Factors Influencing the Growth of South Africa's Agricultural Exports to World Markets

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Abstract

The paper assesses the factors influencing South Africa's agricultural export growth to its cardinal destinations between 2001 and 2014. A gravity model was used to present investigation of trade flows that has been validated as a suitable tool in determining export growth. The findings indicate that an improvement in South Africa's and importer's GDP causes an increase in agricultural exports. Distance and political stability have been shown to have no influence on the growth of agricultural exports to its trading partners. The importer's population and the export capacity showed a positive relationship on the growth of South Africa's agricultural exports to its trading partners. Trading agreements, which include AGOA and the TDCA with the EU, show a positive impact on increase in export performance. Therefore, the results suggest that South Africa should focus on countries with a growing population and GDP to improve agricultural export growth and market diversification.

Keywords: Agriculture, exports growth, world markets, South Africa, Gravity model

Introduction

South Africa's agricultural sector contributes approximately 3 % to the national GDP. The sector employs about 900 000 people, equivalent to 3.4 % of South African employment among the active sectors in the economy (STATSA, 2016). Agriculture is also a major earner of foreign exchange. South Africa is still a net exporter of primary agricultural products, earning from the international market an estimated value of $8.7 billion in 2015 (TradeMap, 2016). The country has formed a number of trade agreements with the European Union (EU) under trade preferential access known as the Trade Development and Cooperation Agreement (TDCA),

South African Development Cooperation (SADC) and African Growth Opportunity Act (AGOA). Flatters and Stern (2007) noted that since the inception of liberalised trade for South Africa and the involvement of the country in trade agreements, South Africa's agricultural export competitiveness in international markets has increased.

South Africa has since increased its trade beyond the EU, recently focusing on the African and Asian markets. The country's trade grew from $2.4 billion in 2001 to over $8.7 billion in 2015, which is equivalent to an annual average rate of 13 %. It has been notable that fruits are an important contributor towards South Africa's growing exports to world markets, accounting for a share of 33.39 % in 2015. Agricultural exports of beverages, spirits and vinegar, cereals and miscellaneous edible preparations to world markets have recently declined, from $1.1 billion in 2011 to $392 million in 2015. Market destinations have remained the same as they were in the 2000s, with the EU market losing its market share to African countries (TradeMap, 2015).

Various studies have been conducted on the factors that influence agricultural export growth to global markets. These factors include growing world population, economic growth, trade relationships among countries, exchange rates as well as improvements in technology and transport systems (Hatab, Romstad, Huo, 2010; Alleyne & Lorde, 2014; and Eita, n.d.). Fosu and Mold (2007) supported that economic growth plays an important role in the increase of trade flows among nations. The gravity model has been widely used as an analytical tool to assess the determinants of export growth in the world.

Hatab *et.al* (2010) argued that gravity model has been verified to be important tools in examining the bilateral trade flows and has been extensively used in the empirical literature in explaining bilateral trade and export determinants. The gravity model was inspired by Newton's physical law of gravity to explain economic interactions between nations. Eita, (n.d) futher supported that the gravity model states that there is an attraction between two countries' masses, inversely proportional to the distance between them, and enforced by trade agreements they belong to. The masses include GDP and population, and the distance between the countries creates transport costs. Authors such as Alleyne and Lorde (2014), Hatab et al. (2010), Idsardi (2010), and Eita (n.d.) have used the gravity model in bilateral trade and export determinants. Their empirical results indicated that explanatory variables such as GDP, GDP per capita and population have a positive effect on exports, although distance has a negative impact on the growth of exports. In most cases the exchange rate has shown to be insignificant with regard to export growth (Alleyne & Lorde, 2014, Hatab et al., 2010, Idsardi 2010, and Eita, n.d.).

Against this background, this paper seeks to review the factors that influence the growth of South Africa's agricultural trade performance between 2001 and 2014, with a special focus on agricultural exports. The rest of the paper is structured as follows: section 2 reviews South Africa's agricultural exports performance between 2001 and 2015. Section 3 presents the methodology estimation and section 4 present results of the empirical analysis. Section 5 summarises the paper and addresses important policy recommendations in South Africa in regard to factors that influence agricultural exports to the world.

South African export performance review

In this section, we briefly indicate the performance of South African exports over the period 2001–2015. **Figure 1** shows that the country's total exports and agricultural exports have been increasing over the years, although they have been characterised by fluctuations over time. South African exports, especially agricultural exports, experienced a strong growth of 70 % in the early 2000s (i.e. between 2001 and 2003) and then dropped by 6 % in 2006. The growth of exports to the global market was mainly influenced by the weaker exchange rate and the deregulation of the agricultural industry. The second significant period was experienced between 2007 and 2008 when the world suffered a global recession. During this period, South African exports experienced a sharp increase as global demand increased significantly, and the agricultural sector in the country also brought about $5.5 billion through foreign income, following an insignificant decline of about 0.6 % in 2009. After the recession the country's agricultural exports showed a significant increase which was presented through the global financial recovery period between 2010 and 2012. Strong signs of world recovery from the recession are observed from the steadily increasing world demand, which has triggered South African exports to the world. It has been noted that between 2014 and 2015, South Africa showed a loss of exports of about $915 million, which was attributed to the effects of drought, which affected maize and wheat amongst other primary products.

