

Revealed Comparative Advantage of South African Wool

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Abstract

The aim of the study is to analyse the comparative advantage of the South African wool using the revealed comparative advantage (RCA), revealed symmetric comparative advantage (RSCA) index and relative trade advantage (RTA). The study used trade data from the UN COMTRADE statistics and the ITC Trade Map over the period 2003 to 2022. The foot-and-mouth disease (FMD) outbreak data was sourced from the WOA database. The RCA, RSCA, and RTA show that South Africa has a comparative advantage in wool. Moreover, the South African comparative advantage is exhibiting an increasing trend but the decline in comparative advantage happened after FMD outbreaks. However, in 2022, different to the RCA and RTA, the RSCA show that South Africa has a comparative disadvantage in wool, likely due to FMD outbreaks that triggered trade restriction. The control of FMD is likely to improve South Africa comparative advantage in wool

Keywords: revealed comparative advantage, wool, foot and mouth disease, exports

1. Introduction

South Africa ranks in the top ten as a producer of wool in the world. The world's production of wool was at approximately 1 759 760,10 tons in 2022. The leading producers of wool are China with a share of 20,24% followed by Australia at 18,64% and New Zealand at 7,21% (FAO, 2024). South Africa accounted for a 2,56% share of the production of wool in the world. Likewise, total world exports of wool were at around R194,53 billion in 2022. The main exporters of wool were Australia accounting for 20,24%, China at 19,02% and Italy at 17,33%. South Africa contributed around 2,85% of the world's exports of wool. Major importers of wool are China, Germany and Italy with a share of 26,81%, 14,97% and 5,36%, respectively, in 2022 (ITC Trade map, 2024).

However, South Africa, particularly from China, has faced trade restriction because of the foot-and-mouth disease (FMD) outbreaks (USDA Foreign Agricultural Service, 2019). In 2023, China accounted for approximately 62% of South African wool exports. Consequently, wool trade restriction is likely to affect South Africa's comparative advantage. This could have

negative consequences on smallholder farmers who depend on wool production for their livelihood. The wool industry is estimated to be responsible for about 23 976 jobs, while mohair was at 6 765 jobs. Smallholder farmers contributed 11% of South African total production of wool, while for mohair it was at 12,8% (NAMC, 2019). The aim of the study is to analyse the comparative advantage of the South African wool. The first section presents trends in production, gross value, sales, price and trade in South African wool. This is followed by literature review, methodology, results and discussion, and, lastly, is the conclusion.

2. Trends in South African wool

Number of commercial sheep in South Africa

Figure 1 presents number of sheep (commercial numbers) in South Africa. In 2023, South Africa had about 19 million sheep, mainly in the Northern Cape, Eastern Cape, Western Cape and Mpumalanga. The merino breed is the one used for wool production (Cloete and Olivier, 2010). They were about 10 million merino sheep recorded in 2023. Other woolled sheep and non-woolled sheep were around 3,64 million and 5,27 million, respectively. The karakul sheep, as presented in Figure 2, were approximately 21 thousand in 2023 (DALRRD, 2024).

