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The competitiveness of The Gambia agro-food trade

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This paper examines the competitiveness of The Gambia agri-food exports from 2012 to 2021 utilizing the revealed comparative advantage index, the Kaplan-Meier survival function, and Cox regression model. The results indicate that thirteen of the twenty-four products have comparative advantages in the global market, while seven of the twenty-four products have comparative advantages in the regional market. In terms of product structure, raw materials are sources of comparative advantage in global trade. While processed products offer comparative advantages in regional trade. In general, global agri-food trade has comparative advantages over regional agri-food trade. However, the duration test indicates that competitive positions are generally declining. Survival chances fell from 96% at the start of the period to 13% at the end, indicating that The Gambia faces fierce competition in global and regional agri-food trade. The hazard regression analysis reveals that inflation and good governance significantly reduce the hazard rate and hence improve the duration of agro-food exports.

Key words: The Gambia, cox regression, agro-food trade, comparative advantage, competitiveness.

INTRODUCTION

In an open global environment, a sustainable economy and sustainable economic development can develop and sustain when an economy and its sectors are competitive on both domestic and foreign markets over time. The Gambia's agri-food exports as a percentage of total merchandise exports are constantly increasing but are primarily based on unprocessed agri-food raw materials and low-processed products. About 75% of all household income comes from the crop subsector, which also produces about 40% of the foreign exchange earnings. Direct investments in the food industry can shift the trade structure in favor of production and the export of more processed products with high value added. This will increase consumer demand for high-quality agro-food products. Among the most significant factors affecting the growth of the agro-food trade are economic restructuring, productivity growth, an improvement in product quality, and changes in specialization toward comparative advantages (Bojnec and Fertő, 2012). The Gambia has a high potential for agricultural production, which is evidenced by its consistent growth in value, employment share, higher exports of agro-foods, and gross domestic product (GDP) contribution. However, there has been very little research into comparative advantages in The Gambia. Likewise, research on agricultural competitiveness in The Gambia using trade data is

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limited. Both analyses are especially pertinent to the country, given the critical role that agro-food exports play in development, particularly for the rural population, which accounts for a sizable proportion of the total population.

The three contributions of this paper to the current literature are as follows: Firstly, even though there is only one study on the competitiveness of The Gambia's international trade, the research periods typically end in 2014. This study extends the timeframe past 2014. Secondly, we use Balassa's (1965) revealed comparative advantage index to investigate agro-food export dynamics in The Gambia. We describe how these trade developments have changed over time and how they will probably change going forward. Third, we used a hazard regression model with governance and trade independent variables that could influence the agro-food exports duration. Fourth, the study identifies product categories and individual products with strong market positions that serve as the backbone of the agri-food industry. This is based on researchers' and decision-makers' expectations that West African countries with abundant land and labor will become important net exporters of agricultural products to the global market. Thus, the findings may be of broader interest to those involved in commercial trading as well as policymakers involved in rural development.

LITERATURE REVIEW

The literature on trade and economic development contends that factor endowments and good governance promote trade and development. The competitive capacity of specific sectors is influenced by factors such as population size and structure, capital and natural resources, and economic governance style (Sulmicki, 1977). Most studies show a positive relationship between productivity and comparative advantage. It is obvious that many of the most competitive countries are also the most productive - allowing for more efficient resource utilization (Gaubert and Itskhoki, 2021; Alviarez, 2019; Jambor et al., 2018). A country's ability to produce and export in global markets is more likely to occur in line with its comparative advantage. Technical progress is one of the influential factors that aids countries in gaining a sustainable competitive advantage and improving market survival (Prasanna et al., 2019; Pais and Bonito, 2018; Ahmedova, 2015).