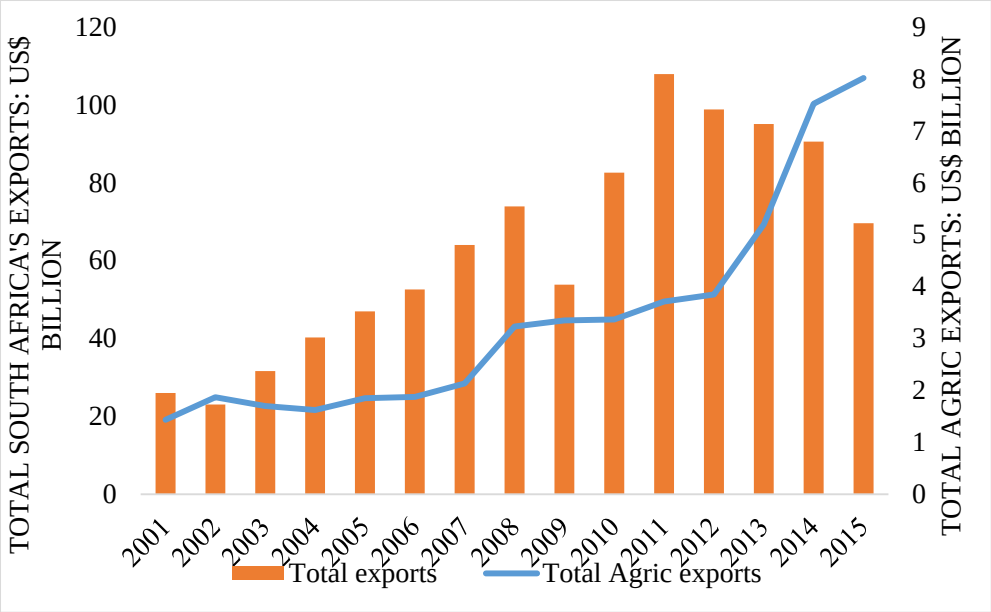

Figure 1: South African export growth between 2001 and 2014
Source; TradeMap (2016)

Figure 2 illustrates the composition of South Africa's major importing regions in the global market. During this period the SADC region was noted to be the largest importer, commanding a share of 49 %. The EU was ranked as the second largest market destination with a share of 37 %, followed by the Middle East (8 %) and the BRIC countries (6 %). According to the TradeMap database, the export share of EU markets deceased from 37 % in 2001 to 25 % in 2014 as South Africa shifted its focus to African and Asian markets. This is evident when evaluating the export share of the BRIC and SADC markets, with the former increasing from 2.5 % to 40.7 % during the period concerned, and the latter increasing from 21.1 % to 40.7 % during that time.

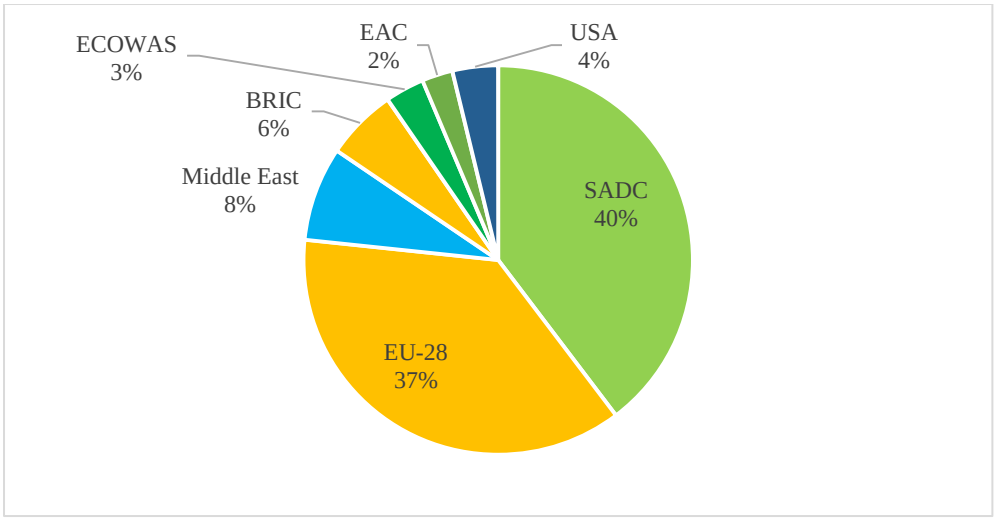

Figure 2: Composition of SA's exports
Source: TradeMap and authors' calculations

Table 1 shows the main agricultural products exported to the world markets. The listed top ten products further confirm the growth of agricultural exports over the period under review. In spite of the number of challenges the listed products face in the global markets, such as quality assurance and sanitary and phytosanitary regulations, there was still an increase in value against all odds. The increasing growth of the products in the global market is mainly influenced by product diversification into world markets.

