www.jard.edu.pl http://dx.doi.org/10.17306/J.JARD.2023.01669

Journal of Agribusiness and Rural Development

pISSN 1899-5241
eISSN 1899-5772

3(69) 2023, 315–322
Accepted for print: 14.09.2023

EFFECT OF THE SOUTHERN AFRICA DEVELOPMENT COMMUNITY (EXCLUDING SOUTHERN AFRICAN CUSTOMS UNION) AGREEMENT ON SOUTH AFRICAN EXPORTS AND IMPORTS OF WOOD AND WOOD PRODUCTS

Joshua Magomani[1]✉, Abayomi Samuel Oyekale[2], Michael Akwasi Antwi[3]

[1]University of Pretoria, South Africa
[2]North West University, South Africa
[3]University of South Africa, South Africa

Abstract. The aim of the study was to analyse the effect of the Southern Africa Development Community agreement (SADC) (excluding Southern African Customs Union (SACU)) on South African wood and the wood products trade, using the gravity model. The study used panel data from 1996 to 2016. The results showed that the SADC (excluding SACU) agreement positively impacts the exports of wood and wood products. However, on imports, there is insufficient evidence to indicate that the SADC (excluding SACU) agreement has a statistically significant positive effect on South African wood and wood products. The SADC (excluding SACU) is an important market for South African wood exports and wood products exports. Therefore, maintaining or improving trade facilitation measures could further benefit South Africa's exports of wood and wood products.

Keywords: SADC, South Africa, exports, imports, wood and wood products

INTRODUCTION

The wood and wood products industry, in accordance with the standard industrial classification, is one of eleven divisions of the agro-processing industry. The South African high unemployment rate coupled with low economic growth has underscored the important role of the agro-processing industry in job creation. This is seen in policies such as the National Development Plan (NDP), Industrial Policy Action Plan (IPAP), and Agriculture Policy Action Plan (APAP) (DAFF, 2016). This study, at a disaggregated level, provides the implication of the Southern Africa Development Community (excluding Southern African Customs Union (SACU)) (SADC (excluding SACU)) on South African exports and imports of wood and wood products. In excluding SACU members, the study intends to show the real impact of the SADC agreement. Conversely, it avoids claiming success achieved under the SACU as that of the SADC agreement as other studies conveniently do.

The Southern African Customs Union (SACU), established in 1910, is an agreement between the Governments of the Republic of Botswana, the Kingdom of Lesotho, the Republic of Namibia, the Republic of South Africa, and the Kingdom of Swaziland (Eswatini). The objectives of SACU, as contained in Article 2 of the 2002 SACU Agreement, are to facilitate the cross-border movement of goods between the territories of the Member States; create effective, transparent, and democratic institutions,

✉Department of Agriculture, Land Reform and Rural Development, University of Pretoria, Arcadia, South Africa, e-mail: magomanij@gmail.com, https://orcid.org/0009-0007-8183-2632

which will ensure equitable trade benefits to Member States; promote conditions of fair competition in the Common Customs Area; increase investment opportunities in the Common Customs Area; enhance the economic development, diversification, industrialization, and competitiveness of Member States; promote the integration of Member States into the global economy through enhanced trade and investment; facilitate the equitable sharing of revenue arising from customs, excise, and additional duties levied by Member States; and facilitate the development of common policies and strategies (SACU, 2019).

The Southern African Development Community (SADC), signed in 1996, is a regional economic community comprising of 16 Member States, namely: Angola, Botswana, Comoros, Democratic Republic of Congo, Eswatini, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Tanzania, Zambia, and Zimbabwe. The overall aim of the Southern African Development Community (SADC) is to achieve Regional Integration and Eradicate Poverty within the Southern African region. To achieve these goals, member states need to work together harmoniously to achieve effective results on common problems and issues. The SADC has several legal and institutional instruments in place to guide and standardise its work. One of these instruments is the SADC Protocols, which enshrine the aims of the Community by providing codes of procedure and practise on various issues, as agreed by Member States. The implementation of the SADC protocol on trade started in 2000 (SADC, 2019).

The wood and woods products industry play an important role in the South African economy in terms of trade, employment creation, and investment opportunities, as illustrated in Figure 1 and 2 below.