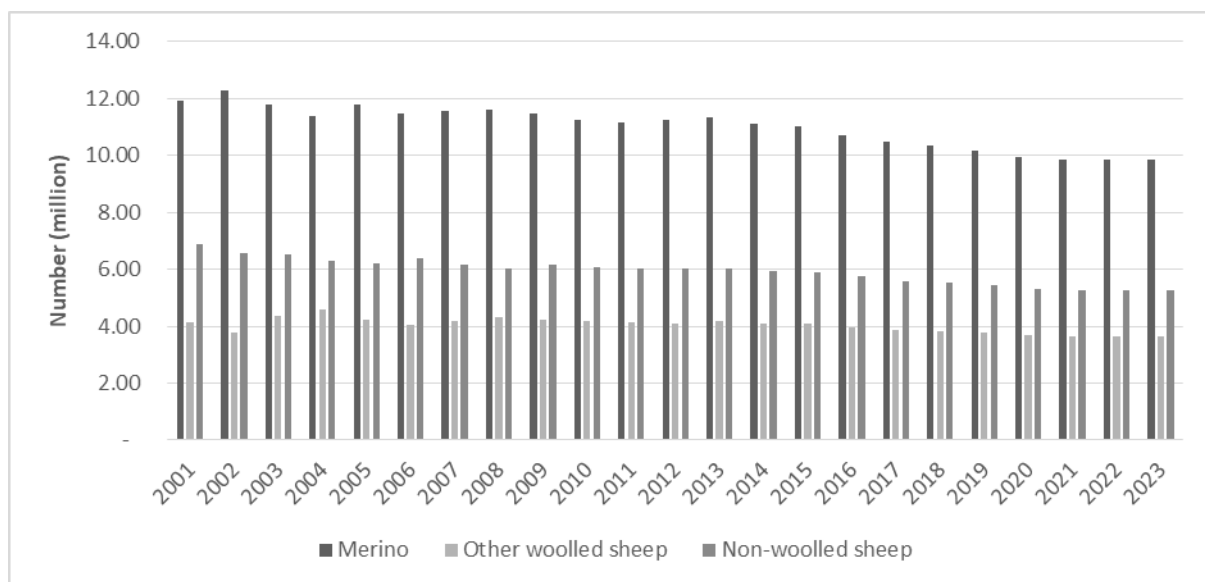


Figure 1: Number of sheep in South Africa, 2001–2023

Source: DALRRD, 2024

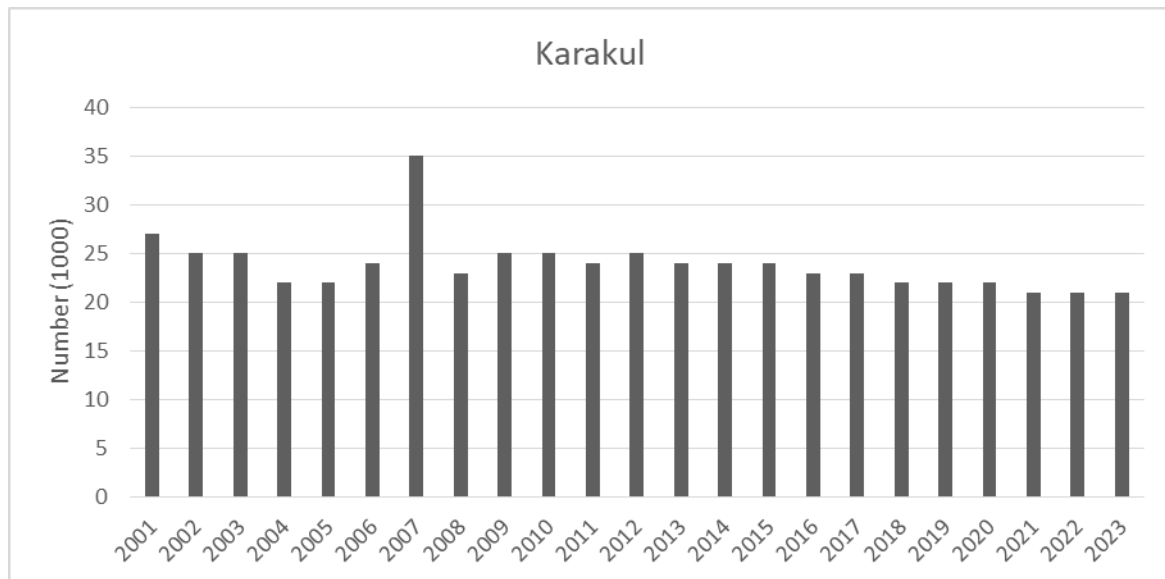


Figure 2: Number of karakul sheep in South Africa, 2001–2023

Source: DALRRD, 2024

South African production of wool

Figure 3 presents South African production of wool from 2001 to 2022. The South African production of wool has been fairly stable, ranging between 39 thousand tons and 49.79 thousand tons. It peaked in 2015, while the lowest was recorded in 2023. Subsequent its peak in 2015, wool production slightly declined to about 45,06 thousand tons in 2022