Table 1: Main agricultural products exported to the world market

	Values in US$ million			
Products	2001	2008	2012	2015
Citrus fruit	205	663	903	1 095
Wine	230	757	772	698
Grapes	155	372	500	593
Pome fruit	98	354	496	558
Nuts nes	18	46	165	309
Fruit & veg juices	76	171	310	293
Wool	49	151	292	254
Maize	81	530	545	211
Food preparations	32	83	191	202
Preserved fruits nes	108	164	196	192

Source: TradeMap

Methodology

Foundation and specification of the model

The gravity approach was used for this study to determine the drivers of South Africa's agricultural exports to world markets. This model was first

developed by Tinbergen (1962) and Pöyhönen (1963) to measure the trade flows between countries. Bergstrand (1985) Deardorff (1995), Anderson and van Wincoop (2003) have proven the validity of the application of the gravity model and the theoretical basis was further explored. Literature also presents that there are three methods that account for the price effects in the gravity model which are the use of price indices, direct estimation and the use of country effects. Furthermore, literature also indicates that this model has its weakness, whereby price indices may not accurately show the true border effects. Accordingly, Anderson and van Wincoop (2003) indicated that the mdol has strenghn in solving for the multilateral/resistance indices as a function of the observables bilateral distance and a dummy variable for international border. Furthurmeore, this method accounts for bilateral trade flows between countries. Therefore, a description of the gravity in its linearised forms between 2001 and 2014 is expressed as follows;

$$LogX_{ji} = \alpha + log\beta_0 GDP_j + log\beta_1 GDP_i + log\beta_2 Pop_i + log\beta_3 D_{ji} + +log\beta_4 EX + log\beta_5 EXP\_C_{jti} + PLS + SADC_{ji} + TDCA_{ji} + CommL_{ji} \dots\dots\dots \quad (3)$$

Whereby the following represents

X_{ij} : South Africa agricultural exports to its destination

GDP_j : Gross Domestic Product of South Africa

GDP_i : Gross Domestic Product of importing country

Pop_i : Population of importers

D_{ij} : Average distance between South Africa and importers

EX: Exchange rate

EXP_C_{jti} : Export Capacity

PLS : Political Stability

$SADC_{ji}$:

$TDCA_{ji}$:

CommL: Common Language between South Africa and importers

The main economic masses of GDP in the gravity model, for an enhancement of bilateral trade, are represented by supply of the exporting country and demand increase of the importing country (Karamuriro & Karukuza, 2015). The model includes the exchange rate to measure the impact of currency devaluation on bilateral trade. The inclusion in the model of the distance between the two countries was to determine the impact of transportation costs. This study includes export capacity, which is the indicator used to present the ability to satisfy private quality standards faced by exporting countries in selling commodities to specific destinations (Cardamone, 2011). The TDCA, AGOA and SADC represent trade agreements (PTAs/FTAs) between South Africa and the European Union, the

USA and the SADC. These variables are treated as dummy variables and the inclusion of a common language, in this case English, and political landscape in case of political instability. All the data was sourced from the World Bank database except for trade flows, which were collected from TradeMap, and common language collected from the Central Intelligence Unit. The first step undertaken for the gravity model was to test multicollinearity among the variables. Therefore, **Table 2** represents correlational analysis that indicates coefficients that suggest that multicollinearity would not be a problem for model specification.

Table 2: Matrix of South Africa agricultural exports into 10 world markets

	SA's Exports	Importer's GDP	Exchange rate	Export capacity	South Africa's GDP	Distance	PLS	SADC	AGOA	TDCA
SA's Eports	1									
Importer's GDP	0.16	1								
Exchange rate	−0.081	−0.14	1							
Export capacity	0.15	0.06	0.014	1						
SouthAfrica's GDP	0.33	0.16	0.0086	0.24	1					
Distance	0.2051	0.61	−0.24	0.0075	0.003	1				
PLS	0.23	0.32	−0.57	−0.02	−0.02	0.33	1			
SADC	0.21	−0.30	0.24	0.006	0.003	−0.50	0.03	1		
AGOA	0.27	0.12	−0.013	0.008	0.004	−0.21	0,09	0.68	1	
TDCA	0.56	−0.09	−0.49	0.008	0.004	0.23	0.28	−0.11	−0.16	1
CommL	−0.099	−0.54	−0.043	0.007	0.0035	−0.14	0.12	0.14	0.19	0.19

This paper used panel data to estimate the regression model with the inclussion of three widely used model. This includes pooled, fixed and random regression models. A random effects model are defined as known as an appropriate in determing trade flows in a randomly selected sample of trading countries from a large population. A fixed effects model is known to a good model in determing trade flows between an ex ante predetermined selection of countries. Therefore, this article will use the Hausman test to determine the appropriate model of choice. Autocorrelation will be tested to confirm correlational relations between the variables.