As depicted in Figure 1, the South African exports and imports of wood and wood products show an increasing trend over the period under review. The exports of wood and wood products increased from about R 808,33 million in 1996 to R 7 237,26 in million in 2021. Likewise, imports increased from R 803,56 million in 1996 to R 5 341,85 million in 2021. After 2015, South Africa's trade surplus for wood and wood product division appears to widen more as compared to the period 2008 to 2014.

The real output, investment, and employment of the wood and wood products division are shown in Figure 2. The real output depicts an increasing trend, albeit slow, over the period under review. The real output increased from approximately R 15 496 million in 1996, reaching about R 30 500 million in 2019. However, investment in the wood and wood product division shows a relatively even trend, with a notable spike observed in 2008 at around R 22 452 million. Employment, on the other hand, increased from 53 892 jobs in 1996 and peaked at 74 698 jobs in 2008, thereafter it declined to about 58 438 jobs in 2021.

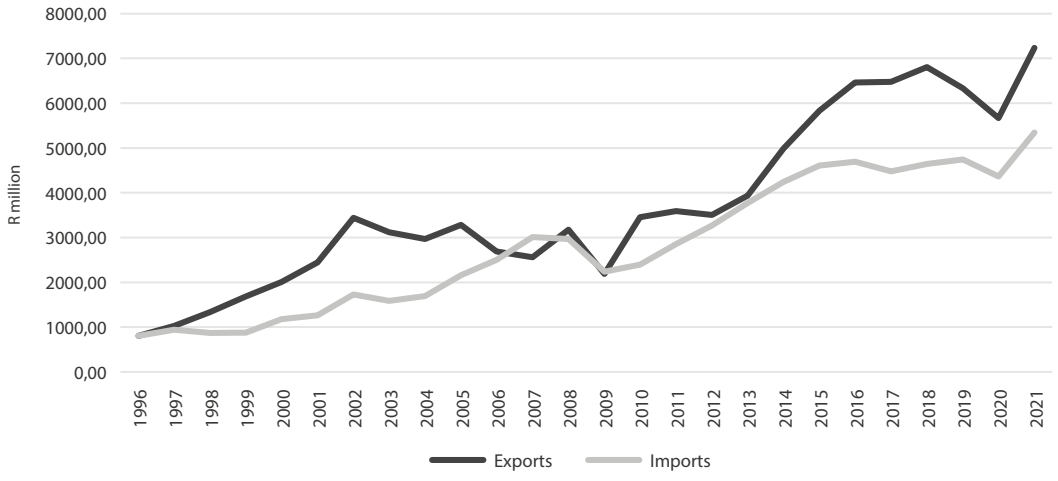

Fig. 1. South African exports and imports of the wood and wood products, 1996 to 2021
Source: Quantec, 2023.

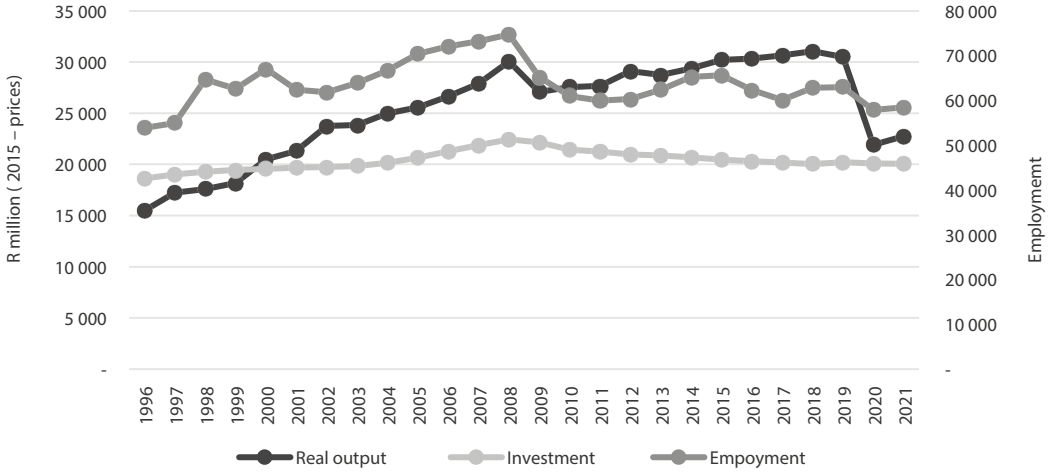

Fig. 2. Real output and investment of the wood and wood products division, 1996 to 2021
Source: Quantec, 2023.

