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Analysis of Export Competitiveness of Kenya's Cut flower exports to the European Union Market

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Abstract: *This paper analyzed export competitiveness of Kenyan cut flower exports to the European Union market using secondary data from 2001 to 2017. Revealed Comparative Advantage (RCA) was used to assess the competitive position of Kenyan cut flower exports in the global picture and a multiplicative model which assessed the determinants of cut flower exports to the European Union market while a Multiplicative model was used to evaluate the determinants of cut flower exports to the European Union market. Revealed Comparative Advantage index indicated that Kenya exhibits a very strong comparative position in relation to Malaysia, Germany, Italy and Belgium. Kenya exhibits moderate comparative advantage against Israel and the Netherlands and a weaker comparative advantage against Colombia. The study also found out that Kenyan cut flowers were uncompetitive in relation to exports from Ecuador and Ethiopia. Real interest rate, real exchange rate and foreign income were significant in relation to the competitiveness of cut flower exported to the European Union market whereas agricultural GDP was insignificant. Enforcement of food safety and Sanitary and Phytosanitary standards to maintain high shares in the European Union market and the development and enhancement of policies that will stabilize interest and exchange rates is essential.*

Key Words: *Competitiveness, Cut flowers, Revealed Comparative Advantage, Robust Regression*

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I. Introduction

Exports plays a vital role in the economic growth and development of a country arising primarily from production, economies of scale rising from international markets and employment creation especially in developing Countries. In Kenya, substantial growth has been achieved in the last decade in the flower industry worldwide. Kenya's position in the export markets has continued to grow over the years and with 38% market share to the European Union (EU) market, it is among the leading exporters (Horticultural Crops Directorate, 2018).

Hale and Opande 2005, reported that cut flower exported to the EU are mainly auctioned or sold to whole sellers with Netherlands providing the primary market for flowers. The country's position as a major flower producer in the world has however been changing from time to time majorly due to changing and unpredictable climatic conditions. The aim of this paper is to assess the competitiveness of Kenyan cut flower exports in the EU market.

According to the Horticultural Crop Directorate (HCD) statistics of 2017, Kenya's export volume has recorded the highest growth in volume and value of cut flowers exported every year from 2010 to 2017 as shown in fig 1. Exports has exhibited an upward trend in value from 35.5 billion shillings in 2010 to 82.25 billion shillings in 2017 while volumes increased from 120,221 metric tons in 2010 to 159,961 metric tons in 2017 (fig 1).

Figure 1: cut flower export volumes in metric tons and value in billion shillings
Source: Author's computation using data from ITC statistics database

II. Literature Review

2.1 Theoretical literature

Export competitiveness has been defined in numerous ways along several scopes in literature. Boansi 2013, defines competitiveness as "the ability of a country (a firm/or an entity) to offer products and services that meet local and international quality standards, worth domestic and global market prices and provide adequate returns on the resources used in producing them". Latruffe, 2010 defined competitiveness as the ability to face competition and to be successful when facing competition".

Trade theory suggests that a country's competitiveness is based on the notion of comparative advantage. Trade flows among countries are the result of differences in their resource endowment and

production costs. Under common conditions, a country will specialize in production of a good in which it has a cost advantage. This paper however makes use only of the revealed comparative advantage (RCA) measures in assessing cut flower export competitiveness for Kenya.

2.2 Empirical literature

RCA and a multiplicative models were used in assessing the competitiveness of cut flower exports to the EU market. Previous studies include Mahmood (2004), Ghaniet et al. (2008), Shah et al. (2009), Yego, Samoei and Biwott (2016), Orindi (2010), Miano (2009), Eita (2008), Yego & Siahi (2018) and Meme (2011). The regression results of a study on the determinants of the Kenyan exports by Orindi (2010) indicated that explanatory variables namely, the importer's GDP and population provided most of the explanatory power in the regression. The coefficients of these variables had positive signs and hence they were consistent with theoretical expectations.

Miano (2009) in a study investigated factors that determine tea export supply in Kenya by using time series data from 1970-2007: the author employed Simple linear model using Ordinary Least Squares (OLS). The variables under consideration were real exchange rate, input prices, and prices of tea substitutes, weather patterns, wage rate and structural adjustment programmes.

Yego & Siahi (2018)assessed the competitiveness and determinants of Livestock and livestock products exports from Kenya and concluded that an increase in Kenya's and importer's GDP led to an increase in exports. The distance variable was negative and significant implying an increase in distance has an inverse relationship with livestock and livestock products exports. Distance was used as a proxy to transaction costs.