According to many studies, export earnings support economic growth primarily through their ability to stimulate investment and capital formation (Feddersen et al., 2017). Therefore, increased export growth contributes to higher economic growth (Mishra, 2011; Kim, 2011). Studies show that processed agricultural products outperform unprocessed agri-food raw materials in terms of comparative advantages. This suggests that processed goods are more competitive than raw materials, and that greater value-added yields greater comparative advantages (Mizik et al., 2020; Fertő, 2018). In the literature, there is evidence that suggests competitive advantages are greater for regional trade and less so for worldwide trade, highlighting the importance of regional trade agreements. Globally, it appears that regional trade in food and agricultural products has increased, which also suggests greater integration (Purwono et al., 2022; Bojnec, 2001).

A large body of literature provides evidence that technological innovation improves competitiveness and support economic sustainable growth (Kim and Kim, 2015), outward looking development strategies (Botella-Rodríguez, 2018; Keesing, 1967), well-educated labor force (Cho, 1994; Lucas, 1993) and technological innovation combined to bring what is so-called "Asian miracle".

This paper examines the competitiveness of The Gambia's agri-food trade and seeks to answer the following research questions:

(1) How do patterns of competitiveness change if The Gambia trades regionally or globally?
(2) How stable is The Gambia's ability to compete in the agro-food sector?
(3) Which governance and trade explanatory variables influence the duration of agro-food exports?
(4) Which products are more competitive: raw materials or processed goods?

METHODOLOGY

First, we are also interested in investigating the revealed comparative export advantage (B) index and duration of The Gambia's agro-food exports to both regional and global markets. Based on Balassa-proposed comparative trade advantage (B) (1965, 1977),

$$B_{ij} = RCA_{ij} = (X_{ij} / X_{it}) / (X_{nj} / X_{nt}) \quad (1)$$

where X stands for exports, *j* is the good, *I* is the nation, *t* is a set of goods, and *n* is a set of nations. The observed trade pattern forms the basis of the B index. It gauges a nation's export of a specific good in relation to its overall exports and the performance of various nations' exports in general. There is a comparative export advantage, or a sector in which the nation is relatively more specialized in terms of export, if $B > 1$. When $B < 1$, there is a comparative export disadvantage.

The Balassa index is criticized for its asymmetric values. The B-index's asymmetric value reveals that it has a range of one to infinity; this is generally not a problem, but in the case of comparative disadvantage, it can vary between zero and one, overestimating the relative weight of a sector. To address the shortcomings of the Balassa index, Dalum et al. (1998) transformed it into the Symmetric Comparative Advantage (RSCA) index:

$$RSCA = (B - 1) / (B + 1) \quad (2)$$

The RSCA index has a range of -1 to 1. Values between -1 and 0 indicate a comparative export disadvantage, while values between

0 and 1 indicate a comparative export advantage. The RSCA distribution is symmetrical and centered on zero, preventing possible bias (Dalum et al., 1998).

Aside from the Balassa index, Bojnec and Ferto (2008) suggest survival function, S(t). For the analysis of the RSCA index's product level distribution, S(t) employs the non-parametric Kaplan-Meier product limit estimator. The sample contains explanatory observations, denoted as ti, ci, where I = 1, 2,…., n; ti is the survival time and ci is the censoring variable C of observation I (C=1 if a failure occurred and 0 otherwise). Additionally, it is assumed that the recorded failure times are m < n. The orderly times of survival are then described as t (1) < t (2) <…< t(1):

$$\hat{S}(t) = \prod_{t(i) < 1} n_j - d_j / n_j \quad (3)$$

The survival function was calculated by pooling estimates from all products and years to create a single estimate. The results were then displayed at the national level. According to Besedeš and Prusa (2011), survival export relationships are necessary for trade expansion and export growth, and export expansion leads to higher economic growth (Greenaway et al., 1998). The equality of survival functions is also checked by two non-parametric tests, log-rank testing, and Wilcoxon testing.

