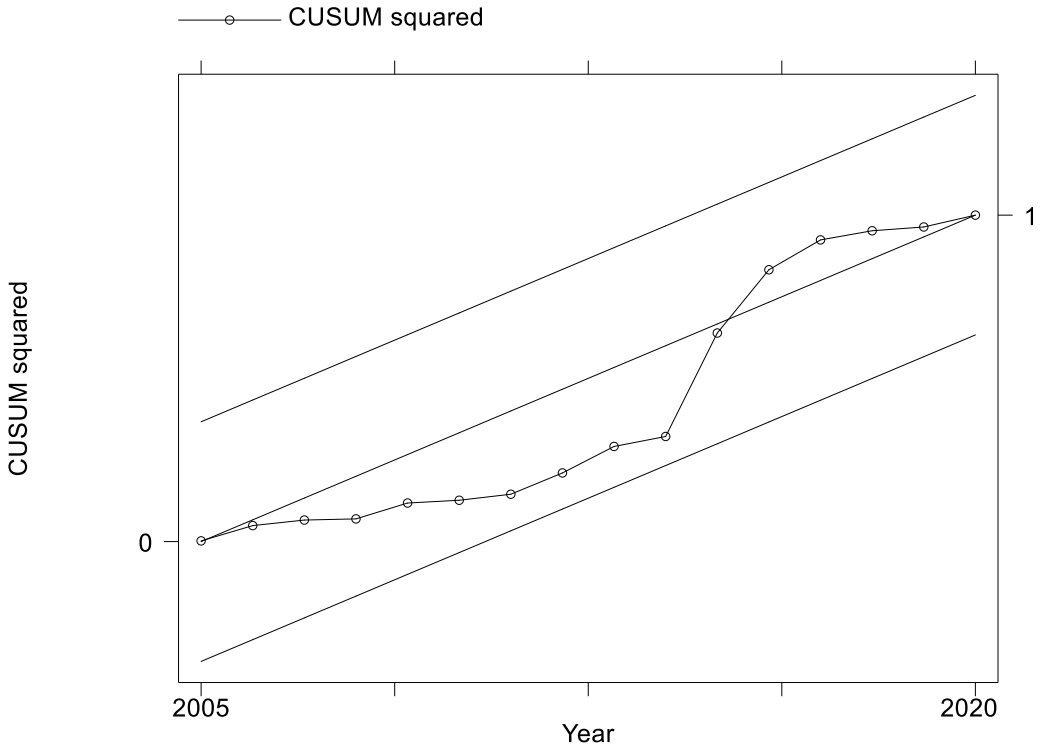
accept if t > critical value for I(0) regressors
reject if t < critical value for I(1) regressors

k: # of non-deterministic regressors in long-run relationship
Critical values from Pesaran/Shin/Smith (2001)

5.4.2 Stability Check

According to Brown et al. (1975), researchers examine the long run stability and reliability of the ARDL model using the cumulative sum (CUSUM) and cumulative sum square (CUSUMQ) owing to the existence of structural fluctuations in all variables due to single or many structure breakdowns. The CUSUM of squares test, as seen in the graph below, is significant at a 5%

level. Thus, it can be concluded that all of the variables included in the ARDL regression analysis have stayed constant throughout time.



5.4.3 Summary of the ARDL model

In the long run, agricultural land and regulatory quality have a significant impact on agricultural value addition in Sierra Leone. On the other hand, Regulatory Quality has an inverse relationship with value addition in the long run. Especially, in countries where agriculture is a significant economic activity, it is easier to reform the regulations governing the agricultural industry. The superior regulatory frameworks in countries where agriculture accounts for less than 25% of the GDP, on the contrary, stimulate agribusiness and ensure the production of high-quality food (World Bank, 2016).

6 CONCLUSIONS AND RECOMMENDATIONS

This section presents a summary of the findings from the previous chapters. Also presented in this chapter are the study's conclusions and recommendations based on findings of the study from both the empirical analysis and reviewed literature.

6.1 Summary of Findings

The study investigated the impact of governance and regulatory policies on agricultural production inefficiency in Sierra Leone by applying the stochastic frontier approach. The frontier consisted of four main inputs which are land, capital, fertilizer, and labor. Technical inefficiencies in the study are measured by the deviations from the agricultural frontier (agriculture value added) and functions of governance indicators and regulatory policies. The study also controls for climate change and education.