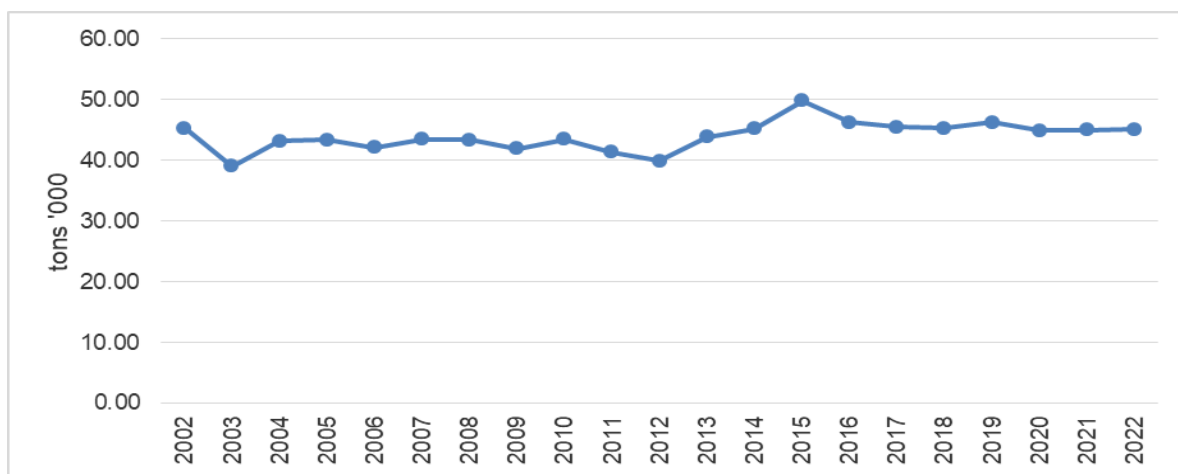


Figure 3: South African production of wool, 2002–2022

Source: FAO, 2024

Gross value of wool and mohair

Figure 4 presents gross value of wool and mohair over the period 2001 to 2023. Both gross value of wool and mohair show an upward increasing trend, however the wool gross value is increasing at a faster rate as compared to mohair gross value. In 2019, wool gross value was approximately R5,16 billion, which slightly decreased to R 5,01 billion in 2021, however it increased to R5,86 billion in 2023. The gross value of mohair, on the other hand, increased moderately from R1,15 billion in 2019 to about R1,65 billion in 2022 but slightly dropped to about R1,45 billion in 2023.

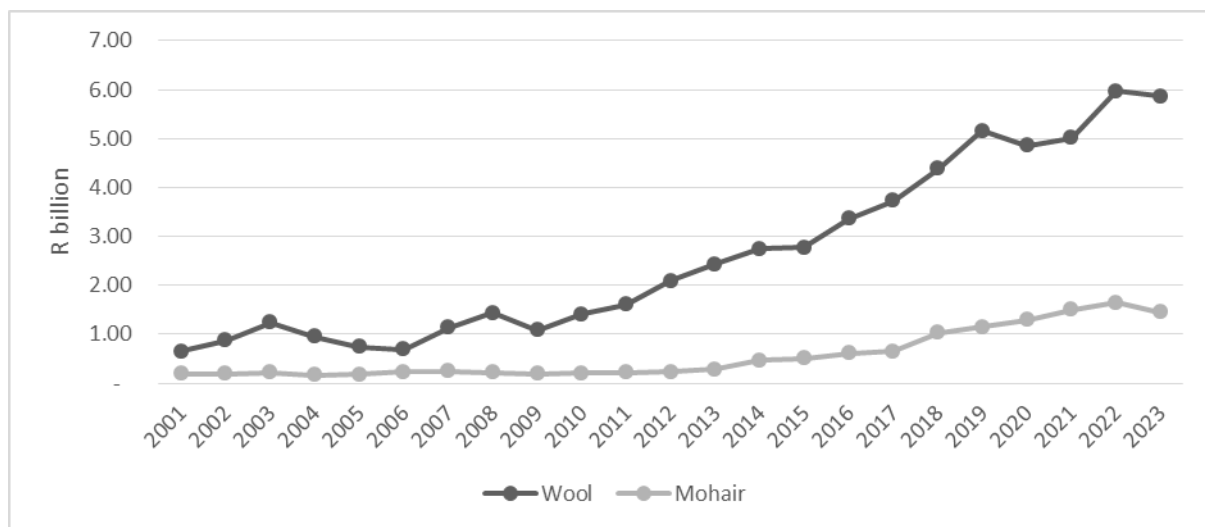


Figure 4: Gross value of wool and mohair, 2001–2023

Source: DALRRD, 2024

Wool sales and prices at the auction

Sales of merino wool and other wool, as illustrated in Figure 5, exhibits a similar trend. The Merino breed, in South Africa, dominates wool production (Cloete and Olivier, 2010). Consequently, its sales are greater than that of other wool. Merino wool sales peaked in 2019 at around R4,00 billion but declined to about R2,74 billion in 2021. During 2023, merino wool sales were recorded at around R2,98 billion, which is a slight drop as compared to R3,36 billion recorded in 2022. Sales for other wool peaked in 2018 at R1,23 billion but declined to about R0,67 billion 2020. In 2023, sales for other wool were at around R1,32 billion.