In addition, we run the following stratified Cox proportional hazard model:

$$h_s(t, x, \beta) = h_{so}(t) \exp(x' \beta) \quad (4)$$

where x is a vector of independent variables and β (predictor parameter) is an estimate. The baseline hazard, $h_{s0}(t)$, describes how the hazard function evolves over time. Explanatory variables include typical trade model variables such as demand, exchange rate and factor endowment, as well as inflation. Higher factor endowments are expected to promote trade and positively influence trade durability. The real effective exchange rate (RER) is used to explain the duration of agro-food exports as a proxy for potential economic instability as well as inflation (INF). It reflects a country's perceived level of economic instability as well as the competitiveness of its exports, with an impact on trade duration. Depreciation of domestic currency may boost exports and increase trade competitiveness. GDP per capita and agricultural land are used as proxy measures for factor endowments. Economic output per person is also a universal indicator of economic development (Bojnec and Fertő, 2012). In addition, we included a proxy that measures institutional aspects of governance. We anticipate that improved governance, including voice and accountability, political stability, government effectiveness, regulatory quality, rule of law and control of corruption will contribute to the performance of agro-food exports (Shpak and Pilipuk, 2014), as well as positively impact the duration and size of trade. The impacts of good governance on agro-food trade have been neglected in trade literature. The performance of the Gambia's agriculture and food exports in global and regional markets is examined using World Bank World Integrated Trade (WITS) data from 2012 to 2021. The sample consists of data from product groups classified at the HS-6 level (HS1 to 24).

RESULTS AND DISCUSSION

Agro-food sector analysis in The Gambia

Factors of production like agricultural land, labor, and agricultural share are important in agro-food production, processing, and trade

Despite the significance of the agro-food sector in The Gambian economy, its share and performance have been inconsistent in recent years. Food exports have increased significantly, while the rural population has decreased. Over time, both the agricultural value-added share, and the share of agricultural employment have decreased. In 2020, agro-food exports will account for more than two-thirds of food exports and more than a quarter of employment, demonstrating the sector's importance in economic development, particularly in rural areas where about 40% of the people live (Table 1). The share of agro-food in total export and agro-food export have both decreased significantly, indicating that non-agro-food products are growing the fastest (Table 2).

The analysis of agro-food product groups revealed that the most important products differ globally and regionally, with evidence of high concentration around seven top product groups. Fish and crustaceans; fruits and nuts; oil seed and oleaginous fruits; animal or vegetable fats and oils; and sugars and sugar confectionery were the most important product groups at the global scale, and their market share increased at the end of the period studied (Table 3). Aside from these product groups, the other most important product groups are dairy products and birds' eggs; and coffee and tea but their market shares have decreased significantly by the end of the studied period. The results, however, show a high concentration of agro-food product groups, with the top seven product groups accounting for more than three-quarters of all agro-food exports.

Similarly, the analysis revealed that coffee, tea and mate; sugars and sugar confectionery; animal or vegetable fats and oils; and cereal preparations were the most important regional export products, with their market shares increasing by the end of the period studied. Aside from these products, dairy products, and birds' eggs; vegetable, fruit, and nut preparations; and miscellaneous preparations are the other most important product groups, though their market share has decreased significantly by the end of the study period (Table 3). The results, however, show a high concentration of agro-food product groups, with the top seven product groups accounting for more than 85% of all agro-food exports at regional level.

Competitiveness of agro-food trade in The Gambia

The revealed comparative advantage levels and compositions are analyzed over time for global trade, regional trade, and product groups using HS product group classification data. The analysis's results, as well as the product group classifications, are discussed subsequently.

HS agri-food product group classifications

The agro-food product groups used in this study are

Table 1. The agro-food sector's role in the Gambian economy.

2012				2021			
Food export%	Rural population%	Agriculture value added	Employment in agriculture	Food export%	Rural population%	Agriculture value added	Employment in agriculture
54.09	42.90	27.39	30.54	88.23	37.42	20.98	27.03

Source: Author's estimation from World Bank.

Table 2. Agro-food exports to the global market.

In millions of dollars			Agro-food exports as a percentage of total exports		
2012	2016	2020	2012	2016	2021
32,221.84	24,175.13	5695.6	27.15	66.75	22.02

Source: Author's estimation from WITS.

Table 3. Top 7 product groups share of total agro-food trade in the global and sub-Saharan market.