In analysing the impact of trade agreements on wood and wood products industry, the study seeks to contribute to the existing body of knowledge or literature on the nexus between trade agreements and trade. Therefore, policy makers can draw inferences from the study about the implication of the SADC agreement on trade in the South African wood and wood products industry.

Research questions

What is the impact of the SADC on South African exports of wood and wood products?

What is the impact of the SADC on South African imports of wood and wood products?

The aim, objectives, and hypotheses of the study

The aim of the study was to analyse the impact of the SADC agreement on exports and imports of South African wood and wood products.

The objectives of the study

To analyse the impact of the SADC agreement on South Africa exports of wood and wood products.

To analyse the impact of the SADC agreement on South African imports of wood and wood products.

Hypotheses of the study

The null hypotheses are:

H01: The SADC agreement has a statistically significant negative effect on exports of wood and wood products.

H02: The SADC agreement has a statistically significant positive effect on imports of wood and wood products.

LITERATURE REVIEW

The gravity model is widely used in the analysis of bilateral trade flows. In a recent study applying the gravity model, Alawadhi et al. (2021) looked at the effect of the EU and the Gulf Cooperation Council agreement on the margins of trade and found evidence of a slight increase in the extensive margin of trade. Studies of this nature applying the gravity model to determine trade margins are not common, but this shows the usefulness of the gravity model to new trade areas.

Moreover, in a recent free trade agreement (FTA) analysis, using the gravity model, albeit at differing variations of the model, Choi and Minondo (2019) looked at the effects of the Central European Free Trade Agreement on Albania's trade. The evidence based on the gravity model's equation showed a positive impact on Albania's exports.

Khurana and Nauriyal (2017) evaluated the effects of the ASEAN-India FTA and concluded that the gravity model's variables, namely, gross domestic product (GDP),

distance, common language, and border were significant with their expected signs. Timsina and Culas (2020) looked at Australia's FTAs with respect to whether they are trade creating and export diverting. They concluded that the FTAs that Australia participates in showed evidence of trade creation, which was higher than export diversion.

Ngepah and Udeagha (2018) analysed the effect of regional trade agreements (RTAs) in Africa using the gravity model, which was estimated by Eicker–White robust covariance Poisson pseudo-maximum-likelihood method. This method, as Ngepah and Udeagha (2018) argued, is superior compared to non-linear least square estimators. Overall, the results showed that RTAs in Africa have indeed increased trade.

Furthermore, the positive impact of RTAs in Africa was identified by Kagochi and Durmaz (2018). They observed the positive benefits of increased trade brought about by RTAs in sub-Saharan Africa. This has been true for the Common Market for Eastern and Southern Africa, the Economic Community of West African States, and the SADC agreements.

Therefore, the use of the gravity model in analysing trade continues to dominate *ex-post* studies. Irrespective of the variations on how the gravity model is estimated, the conclusions have remained predominately common, with arguments indicating that trade agreements lead to trade creation or trade diversion.

TRADE THEORY

The seminal work by Smith (1776) in an inquiry into the nature and causes of nations' wealth laid the foundation for trade theory. Smith indicated that countries could gain from trade if they specialise in goods that they produce efficiently. This is known as having an absolute advantage. However, other notable theory is that of Ricardo (1821). Ricardo introduced the theory of comparative advantage. Ricardo argued that the opportunity cost of producing a good is key in determining how countries can gain from trade.

In addition to why countries engage in trade, Helpman and Krugman (1985) showed that the will to achieve economies of scale is a major influential variable. Different from comparative advantage theory, as reflected above, based on constant returns to scale and perfect competition assumptions, Helpman and Krugman's theory adds the concept of increasing returns to scale as a determinant to trade.

However, the theory applicable for the study is that of Viner (1950). The seminal work of Viner provided a breakthrough in analysing the implication of trade agreements on participating and non-participating members, which introduced the concept of trade creation and diversion. Trade creation is when consumers switch from domestic suppliers to a cheaper supplier from a trade agreement member. Trade diversion is when consumers switch from an efficient foreign supplier to buying from partners in the trade agreement.