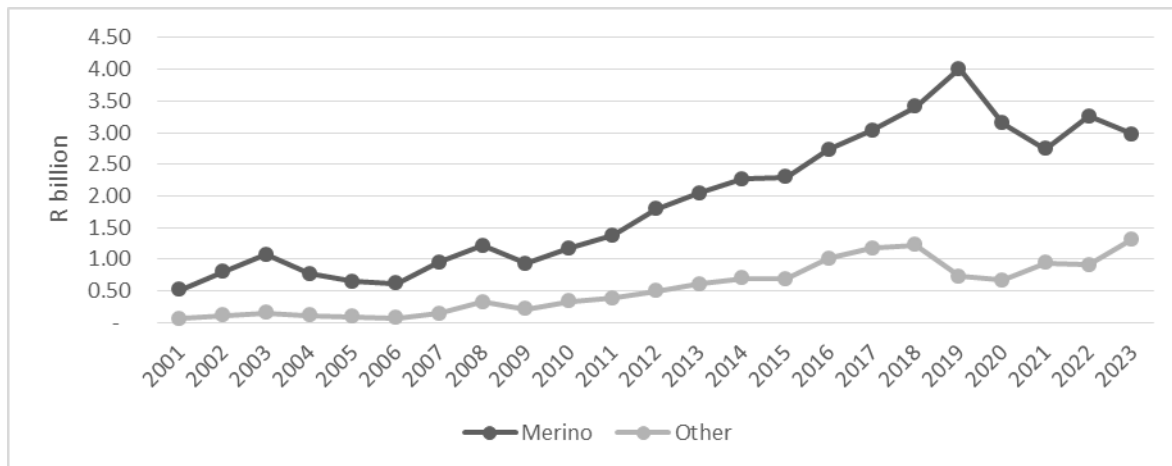


Figure 5: South African sales of wool, 2001–2023

Source: DALRRD, 2024

The merino wool, dominating the South African markets, fetched high price at the auction relative to other wool. However, both merino wool price and other wool mirror the same trend as shown in Figure 6. The average auction price of merino wool reached its peak in 2019 at around R126,47 per kg, however, it declined to R94,39 per kg in 2021. In 2023, the average auction price of merino wool was below its peak at around R110,52 per kg in 2023. Likewise, the average auction price of other wool peaked in 2018 at around R78,12 billion but declined to R54,26 billion 2020. Subsequent to a decline, the average auction price of other wool increased to about R101,19 per kg.

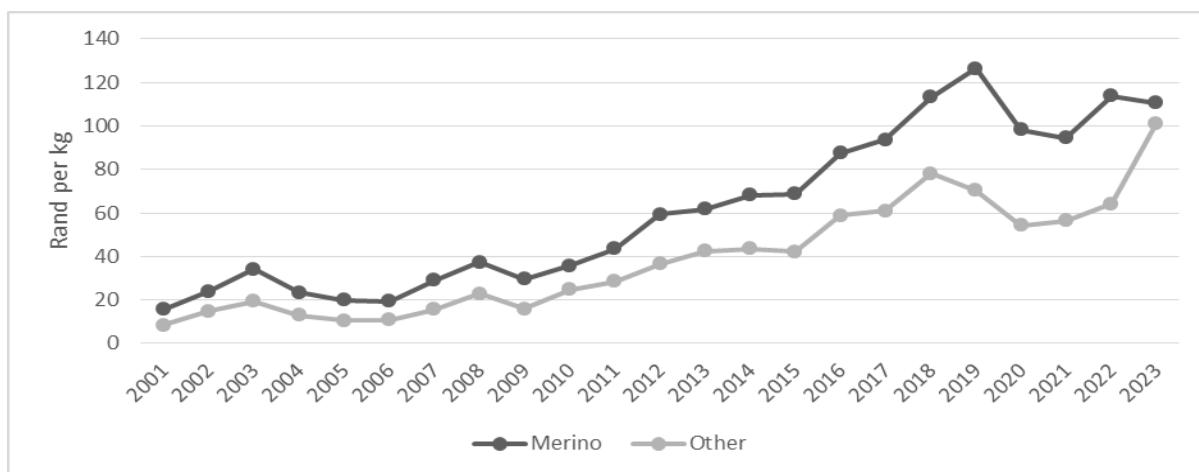


Figure 6: The average auction price of merino wool and other wool

Source: DALRRD, 2024

The pattern of South African wool trade

South Africa has a positive balance in wool. South African exports of wool as depicted an increasing trend, reaching its highest point in 2018 at around R6 407 million. However, wool exports declined to about R5 272 million in 2020. It appears that there were frequent fluctuation in wool exports after 2018. In 2022, wool exports were recorded at approximately R5 545 million. Differently, South African imports of wool appear to have remained stable, ranging between R116.48 million and R1 043 million. There was a significant drop in imports in 2019 to R387,31 million following a peak at around R805,60 million in 2016. However, subsequent to a drop in 2019, imports of wool increased to about R1 043,91 million in 2022.