Meme (2011)estimated the export performance of horticultural exports from Kenya and concluded that Agricultural GDP, Real exchange rate and Real interest rates explained the performance of horticultural exports while foreign income did not significantly explain the performance of horticultural products exports.

III. Data And Methodology

3.1 Data types and sources

This study used secondary data for the year 2001 to 2017 (data for analyzing the Revealed Comparative Advantage was from 2008 to 2017). Data for Cut flower exports in tons was obtained from International Trade Commodity (ITC) statistics while GDP per capita was obtained from World Development Indicators database of the World Bank. Data for exchange rate and real interest rates were obtained from the Central Bank Statistical Bulletin while that of Agricultural GDP was obtained from FAOSTAT data base while that of Consumer Price Index (CPI) for Kenya and importing countries was obtained from the World Development Indicators (WDI) of the World Bank. The market of focus was for the 28 members of the European Union commonly known as EU-28.

Table 1: Definition of variables

Variable	**Explanation**	**Expected *a priori* assumption**
Cut flower exports (y)	Total exports to EU-28 in metric tons	Dependent variable
Agricultural GDP (x1)	Capacity to produce in the agricultural sector implying that an increase in its GDP reflects an increase in exports	+
Real interest rate (x2)	Changes in real interest rates affects exports due to its effects in the cost of borrowing i.e. cut flower industry is capital incentive and most exporters get capital through loans	-
Real effective exchange rate (x3)	Depreciation or appreciation of the local currency has an effect on the value of exports	-/+
Foreign income(x4)	Changes in national income in foreign countries affect the exports through the income effect that occurs when there is a change in consumption due to a change in real income	+

3.2 Model specification

3.2.1 Revealed Comparative Advantage

The RCA index, presented by Balassa, is in the shape of ratios of two shares. The index explores whether the country has a comparative advantage over the rival countries. The standard Balassa s' RCA index is in following form:

$$RCA = In\ [(X_{ik}/\Sigma X_k)/ (X_{ir}/\Sigma X_r)] \ldots\ldots\ldots\ldots (1)$$

Where, X_{ik} *= Exports of cut flowers from Kenya to the EU*

X_k *= Total exports from Kenya to the EU*

X_{ir} *= Exports of cut flowers from a rival country to the EU*

X_r *= Total exports from a rival country to the EU*

The advantage of using RCA index is that it considers the inherent advantage of a particular export commodity and is constant with the change in an economy's comparative factor endowment and productivity.

The shortcoming though, is that it cannot differentiate improvements in factor endowment and pursuit of suitable trade policies by a country (Batra and Khan, 2005). RCA can be further categorized into four classes according to the works of Hinloopin and Van Marrewiyk (2001):

Class a: 0< RCA index ≤ 1: Comparative disadvantage
Class b: 1< RCA index ≤ 2: Weak comparative advantage
Class c: 2< RCA index ≤ 4: Medium Comparative advantage
Class d: 4< RCA index: Strong comparative advantage

A multiplicative model was adopted in assessing the determinants of cut flower exports to the EU market. The study adopted the model of the following form;

$$Yi = \beta_0 + X^{\beta 1}{}_{1i} + X^{\beta 2}{}_{2i} + X^{\beta 3}{}_{3i} + X^{\beta 4}{}_{4i} + \mu_i \ldots\ldots\ldots\ldots\ldots \quad (2)$$

Where, *Yi = Cut flower exports to the EU market in tons*
X1 = Kenya's agricultural GDP
X2 = Real interest rate
X3 = Real effective exchange rate
X4 = Importer's GDP per capita (proxy for foreign income of the importer)
$\beta_0 - \beta_4$ *= parameter estimates*
μ_i *= Error term*

The model above can be linearized into double logs as follows:

$$LnYi = \beta_0 + \beta_1 LnX_{1i} + \beta_2 LnX_{2i} + \beta_3 LnX_{3i} + \beta_4 LnX_{4i} + \mu_i \ldots\ldots\ldots\ldots \quad (3)$$

IV. Results And Discussion

4.1 Revealed Comparative advantage index of Kenya and her competitors in the EU market

The period under consideration is 2008-2017 as indicated by the summary of results presented in Table 2. Kenya exhibits a very strong comparative position against its rival countries Malaysia, Germany, Italy and Belgium with very strong RCA indices (RCA>4) for the whole period under investigation. It exhibits a moderate comparative advantage against Israel and the Netherlands and a weaker comparative advantage against Colombia. Netherlands is the leading exporter of cut flowers accounting for 52% of total cut flower exports in the world but is also a one of the largest importers of the same with the main destination of Kenya's cut flower exports in Europe.