METHODOLOGY

The use of the gravity model in analysing trade flows, irrespective of its lack of theoretical foundation, was first observed in the study of Tinbergen (1962) and subsequently in Poyhonen (1963). However, the breakthrough in providing a theoretical basis for the gravity model began with the seminal work of Anderson (1979).

The initial specification of the model is:

$$T_{ijt} = \gamma_0 \frac{Y_{it} Y_{jt}}{D_{ij}} \tag{1}$$

Where: T – represents bilateral trade, Y – is the national income, and D – is the distance. The model indicates that bilateral trade is proportional to the national income and inversely proportional to the distance between the countries. However, over the years, the model has been improved.

The standard gravity models explain bilateral import demand (X_{ij}) with a variety of explanatory variables, e.g., the income of the importing country (Y_i), the income of the exporting country (Y_j), per capita income of the importing country (N_i), per capita income of exporting country (N_j), a variable that accounts for the distance between the importing and exporting countries (D_{ij}), and a vector of additional variables that may be employed if thought to be relevant (V_i) (Plummer et al., 2010). Expressed in logarithmic form, a characteristic gravity model of bilateral trade is:

$$\ln X_{ij} = A + \delta_1 \ln(Y_i \cdot Y_j) + \delta_2 \ln(N_i \cdot N_j) + \delta_3 \ln D_{ij} + \\ + \delta_z \ln V_z + \ln e_{ij} \tag{2}$$

Where: i – importing country; j – exporting country; A – intercept; δ – coefficients of the explanatory variables; ln e_{ij} – lognormal error term.

However, in estimating the model, the national income is replaced by the GDP.

Analytical methods

The study uses the gravity model, shown in equation 3, to analyse the impact of the SADC agreement on South African wood and wood products trade. A positive and significant coefficient of the FTA variable indicates that either exports or imports of wood and wood products have increased (trade creation) because of the implementation of FTAs and *vice versa.* The GDP is a proxy of the country's income; however, together with the population, they serve as a market size guide. The time invariant variables such distance, common language, colony, and landlock are included in the gravity model. Variable distance is a geographic distance between the capitals of countries *i* and *j*. Distance and landlocked variables are proxies for transportation cost. Countries that are closer to each other tend to trade more compared to countries that are farther apart. Colony indicates whether the country pair had a common coloniser. Likewise common language indicates that the country pair had a common official language. Therefore, countries having the same coloniser and language are likely to trade more with each other. Table 1 shows expected signs of variables in the gravity model.

$$\ln(X_{ijt}) = \beta_0 + \beta_1 \ln Y_i Y_j + \beta_2 \ln P_i P_j + \beta_3 \ln dist_{ij} + \\ + \beta_4 \ln(Area_i Area_j) + \beta_{\text{FTA}} FTA_{ijt} + \sum_i \beta_i D_{ij} + \mu_{ijt} \quad (3)$$

where:

- X_{ijt} – is bilateral trade, which is exports and imports between countries *i* and *j* at time *t*,
- Y_i – is real GDP in country *i*,
- P_i – is the population in country *i*,
- Y_j – is real GDP in country *j*,
- P_j – is the population in country *j*,
- $dist_{ij}$ – is the distance between countries *i* and *j*,
- $Area_i$ – is the area of country *i*,
- $Area_j$ – is the area of country *j*,
- FTA_{ijt} – is the dummy variable equal to one if countries *i* and *j* share a trade agreement at time *t*,
- D_{ij} – are dummies that show the characteristics of the country pair, such as common language, border etc., and
- u_{ijt} – represents the variables that are not captured by the model.

Table 1. The gravity model's variables and expected signs

Variables	Expected signs
GDP	+
Population	+
Distance	–
Free trade agreement	+
Area	+
Common language	+
Colony	+
Landlocked	–

Source: own elaboration.

Data

The study used panel data, with exports and imports data sourced from Quantec database. The GDP and population data were sourced from the World Bank, while the binary variables (landlocked, colony, and common language) data and the data for area and distance are sourced from the CEPII database. The data is from 1996 to 2016, and it is annual data.

RESULTS AND DISCUSSION

The impact of the SADC agreement on South African exports of wood and wood products

As the fixed effect regression results show in Table 2, the variables with positive and significant coefficients are the GDP and SADC agreement. An increase in GDP by 1% results in an increase in exports of wood and wood products by 0.16%. The SADC agreement, on the other hand, has a statistically significant positive effect on exports of wood and wood products.