Empirical results and discussion

Table 3 shows the results of the gravity equation. The table furthers shows the results of pooled, fixed and random effects as simulated from stata. The results of the three effects are different, and with the fixed effects model introducing heterogeneity through estimating the country effects, the Hausman test was used to test the ability of the presented models and their results. Eita (n.d) study argured that the Hausman test presents whether

null hypothesis is not correlated between variables in the model. Futhermore, this used to differentiate the fixed effects and random effects model. Therefore, if the null hypothesis is not rejected means that the random effects are preferre, if otherwise the fixed effects model will be appropriate. For the case of this study, the Hausman test shows that the null hypothesis is rejected, with an indication that country's specific effects are correlated. Therefore, the fixed effects is appropriate to interpret the results.

Table 2: Gravity model estimations

	Pooled	Fixed	Random
Importer's GDP	−0.786 (0.042)	0.78 (0.10) ***	0.57 (0.089)***
South Africa's GDP	1.09 (0.12) ***	0.195 (0.18) *	0.39 (0.112)***
Exchange Rate	0.24 (0.045) ***	−0.191 (0.166)	0.068 (0.135)
Distance	−0.018 (0.089) ***		−0.305 (0.48)
Population	−0.024 (0.076)	0.27 (0.25)*	−0.81 (0.44)*
Export Capacity	0.58 (0.35)	0.35 (0.18) *	0.36(0.19)*
Political stability	0.32 (0.104) **	−0.14 (0.10)	−0.012(0.106)
SADC	−1.19(0.44) *		3.95 (2.03)*
AGOA	2.292 (0.33) ***		−1.69 (1.400)
TDCA	2.86 (0.17) ***		2.7 (0.92)**
Common Language	−1.06 (0.27) ***		1.45 (1.06)
Number of observations	207	207	207
Constant	−8.07	−10.4 (3.6)	−8.7 (6.2)
Adjusted R squared	0.7287	0.686	0.3753
F-test		67.79***	
LM test			376
Hausman test		24.76***	

NB: ***, ** and * denote significance levels of 1 %, 5 % and 10 %, respectively.

The incomes of importing countries were expected to have a positive relationship with South Africa's agricultural exports. The results show that both GDP for South Africa and importers shown are statistically significant positive coefficients. South Africa's real exchange has an insignificant coefficient, indicating that they do not have impact on South African agricultural exports. The importers' population and export capacity shows a positive relationship with South Africa's exports, which present as factors that boost agricultural export growth. The results show that political variables have no influence on South Africa's exports to the main importers due to the fact that they are statistically insignificant.

Table 2: Second stage regression

Variables	Coefficient
Distance	−0.008(0.214)
Comp	−1.002(0.181) ***
TDCA	2.52 (0.192) ***
AGOA	1.5 (0.255) ***
SADC	0.23(0.37)

Notes: ***, ** and * denote significance levels of 1 %, 5 % and 10 %, respectively.

In solving the collinearity problem for the fixed effects for explanatory variables such distance and dummies, a second stage of individual effects was performed. The results showed that distance is statistically insignificant with a positive coefficient. Therefore, the null hypothesis is rejected and does not have impact on trade. It has also been noted that trade agreements that South Africa is currently involved in play an important role in boosting South African agricultural exports, although it has been noted that the gains in the SADC region have no significance, with a positive coefficient. This indicates that the SADC dummy variable with South Africa doesn't seem to determine export growth and that gains from regional trade agreements have been minimal.

Conclusion and recommendations

Agricultural exports play an important role in boosting a country's economic growth. The objective of this article was to analyse the factors behind the growth of exports to South Africa's major markets. The gravity model was used in explaining the factors behind the growth of agricultural exports between 2001 and 2014. It has been noted that the factors that influence the growth of South African exports is GDP and the FTA agreements with its major destination countries. It has been also noted that the exchange rate is not a driver of growth in agricultural exports as the results have shown that is insignificant. Lastly, distance and the political stability of their major destinations proved to have no influence on South Africa's exports. This is an indication that these factors distort trade flows to their major market destination. The paper concludes that growth in South African exports is mainly driven by population and income growth in the world market.

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