Table 2: RCA index: Cut flowers and flower buds - SITC REV 3, CODE - 0603

Year	Belgium	Colombia	Ecuador	Ethiopia	Germany	Israel	Italy	Malaysia	Netherlands
2008	5.66	1.27	0.97	-0.79	7.56	3.19	5.70	8.04	2.25
2009	5.02	1.49	0.27	-1.06	7.54	2.56	5.71	8.33	2.24
2010	4.58	1.12	0.31	-0.86	7.67	2.20	5.58	8.50	2.24
2011	4.68	1.81	0.41	-0.80	7.00	2.99	5.72	8.82	1.99
2012	4.62	1.89	0.25	-0.82	6.87	2.99	5.72	8.64	2.13
2013	4.67	1.89	0.55	-1.10	6.83	3.00	5.67	8.31	2.51
2014	4.54	1.77	0.28	-1.05	6.82	3.04	5.74	8.98	2.46
2015	5.70	1.42	0.31	-1.11	6.84	3.18	5.71	8.75	2.51
2016	5.76	1.39	0.54	-1.01	7.03	3.12	5.77	9.29	2.58
2017	5.82	1.44	0.57	-0.93	7.17	3.55	5.80	9.66	2.48

Source*:* ITC Trade map and own calculations

Kenya has however a comparative disadvantage over Ecuador and Ethiopia for the whole period under consideration (RCA < 1). These two countries appear to be in relatively strong competitive position than Kenya within the EU market as Ethiopia holds a very strong position in the export of cut flowers. This means that Kenya faces a threat especially signing of future preferential trade agreements between Ethiopia and the EU since cut flower structure between Kenya and Ethiopia are similar. This results were consistent with that of Mahmood (2004) of Pakistan's Agricultural exports.

4.2 Unit root test results

This section used secondary data from 2001- 2018, balanced fixed and short panel data set. The study used Im pesaran and Shin (IPS) panel unit root test. The null hypothesis is that all individuals follow a unit root while the alternative allows some individuals to have unit root (IPS, 2003). The variables were non-stationary at levels but became stationary upon first differencing (Table 2).

Table 3: Unit root regression results

Stationary at levels				Stationary at first differencing			
Variable	**statistic**	**p-value**	**Decision**	**Variable**	**statistic**	**p-value**	**Decision**
Y	6.247	1.000	Non stationary	Dy	-7.378	0.000	Stationary
x1	0.589	0.722	Non stationary	Dx1	-4.797	0.000	Stationary
x2	-5.492	0.000	Stationary	Dx2	-7.621	0.000	Stationary
x3	3.927	1.000	Non stationary	Dx3	-8.918	0.000	Stationary
x4	-5.295	0.000	Stationary	Dx4	-7.267	0.000	Stationary

Source*:* Authors computation from Stata software version 13.0
Note: "D" denotes differencing

4.3 Hausman test results

Two approaches are used in panel data i.e. the random effects model and the fixed effects model to decide on which method to use. Hausman test is done in order to determine the best approach between the two. The null hypothesis of the hausman test is that random effects is the best approach. Hausman test was conducted and the value of Probability > chi^2< 0.05, i.e. significant, then fixed effects becomes the best approach. In this study, the Hausman test revealed that ch2 (4) = 0.64. Probability >chi^2 = 0.9591 which is > 0.05 and hence the study used the random effects approach.

The study used robust random effects regression to check and correct for heteroskedasticity and serial correlation. Results for fixed effects and random effects regressions are presented in Appendices.