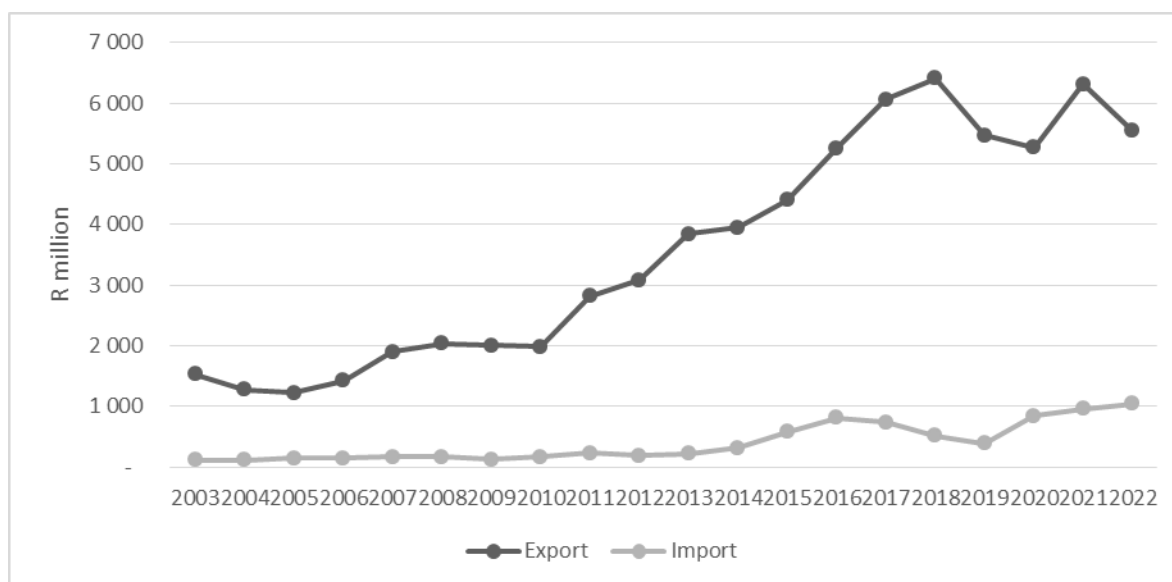


Figure 7: South African exports and imports of wool

Source: ITC Trade Map, 2024

Table 1 illustrates leading export destinations of South African wool in 2023. During 2023, South African wool export value stood at around R6 666,81 million. China accounted for approximately 62,72% of South African wool exports, followed by Germany, Italy, Bulgaria and India at around 12,54%, 12,18% and 2,30% share, respectively, in 2023. In Africa, only Egypt appears in the top ten of South Africa's export destinations with a share of around 1,14%.

Table 1: South African exports of wool in 2023

Country	Export value (R million)	Share (%)
World	6 666,81	100
China	4 181,34	62,72
Germany	835,72	12,54
Italy	811,96	12,18
Bulgaria	153,06	2,30
India	125,74	1,89
Taipei, Chinese	124,04	1,86
United Kingdom	87,61	1,31
Egypt	75,86	1,14
Japan	46,02	0,69
Denmark	34,58	0,52

Source: ITC Trade Map, 2024

Despite that South Africa is a major exporter of wool, in 2023, its imports of were at around R1 094,87 million. South Africa's imports of wool appear to be concentrated, with Lesotho accounting for approximately 80,48% of total imports. Australia, the USA, Czech Republic and China constituted a share of 4,86%, 4,55%, 3,20% and 1,83%, respectively, in 2023.

Table 2: South African imports of wool ,2023

Country	Import value (R million)	Share (%)
World	1 094,87	100,00
Lesotho	881,14	80,48
Australia	53,21	4,86
United States of America	49,80	4,55
Czech Republic	34,98	3,20
China	20,00	1,83
United Kingdom	12,22	1,12
Uruguay	10,12	0,92
Taipei, Chinese	7,37	0,67
Peru	5,44	0,50
New Zealand	4,65	0,42

Source: ITC Trade Map, 2024

3. Literature review

Comparative advantage is mainly measured, among others, using Balassa index Balassa (1965). To date, several studies (Visser *et al.* (2015), Bahta and Willemse (2016), Thomas *et al.* (2019) and Ahmad *et al.* (2021)) apply the index to measure product with comparative advantage.

China's comparative advantage in agricultural products, as show in Fojtíková (2018), is in two folds. Firstly, is the category of products with comparative advantage, mainly these are products of animal origins, edible vegetables and certain roots and tubers, lac, gums, resins and other vegetable saps and extracts and the preparations of meat. On the other hand, there are products that lost their competitiveness, these are meat and edible meat offal, cereals, preparations of cereals and beverages, spirits and vinegar (Fojtíková, 2018).

López *et al.* (2022), in analysing the competitiveness of avocados produced in Mexico using revealed comparative advantage Index and the normalized revealed comparative advantage index, found that Mexico has high comparative advantage in avocado. Likewise, Duru *et al.* (2022) focusing on trade in citrus, analysed competitiveness of Mediterranean countries in the using Balassa's relative comparative advantages, revealed symmetric comparative advantage and Lafay indexes. Duru *et al.* observed that, despite a strong competitiveness of Mediterranean countries in citrus, competitiveness had slightly declined.

Erdem (2020), looking at the competitiveness of dried fruits, using a combination of indices, namely, the revealed comparative advantage, relative export advantage, relative Import advantage, relative trade advantage and relative competitiveness, found that the Turkish comparative advantages and competitiveness are still at a higher level as compared to their competitors. Likewise, as Erdem further alluded, South Africa has high comparative advantage in dried fruits.