Products	2012	2016	2021
Global			
Fish and crustacean	3.31	10.83	10.54
Dairy products, and birds' eggs	18.73	8.80	3.50
Edible fruit and nuts	9.31	9.74	18.58
Coffee, tea, and mate	8.58	14.93	7.47
Oil seed, oleaginous fruits	5.08	37.02	12.74
Animal or vegetable fats and oils	15.73	2.91	19.04
Sugars and sugar confectionery	6.63	5.30	6.55
Total	67.38	89.54	78.42
Sub-Saharan			
Dairy products, and birds' eggs	26.61	22.25	8.18
Coffee, tea, and mate	12.10	37.76	17.48
Animal or vegetable fats and oils	8.56	7.15	31.78
Sugars and sugar confectionery	9.42	13.40	15.32
Preparations of cereal	6.00	6.31	12.27
Preparations of vegetable, fruit, and nuts	4.93	8.16	0.32
Miscellaneous preparations	9.07	3.16	1.24
Total	76.70	98.20	86.59

Source: Author's estimation from WITS.

shown in Table 4.

RCA analysis

The comparative advantage coefficient (RCA) was used to assess the degree to which The Gambia's products are competitive on the global market. RCA greater than one indicates comparative advantages, while an RCA less than one indicates comparative disadvantages. The Gambia had the highest average comparative advantage in the following product groups: sugars and sugar confectionery (10.20), dairy products and birds' eggs (9.81), edible fruits and nuts (8.95), coffee and tea (8.21), oil seeds and oleaginous (7.77), fish and crustaceans (7.58), and animal or vegetable fats and oil (5.76).

Meat, fish, or crustacean preparations (3.95); cereal, flour, and starch preparations (3.65); milling industry products (3.60); miscellaneous edible preparations (3.27); and vegetable, fruit, and nut preparations (3.08);

Table 4. The Agri-food product groups classification.

Code	Product groups
01	Live animals
02	Meat and edible meat offa
03	Fish and crustacean
04	Dairy produce
05	Products of animal origin
06	Live tree & other plants
07	Edible vegetables, roots, and tubers
08	Edible fruit and nuts
09	Coffee, tea, mate and spices
10	Cereals
11	Products of the milling industry
12	Oil seed and oleaginous fruits
13	Lac, gums, resins and other vegetable saps
14	Vegetable plaiting produces
15	Animal or vegetable fats and oils
16	Preparations of meat and oils
17	Sugar and sugar confectionery
18	Cocoa and cocoa preparations
19	Preparations of cereals and flour
20	Preparations of vegetable, fruit, nuts, etc.
21	Miscellaneous edible preparations
22	Beverages, spirits and vinegar
23	Residues and waste from the food industries
24	Tobacco and tobacco products

Source: Author's estimation from WITS.

residues and waste from the food industries (1.64) had the lowest comparative advantages. While live animals; meat and edible meat offal; products of animal origin; live trees and other plants, edible vegetables; cereals, Lac, gums, and resins; cocoa; vegetable plaiting materials; beverages and spirits; and tobacco all had comparative disadvantages during the study period (Table 5).

However, it is worth noting that, in comparison to the previous study, products of animal origin; edible vegetables; cereals; lac and gums; vegetable plaiting materials; and beverages and spirits had lost comparative advantages in global trade, whereas cereal product preparations and miscellaneous edible preparations had gained comparative advantages.

In terms of the Gambia's regional trade competitiveness, dairy products (6.97); meat and fish preparations (4.16); coffee and tea (3.66); and sugar (2.66) had the highest average RCA and are the most competitive in the Sub-Saharan market. While waste and food industry residue (1.91); vegetables, nuts, and fruits preparations (1.88); milling industry products (1.86); fruits and nuts (1.4); and miscellaneous edible (1.37) had some comparative advantages, the rest had comparative disadvantages. In summary, thirteen of twenty-four product groups were competitive in international trade, while nine of twenty-four product groups were competitive in regional trade involving the same product groups (Table 6).