The random effects model results (Table 2) for exports of wood and wood products show that the variables with positive and significant coefficients are GDP, common language, and colony. The GDP, which indicates the size of the market, accounts for an increase of about 0.27% in exports of wood and wood products. Likewise, common language, and colony, showing the closeness of trading partners culturally, account for an increase of around 1.17% and 0.82%, respectively, in exports of wood and wood products. Moreover, the random

Table 2. Regression results for exports of wood and wood products

Variables	Fixed effects		Random effects	
	coef.	*P*-value	coef.	*P*-value
Gross domestic product	0.1570444	0.058	0.27234	0.000
Population	0.2370239	0.380	0.18223	0.175
Distance	1.269578	0.460	–2.9728	0.000
Area	0.1635367	0.534	0.13725	0.127
Common language	(omitted)		1.17371	0.010
Colony	(omitted)		0.82068	0.052
Landlocked	(omitted)		–1.3268	0.002
SADC (excluding SACU)	0.6479431	0.048	0.63788	0.036
Constant	–5.691349	0.766	11.9422	0.003
sigma_u	3.3630695		1.88547	
sigma_e	1.8920401		1.89204	
rho	0.7595834		0.49826	
R-sq:				
within =	0.0044		0.0019	
between =	0.0568		0.5354	
overall =	0.0086		0.3299	

Source: own elaboration.

Table 3. Regression results for imports of wood and wood products

Variables	Fixed effects		Random effects	
	coef.	*P*-value	coef.	*P*-value
Gross domestic product	0.5469474	0.000	0.6884887	0.000
Population	–0.3106289	0.428	–0.1788258	0.338
Distance	–0.2277008	0.889	–1.957289	0.000
Area	0.2809695	0.244	0.2515724	0.026
Common language	(omitted)		1.78232	0.006
Colony	(omitted)		–0.1772949	0.761
Landlocked	(omitted)		–0.889395	0.126
SADC (excluding SACU)	–0.1831582	0.567	–0.2774257	0.363
Constant	–13.73751	0.467	–10.16351	0.061
sigma_u	3.2212337		2.6994011	
sigma_e	1.7210216		1.7210216	
rho	0.7779385		0.71099548	
R-sq:				
within =	0.0184		0.0179	
between =	0.282		0.4219	
overall =	0.2457		0.3112	

Source: own elaboration.

effects model results show that the SADC agreement has a positive and significant coefficient. Therefore, the SADC agreement has a statistically significant positive effect on exports of wood and wood products. Lastly, the distance and landlocked variables have a negative impact on exports of wood and wood products, accounting for a decline of about 2.97% and 1.33%, respectively.

The impact of the SADC agreement on South African imports of wood and wood products

The imports of wood and wood products, as fixed effects model results show in Table 3, are influenced positively by GDP, indicating that an increase in GDP of 1% results in an increase in imports of wood and wood products by 0.54%. Contrastingly, the coefficient of the SADC agreement is insignificant. Therefore, there is no evidence to support the position that the agreement has a positive effect on South African wood and wood products imports.

The random effects model results (Table 3) show that the imports of wood and wood products are influenced positively by GDP, area, and common language but are impacted negatively by distance. However, the coefficient of the SADC agreement is insignificant. Therefore, there is no evidence to support the position that the SADC agreement has a positive effect on South African wood and wood products imports.

The results on the SADC trade agreement affirm what was found in Jensen et al. (2012), namely, that South Africa benefits significantly from participating in the

SADC FTA. Likewise, Fadeyi et al. (2014) noted that the SADC FTA has increased intra-regional trade. Moreover, Kagochi and Durmaz (2018) and Ngepah and Udeagha (2018), all concluded that RTAs, including the SADC agreement, have enhanced trade. With respect to South African wood and wood products, the study showed that the SADC agreement did indeed increase exports.

CONCLUSIONS AND RECOMMENDATIONS

The aim of the study was to analyse the effect of the Southern Africa Development Community agreement (SADC) on South African wood and wood products trade. The South African agro-processing industry is deemed important in South Africa in terms of its potential to create employment. The South African exports and imports of wood and wood products have shown an increasing trend, amounting to R 7237,26 in million and R 5341,85 million in 2021, respectively. Employment in South African wood and wood products reached about 58 438 jobs in 2021, while investment was around R 20 072 million.