4.4 Robust random effects regression results

Table 4: Robust random effects regression results

Variable	Coefficient	Robust Std. error	Z	p>/z/
Dx1	-1.112	0.013	-85.70	0.000
Dx2	-0.020	0.001	-6.79	0.000
Dx3	0.428	0.012	34.92	0.000
Dx4	0.233	0.024	9.56	0.000
Constant	-0.169	0.001	-128.78	0.000
R^2	0.3960			
Ch^2	9267.21			
Probability > ch^2	0.000			

Source: Authors computation from Stata software version 13.0

The regression results resulted in the following model:

$$DYi = -0.169 - 0.02DX_2 + 0.428DX_3 + 0.233DX_4$$

From the results in Table 4, real interest rate (Dx2), real exchange rate (Dx3) and foreign income (Dx4) are significant in explaining the competitiveness of cut flower exports to the EU-28 market. The coefficients of the three variables are significant at 1% level of significance. A 1% increase in real interest rates lead to a decrease in the exports of cut flowers by approximately 0.2% and the inverse is true. The sign of the coefficient is negative and hence is theoretically consistent with economic theory. The horticulture industry in general is capital intensive and hence the level of real interest rates is very sensitive to exporters as low rates creates an incentive to borrow and vice versa. The coefficient of real exchange rate is positive and also theoretically consistent with economic theory. An increase in real exchange rate by 1% i.e. depreciation leads to an increase in cut flower exports to the EU market by approximately 42.3%. Depreciation of the Kenyan Shilling against the euro currency makes Kenyan cut flowers to be competitive thus increasing exports to these markets. The coefficient of foreign income (national income of importing country) is positive and statistically significant at 1% level of significance, which is consistent with economic theory. This implies that an increase in foreign income by 1% leads to a 23.3% increase in cut flower exports. An increase in the national income in foreign countries will lead to a surge in foreign demand of exports as a result of income effect and the *vice versa* is true. The coefficient of Agricultural GDP was significant but negative against the theoretical aspects of supply.

Similar results were reported by Meme (2011) while estimating the export performance of horticultural exports from Kenya. The author concluded that Real exchange rate and Real interest rates and Agricultural GDP explained the performance of horticultural exports while foreign income did not significantly explain the performance of horticultural products exports. In this study however, the coefficient of Agricultural GDP was negative but while that of foreign income was positive and significant.

V. Conclusion

The study sought to analyze export competitiveness of Kenya's cut flower exports to the European Union market. The study found that in relation to RCA indices Kenya's cut flower exports were highly competitive against Malaysia, Germany, Italy and Belgium while moderately competitive against Israel and Netherlands. The study also found that Kenya's cut flower exports were weakly competitive against Colombia's exports and uncompetitive in relation to exports from Ecuador and Ethiopia. The regression results indicated that real interest rate, real exchange rate and foreign income were significant in relation to the competitiveness of cut flower exported to the EU-28 market whereas agricultural GDP was insignificant in relation to the same.

The government therefore needs to develop and enhance interest and exchange rate stabilization policies. Monetary authorities should formulate policies that maintain the real exchange rate at a level that is competitive for the exports of cut flowers. Policies of lowering inflation should also be adopted since it is one of the key causes of high interest rates.

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Appendix

Appendix 1: Tables of summary statistics and regression results

Table A1: Summary Statistics

Variable	Observations	Mean	Std. Deviation	Min	Max
y	336	11.683	0.153	11.436	11.983
x1	336	13.93	0.543	13.043	14.717
x2	336	2.244	0.211	1.859	2.757
x3	336	4.521	0.383	3.899	5.082
x4	336	10.287	0.705	8.41	11.689

Source*:* Authors computation from Stata software version 13.0

Table A2: Fixed effects regression results

Variable	coefficient	Std. error	t	p>/t/
Dx1	-1.114	0.106	-10.5	0.000
Dx2	-0.019	0.012	-1.54	0.125
Dx3	0.430	0.066	6.49	0.000
Dx4	0.242	0.034	7.20	0.000
Constant	-0.169	0.012	-13.56	0.000

R^2	0.396			
F(4,276)	46.06			
Probability > F	0.000			

Source: Authors computation from Stata software version 13.0

Table A3: Random effects regression results

Variable	coefficient	Std. error	z	p>/z/
Dx1	-1.113	0.102	-10.95	0.000
Dx2	-0.020	0.012	-1.66	0.096
Dx3	0.428	0.064	6.74	0.000
Dx4	0.233	0.032	7.37	0.000
Constant	-0.169	0.012	-14.18	0.000
R^2	0.3960			
Ch^2	198.67			
Probability > ch^2	0.000			

Source: Authors computation from Stata software version 13.0

Appendix 2: Real Exchange Rate Computation

Real Exchange Rate computation (RER)

The computation of RER is as follows:

$$RER = E (P/P^*)$$

Where:

RER = Real Exchange Rate

E = Nominal Exchange rate

P = domestic price level (CPI)

P* = foreign price level (world price index)

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