Analysis of the duration of agro-food export

The duration of agro-food exports was examined using the Kaplan-Meier survival function in both the global and regional markets (Tables 7 and 8). The findings show that survival rates are deteriorating in both the global and regional markets. In other words, the results confirmed that export patterns were neither longer nor consistent throughout the study period. The global market's survival chances fell from 96% at the start of the period to 33% at the end of the studied period, indicating moderate competition. As expected, the duration of exports varies by product group, with fish and crustaceans (HS3), dairy produce, bird's eggs, and natural honey (HS4), fruits and nuts (HS8), coffee and tea (HS9), animal and vegetable fats (HS15), sugar and sugar confectionery (HS17), and cereal, flour, or milk preparations (HS19) having the longest survival periods on the global market. While milling industry products (HS11), oil seed, and oleaginous fruits (HS12), meat, fish, or crustacean preparations

Table 5. RCA of product groups in the global market.

Products	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.02	0.06	0.02	0.11	0.00	0.00	0.00	0.00	0.00
3	1.73	3.17	2.75	3.82	11.32	22.08	14.01	5.40	3.94	4.34
4	11.22	3.18	5.04	4.93	13.38	32.69	16.25	0.09	1.47	0.52
5	0.00	0.00	0.00	0.02	0.02	0.00	0.00	0.00	0.00	0.00
6	0.02	0.07	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.07	0.01	0.03	0.01	0.03	0.00	0.00	0.08	0.03	0.00
8	5.24	8.80	9.81	6.06	9.92	15.28	10.42	9.56	5.45	9.22
9	9.20	4.36	7.85	1.58	35.16	6.22	1.83	2.14	5.51	0.03
10	0.49	0.55	0.13	0.20	0.00	0.02	0.01	0.00	0.00	20.27
11	8.13	0.87	6.51	0.20	0.00	0.04	0.00	8.08	8.64	1.18
12	2.64	0.92	5.83	9.59	45.9	0.03	0.02	0.61	4.43	18.08
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.33	0.00
15	7.17	1.27	3.67	11.71	3.69	2.04	1.17	13.88	7.20	1.38
16	10.33	17.6	2.62	0.45	0.23	0.76	0.23	0.49	2.88	10.81
17	6.34	4.40	11.92	0.34	13.22	31.52	8.80	9.47	5.82	7.19
18	0.10	0.12	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	3.58	2.32	1.01	1.98	4.21	10.62	4.34	2.40	2.47	0.12
20	3.05	1.56	3.20	2.74	11.48	0.47	0.17	5.02	0.08	0.57
21	5.53	0.70	1.76	1.85	2.13	12.03	5.10	0.11	0.26	0.21
22	0.18	0.40	0.17	0.58	0.46	0.37	0.25	0.23	0.06	0.00
23	2.54	0.10	0.10	2.22	0.00	0.00	1.37	2.14	2.99	4.55
24	0.00	0.12	0.14	0.00	0.00	0.66	0.15	0.00	0.00	0.00

Source: Author's estimation from WITS.

(HS16), vegetable, fruit, and nut preparations (HS20), miscellaneous edible preparations (HS21), and food industries residues and waste (HS23) have the shortest duration.

The regional market's survival chances fell from 94% at the start of the period to 16% by the end of the period, indicating fierce competition in the sub-Saharan market. The results vary by product group, though the highest survival rate exists for dairy produce, bird's eggs, and natural honey (HS4), and vegetables and roots and tubers (HS7). While coffee and tea (HS9), milling industry products (HS11), meat, fish, or crustacean preparations (HS16), sugar and sugar confectionery (HS17), and cereal, flour, or milk preparations (HS19), vegetable, fruit, and nut preparations (HS20), and miscellaneous edible preparations (HS21) waste have the shortest duration. Generally, products with high comparative advantages had the highest survival rates in both markets.

To calculate the equality of survival functions among agricultural products, Wilcoxon and Log-rank tests were used. There are no similarities in the duration of comparative advantage across Gambia's agro-food exports, according to the test results, which demonstrate that the hypothesis of equality across survivor functions can be rejected at the 1% level of significance.