The conclusions in trade *ex-post* studies, using the gravity model, have remained predominately common, with arguments indicating that trade agreements lead to trade creation or trade diversion. The study used panel data to estimate the gravity model. The estimated results from the gravity model showed that the SADC agreement has a statistically significant positive effect on South African exports of wood and wood products. However, regarding imports, there is no evidence to support that the SADC agreement has a positive effect on South African wood and wood products imports. Therefore, as South Africa benefits more on its wood and wood products exports to SADC countries, it is recommended that there should be continuous improvement of trade facilitation measures.

REFERENCES

Alawadhi, A., Al-Shammari, N., Alshuwaiee, W. (2021). Effects of the EU-GCC economic agreement on the margins of trade. Emerg. Market. Fin. Trade, 57(8), 2370–2388. https://doi.org/10.1080/1540496X.2019.1696188

Anderson, J. (1979). A theoretical foundation for the gravity equation. Amer. Econ. Rev., 69(1), 106–116. retrieved from: https://www.jstor.org/stable/1802501

Choi, J., Minondo, A. (2019). The trade effects of Albania's trade agreements with CEFTA memeners. Post-Comm. Econ., 31(4), 451–463. https://doi.org/10.1080/14631377.2018.1537736

DAFF (2016). Strategy for the development of small and medium agro-processing enterprises. Retrieved March 3rd 2017 from: http://www.old.dalrrd.gov.za/Branches/Economic-Development-Trade-Marketing/Agro-processing-support/Policy-and-Research

Fadeyi, O., Bahta, T., Ogundeji, A., Willemse, B. (2014). Impacts of the SADC free trade agreement of South African agricultural trade. Int. J. Entrep. Innov., 15(2), 53–59.

Helpman, E., Krugman, P. (1985). Market Structure and Foreign Trade: Increasing Returns, Imperfect Competition, and the International Economy. Cambridge: MIT Press.

Jensen, H., Sandrey, R., Vink, V. (2012). The welfare impact of a free trade agreement: „Cape to Cairo". Agrekon, 51(4), 1–18. https://doi.org/10.1080/03031853.2012.741202

Kagochi, J., Durmaz, N. (2018). Assessing RTAs inter-regional trade enhancement in sub-Saharan Africa. Cog. Econ. Fin., 6(1), 1482662. https://doi.org/10.1080/23322039.2018.1482662

Khurana, R., Nauriyal, D. (2017). ASEAN-India free trade agreement: evaluating trade creation and trade diversion effects. J. East-West Bus., 23(3), 283–307. https://doi.org/10.1080/10669868.2017.1322548

Ngepah, N., Udeagha, M. (2018). African regional trade agreements and intra-African trade. J. Econ. Integ., 33(1), 1176–1199.

Plummer, M., Cheong, D., Hamanaka, S. (2010). Methodology for impact assessment of free trade agreements. Asian Development Bank.

Poyhonen, P. (1963). A tentative model for the volume of trade between countries. Weltwirtschaftliches Archiv, 90, 93–100.

Quantec (2023). Trends in agro-processing industry. Retrieved March 31st 2023 from: https://www.quantec.co.za/

Ricardo, D. (1821). On the principles of political economy and taxation. Library of Economics and Liberty.

SACU (2019). About SACU. Southern Africa Customs Union. Retrieved Sep 6th 2019 from: https://www.sacu.int/show.php?id=394

SADC (2019). About SADC. Retrieved from Southern African Development Community. Retrieved Sep 6th 2019 from: https://www.sadc.int/about-sadc/

Smith, A. (1776). An inquiry into the nature and causes of the wealth of nations. Library of Economics and Liberty.

Timsina, K., Culas, R. (2020). Do free trade agreements increase Australian trade: an application of Poisson Pseudo Maximum Likelihood Estimator? J. East-West Bus., 26(1), 56–80.

Tinbergen, J. (1962). Shaping the world economy: suggestions for an international economic policy. New York: The Twentieth Century Fund.

Viner, J. (1950). The customs union issue. Carnegie Endowment for International Peace. New York.