Recently, in Turkish cotton, Sarica and Dag (2023), using revealed symmetric comparative advantage (RSCA) among others, concluded that there was no revealed competitive advantage in cotton exports. They further observed that the RSCA has shown a declining trend. In 2010, the RSCA index was -0.42, this further declined to about -0.03 in 2020.

In looking at competitiveness and barriers in Indonesia's exports of ornamental fish, Tarihoran *at el.* (2023) found that Indonesia has significant comparative advantage than that of its competitors. Additionally, they noted the existence of barriers such as product quality and continuity, regulations, marketing, shipment, and other internal and external barriers in ornamental fish trade.

On the competitiveness of Ecuador's flower industry, Guaita-Pradas *et al.* (2023) among other observations, concluded that Ecuador enjoys a strong comparative advantage as compared to major exporters of flowers. In tea exports, in the case of Bangladesh, India and Sri Lanka, Islam

et al. (2021) concluded that Bangladesh has lost its tea export competitiveness. However, as they further observed, India sustained its competitiveness, while Sri Lanka had the highest RSCA value of 0.99.

The empirical evidence in comparative advantage studies, despite different variation in the use of indices, show mainly the gain or the loss in comparative advantage in different products.

4. Methodology

Revealed comparative advantage

The RCA index is used to determine the products that a country can specialise in. It is defined as the ratio of a country's share of the commodity in the country's total exports to the share of world exports of the commodity in total world exports (Plummer *et al.* 2010).

The RCA index is as follows:

$$RCA_{ij} = \frac{x_{ij}}{X_{it}} / \frac{x_{wj}}{X_{wt}} \dots\dots\dots(1)$$

Where x_{ij} and x_{wj} are the values of country i's exports of product j and world exports of product j and where X_{it} and X_{wt} refer to the country's total exports and world total exports. A value of less than one implies that the country has a revealed comparative disadvantage in the product. Similarly, if the RCA index is greater than 1, the country is said to have a revealed comparative advantage.

Revealed symmetric comparative advantages (RSCA) index

RSCA index is intended to correct the asymmetry for the advantage or disadvantage of the RCA index Dalum *et al.* (1998). If RSCA index is between -1 and +1, this indicates a comparative disadvantage. Likewise, if the index value is between 0 and +1, this indicates comparative advantage (Rossato, *et al.*, 2018).

RSCA Index equation is as follows:

$$RSCA_{ijA} = (RCA_{ij} - 1) / (RCA_{ij} + 1) \dots\dots\dots(2)$$

Relative trade advantage (RTA)

Vollrath (1991) showed an alternative to comparative advantage, which is the relative trade advantage (RTA). Dismissal to the RCA, the RTA takes imports in to consideration. RTA is calculated as the difference between the relative advantages of exports (RXA) and relative advantages of imports (RMA). A positive value of the RTA shows a net competitive advantage, while a negative value shows a competitive disadvantage.

The RTA equation is as follows:

$$RTA = RXA - RMA \dots\dots\dots(3)$$

$$RXA = RCA \dots\dots\dots(4)$$

$$RMA = \frac{\frac{M_{ij}}{M_{nj}}}{\frac{M_{it}}{M_{nt}}} \dots \dots \dots (5)$$

where M is import, *i* is the country of import, *j* is the imported product, sectors or group of products, *t* is the set of imported products and *n* group of country or whole world.

Data sources

The study used secondary data from 2003 to 2022, with exports and imports data sourced from the UN COMTRADE statistics and the ITC Trade Map. Data on FMD outbreak was sourced from the WOA database, which is from 2003 to 2022. A year when an outbreak of FMD occurred in South Africa is reflected as one or otherwise zero.

5. Results and discussion on revealed comparative advantage.

Figure 7 presents the revealed comparative advantage index for South African wool. South Africa, as the results indicated, has an RCA index that is greater than a unit. This means that South Africa has a comparative advantage in wool. Moreover, the South African comparative advantage is exhibiting an increasing trend. it has increased from about 3,2 in 2005 to reach 7,6 in 2020. However, after 2020, it declined to around 5,7 in 2022.