Analysis of the hazard model

The Cox proportional hazards model (survival regression model) was utilized to investigate the impacts of independent variables on the hazard (Table 5). If the estimated hazard rate is kgreater than one, the predictor is associated with decreased survival; if the rate is less than one, the predictor is associated with increased survival; a hazard rate of one indicates that the predictor has no effect on the survival.

The results show that the level of economic development (GDPC) and market size (GDP) reduce The Gambia's agro-food exports hazard rate, even though the two predictors were close but less than one, confirming our expectations as well as domestic currency appreciation (RER). The estimated inflation (INF) significantly decreased the hazard rate. The estimated results for governance (GOV) also show that good governance reduced the hazard rate significantly (Table 9).

Conclusion

Although there is little diversification in the agricultural sector, it is primarily rain-fed subsistence agriculture with

Table 6. RCA of product groups in the sub-Saharan market.

PRODUCT	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.57	0.31	0.81	0.38	0.27	0.37	0.00	0.00	0.30	1.03
4	9.09	4.03	2.83	4.51	2.81	37.93	0.16	0.10	1.33	0.68
5	0.00	0.00	0.01	0.04	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.09	0.01	1.35	0.02	0.01	0.00	0.00	0.00	0.00	0.00
8	0.01	0.51	4.42	1.34	0.25	1.94	0.00	0.00	0.00	0.00
9	9.08	6.6	0.15	1.64	0.59	7.60	0.11	2.26	4.93	0.04
10	0.13	0.03	0.23	0.06	0.17	0.00	0.08	0.00	0.06	0.01
11	2.16	1.45	0.04	0.07	0.00	0.00	3.72	2.95	2.66	0.50
12	0.00	0.00	0.00	0.85	0.00	0.00	0.00	0.00	2.07	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.17	0.17
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	1.36	1.60	0.53	0.23	0.32	0.06	1.31	5.43	2.07	0.32
16	7.02	2.10	19.02	0.40	0.11	0.44	0.05	0.00	1.74	11.25
17	1.79	2.84	1.20	0.09	0.10	8.53	0.25	2.50	1.30	2.17
18	0.23	0.42	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	2.00	0.52	1.29	1.26	0.93	8.00	0.06	1.76	1.45	0.09
20	2.82	2.64	1.37	1.79	0.79	0.64	0.40	6.41	0.10	0.91
21	3.63	1.09	0.47	1.30	0.91	4.33	0.35	0.09	0.16	0.19
22	0.14	0.12	0.32	0.56	0.48	0.43	0.87	0.25	0.06	0.00
23	3.36	0.16	0.18	0.04	0.00	0.00	0.00	0.00	1.88	5.21
24	0.00	0.00	0.06	0.00	0.00	0.38	0.33	0.00	0.00	0.00

Source: Author's estimation from WITS.

Table 7. Kaplan-Meier survival rates for 13 competitive product groups in the global market.

Year	Survival function	HS3	HS4	HS8	HS9	HS11	HS12	HS15	HS16	HS17	HS19	HS20	HS21	HS23
2012	0.96	1	1	1	1	0.90	0.90	1	0.90	1	1	0.90	0.90	0.90
2013	0.93	1	1	1	1	0.90	0.90	1	0.80	1	1	0.80	0.90	0.90
2014	0.85	1	1	1	1	0.78	0.78	1	0.70	1	1	0.70	0.78	0.90
2015	0.79	1	1	1	1	0.78	0.67	1	0.70	1	1	0.60	0.68	0.77
2016	0.73	1	1	1	1	0.78	0.56	1	0.70	1	1	0.50	0.56	0.77
2017	0.67	1	1	1	1	0.78	0.56	1	0.70	1	1	0.50	0.45	0.77
2018	0.57	1	1	1	1	0.78	0.56	1	0.70	1	1	0.50	0.33	0.58
2019	0.50	1	1	1	1	0.52	0.56	1	0.70	1	1	0.33	0.33	0.38
2020	0.43	1	1	1	1	0.26	0.28	1	0.35	1	1	0.33	0.33	0.19
2021	0.33	1	1	1	1	0.26	0.28	1	0.35	1	1	0.33	0.33	0.19
Log-Rank Test								0.00						
Wilcoxon Test								0.00						