The dimensions of governance used are the ones introduced by Meon and Weill (2005) which are government action, respect for institutional framework, and selection of the authority. Each dimension is the average of the 2 indices from the six suggested by World Governance indicators. The results reject the hypothesis that governance and regulation policies have no impact on agricultural production inefficiencies. The various models presented conclude that better governance enhances efficiency in agriculture production and hence contributes to the growth of agribusinesses. The different dimensions show a fairly stable impact which is highly significant. These results are consistent with literature (e.g., Adkins et al., 2002; Meon & Weill, 2005).

Moreso, the study also investigated the effect of specific regulations and institutions that are either directly or indirectly targeting the agribusiness industry and other related sectors. These are SLSB, SLIEBA, PMB, SMEDA, and SLLCA. The results suggest that although the government has introduced these different policies, the government has not fully addressed the problems of the agriculture sector hence the increase in technical production inefficiencies. This is hindering the growth of the agribusiness industry.

The results also show that land, capital stock, and labor remain significant inputs that enhance agriculture production. However, fertilizer is having a negative effect on agriculture production maybe because it has been overused beyond the optimum levels hence the government may need to relook into ways of improving the contribution of fertilizer usage. The study also controlled for climate change and the results show that climate change has a negative impact on agriculture production and the result is highly significant. Education remains a significant factor in enhancing agriculture production.

The study also used the ARDL approach to distinguish between the short-term and long-term impacts. The dependent variable in the study is AVA, whilst the independent variables are DEBT, GROWTH, GFCF, OPEN, RIR, EX_RATE, and GOV_EFF. The findings showed a significant impact on agricultural land, however, the relationship between regulatory quality (governance index measure) and agricultural production is consistent with the stochastic frontier analysis. The government policies seem not to be appropriate to yield positive results on agriculture production or weaknesses in the implementation of the policies.

In summary, the empirical estimation results revealed that poor governance and inappropriately instituted and implemented government policies are heavily contributing to agricultural

production inefficiencies which is limiting the growth of the sector. The reviewed literature also showed that in Sierra Leone and other developing countries, there is a lack of proper planning and the government policies developed are weakly aligned with agricultural production goals. This has a negative impact on the growth of the sector, an adverse effect on the development of effective and efficient value chains, and a reducing effect on the competitiveness of the agribusiness to efficiently trade in foreign markets. The government of Sierra Leone should take necessary policy actions to improve the quality of governance in the country and adopt the required policies which they should properly implement. The following section provides some of the recommendations.

6.2 Recommendations

1. Taking into account that some of these policies (SLSB, SLIEBA, PMB, SMEDA, and SLLCA) cover other sectors, for agricultural production inefficiency in Sierra Leone, the government should ensure that an inter-institutional framework is designed to ensure synergy in the implementation of institutional programs, thereby identifying bottlenecks and making real-time recommendations to government for the introduction of follow up interventions and or policies.
2. To enhance agricultural efficiency, the government should provide an environment that enhances respect for institutional frameworks through strongly controlling corruption and securing property rights (strengthening the rule of law). The institutional environment should encourage people to undertake long-term investments in agriculture.
3. The government should ensure that political institutions encourage citizens to engage in productive activities rather than the transfer of resources.

4. The government should put up a conducive regulatory environment to promote public-private investment in agriculture to mobilize additional resources to promote the growth of the sector.
5. Policymakers should adopt agricultural transformation to increase Agri-food and services to boost the country's economy.
6. Policymakers must set favorable policy measure that recognizes smallholders and local communities and set out incentive structures for agri-entrepreneurs that will secure the right to access markets.
7. The government should provide adequate public funding to finance agribusiness and facilitate the development of technical and entrepreneurial skills.
8. This study also suggests that the government should bring agricultural reformation into the domestic market to encourage private and rural investment.
9. Agri-entrepreneurs are encouraged not to only engage in the production of agricultural products, but also to store, process, and package ready-to-use agricultural produce as market demand.

6.3 Suggestions for further research

Future studies should concentrate on examining opportunities and formalizing regulations to help build strong institutions to grow agribusinesses. This will make it easier to comprehend how rules affect agribusinesses, especially in Sierra Leone. This research focused on the impact of governance and regulatory policies on agriculture production inefficiency and the growth of the agroindustry in Sierra Leone. Therefore, other researchers are encouraged to examine ways in which strong institutions to support the industry may be developed and ways to enhance public-private investment in the country's agribusiness industry to mobilize financial resources.

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