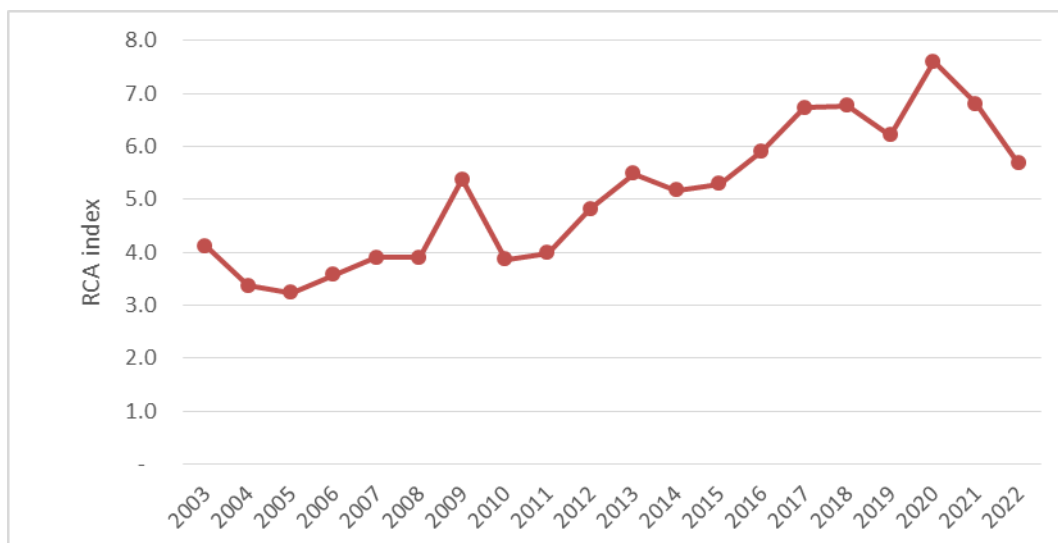


Figure 7: Revealed comparative advantage of South African wool

The reveal comparative advantage results are presented with record FMD outbreaks. The FMD outbreaks led to South Africa, particularly from China, facing trade restriction on livestock products including wool (USDA Foreign Agricultural Service, 2019). The sustained period of FMD outbreak were observed between two periods. The first period is between 2009 and 2014, while the second period is between 2018 to 2022. In 2009, after the FMD outbreak, the RCA

declined from 5,4 in 2009 to 3,9 in 2010, however, it increased to about 5.5 in 2013. The decline in RCA is likely to due to initial reaction to FMD outbreak. A similar decline in RCA index as FMB outbreak is recorded is observed in 2018. This was a marginal decline as compared to the aftermath of 2009 FMD outbreak. The RCA declined from 6,8 in 2018 to 6,2 in 2019. A noticeable decline in RCA is further observed in 2020 from 7,6 to about 5,7 in 2022. This substantial decline happened in midst of the FMD outbreak. Given that South African wool exports are concentrated, approximately more that 60% are destined to China, it likely that a temporary halt in wool exports results in a decline in South Africa's comparative advantage.

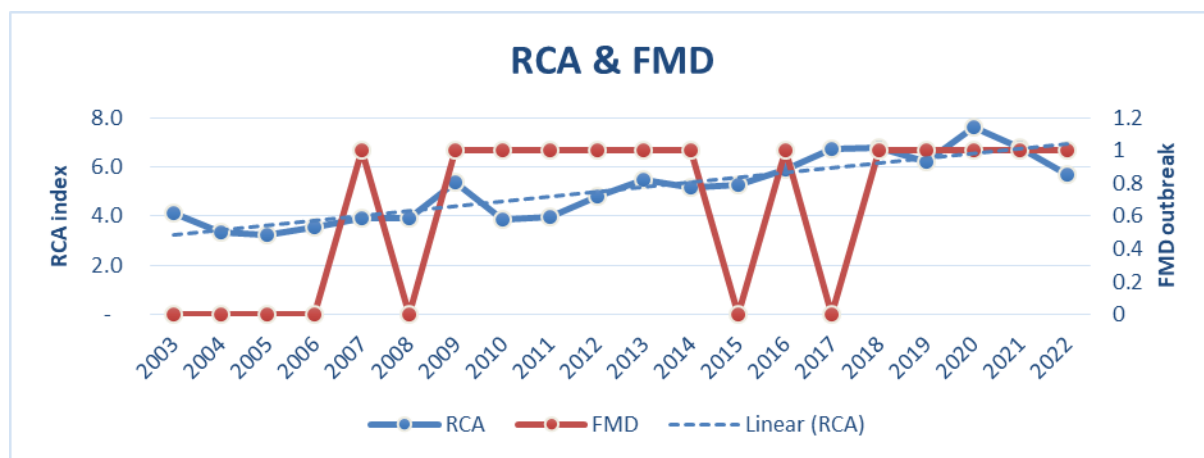


Figure 8: Revealed comparative advantage of South African wool and FMD outbreak

Figure 9 presents the results of the Revealed symmetric comparative advantages (RSCA) index. The RSCA, as alluded by in Dalum et al. (1998), correct the asymmetry in RCA index. The RSCA index results show that South Africa as comparative advantage in wool. In 2022, different to the RCA index, the RSCA show that South Africa has a comparative disadvantage in wool. The comparative disadvantage had occurred during trade restriction from China as a result of FMD outbreaks.