Source: Author's estimation from WITS.

a food self-sufficiency ratio of about 50%. Agricultural exports, on the other hand, play an important role in the Gambian economy. The agro-food sector generates foreign exchange earnings, creates jobs, and contributes to higher economic growth by increasing aggregate demand. This paper's main contribution is to analyze The Gambia's export performance in global and regional markets using the Balassa index, survival analysis, and

Table 8. Kaplan-Meier survival rates for 9 competitive product groups in the sub-Saharan market.

Year	Survival function	HS3	HS4	HS8	HS9	HS11	HS12	HS15	HS16	HS17
2012	0.96	1	1	1	1	0.90	0.90	1	0.90	1
2013	0.93	1	1	1	1	0.90	0.90	1	0.80	1
2014	0.85	1	1	1	1	0.78	0.78	1	0.70	1
2015	0.79	1	1	1	1	0.78	0.67	1	0.70	1
2016	0.73	1	1	1	1	0.78	0.56	1	0.70	1
2017	0.67	1	1	1	1	0.78	0.56	1	0.70	1
2018	0.57	1	1	1	1	0.78	0.56	1	0.70	1
2019	0.50	1	1	1	1	0.52	0.56	1	0.70	1
2020	0.43	1	1	1	1	0.26	0.28	1	0.35	1
2021	0.33	1	1	1	1	0.26	0.28	1	0.35	1
Log-Rank Test						0.00				
Wilcoxon Test						0.00				

Source: Author's estimation from WITS.

Table 9. Survival regression estimates.

_t	Hazard Atio	Standard error	z	P>|z|
LNINF	0.1694357	0.1679904	-1.79	0.073*
LNRER	0.9757496	0.122662	-0.20	0.825
LNGDPC	0.9958885	0.0223112	-0.18	0.854
LNGOV	0.0000016	0.0000168	-1.32	0.188
LNGDP	0.9818601	0.0179716	-1.00	0.317

*10% significant level.
Source: Author's estimation from WITS.

hazard regression model between 2012 and 2021.

In terms of agro-food industry competitiveness, the results show that thirteen of the twenty-four products had comparative advantages in the world market, while seven of the twenty-four products had comparative advantages in the regional market, demonstrating a comparative advantage in both global and regional markets. The survival analysis confirms that agro-food exports have a moderate survival rate in the global market, with most product groups having a higher survival rate. The regional market stability analysis confirmed that most of the products' agro-food trade had temporarily fluctuated. This suggests that competition is fiercer at the regional level, and that the chances of survival for the same product structure in the long run are slim, implying fierce competition in agro-food markets.

The hazard regression analysis reveals that economic development and market size reduce the hazard rate and hence provide comparative advantages. The hazard rate is slightly reduced by appreciation in the real exchange rate, while inflation and good governance significantly reduces it. This implies that the large difference between the export price and the farm gate price makes it difficult for farmers and processors to earn a high income. Thus, ensuring proper export price transmission to an acceptable margin would improve production, processing, and trading in high-value-added agri-food products. On the international market, raw materials are sources of comparative advantages in terms of product structure. While processed goods offer comparative benefits in regional trade. According to previous research results, competitive advantages in regional agri-food trade are typically greater than in world agri-food commerce.

According to our findings, competitive pressures on The Gambia's agri-food exports will increase in the long run. Therefore, the country's competitiveness can be improved by focusing on the export of value-added products, increasing product processing, focusing on regional trade and products with competitive potentials, and ensuring prince stability. Future research could examine the costs and benefits of which product groups the country should specialize in, as well as provide policy implications.

CONFLICT OF INTERESTS

The author has not declared any conflict of interests.

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