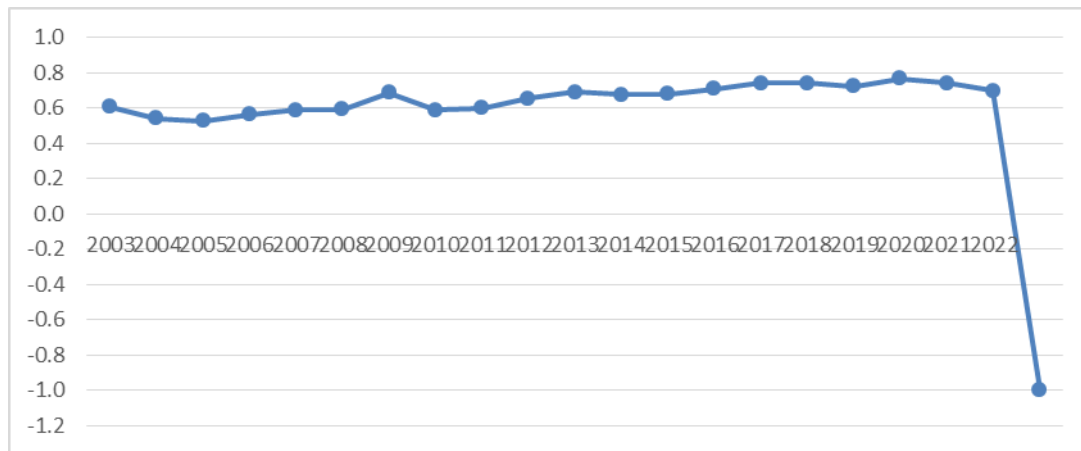


Figure 9: Revealed symmetric comparative advantage of South African wool

Figure 10 shows results of the relative trade advantage of South African wool. Likewise, as shown in the indices above, the RTA shows that South Africa has a comparative advantage in wool. The RTA peaked in 2018 at around 6,21, however, it declined to 4,42 in 2022.

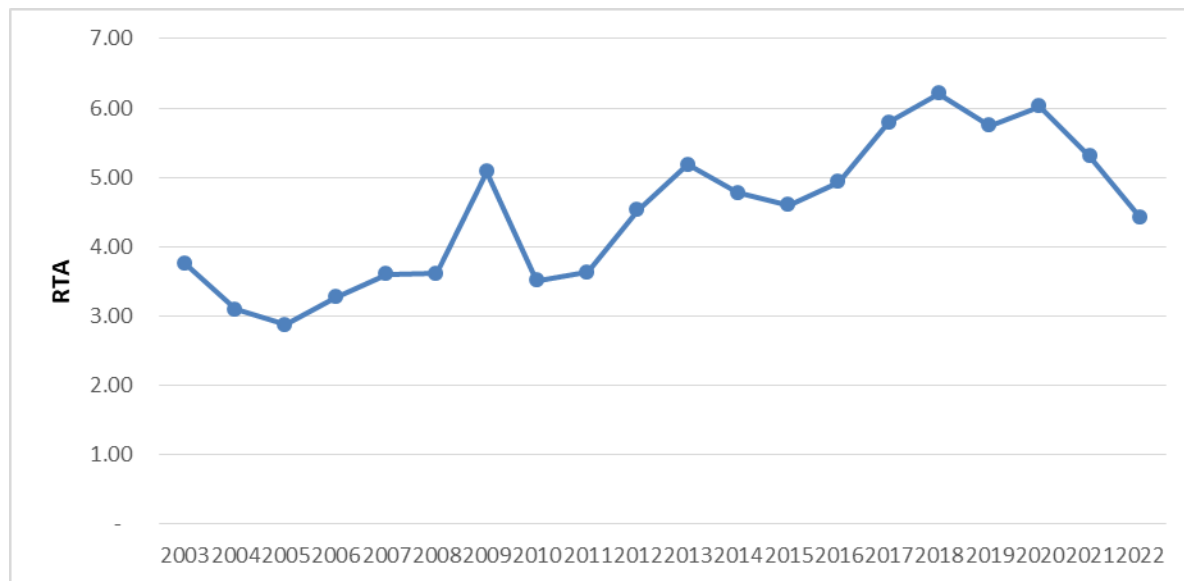


Figure 10: Relative trade advantage of South African wool

6. Conclusion

The wool industry plays a significant role in the livelihood of the smallholder farmers in South Africa. South Africa is one of the leading producers of wool in the world. The South African wool, about 60%, is destined to China. However, with the frequent FMD outbreaks, livestock products, including wool, are affected by trade restrictions. The aim of the study was to analyse

the comparative advantage of the South African wool. The RCA, RSCA and RTA show that South Africa had a comparative advantage in wool. Moreover, the South African comparative advantage is exhibiting an increasing trend but declines in comparative advantage happens after FMD outbreaks. However, in 2022, different to the RCA index and RTA, the RSCA show that South Africa has a comparative disadvantage in wool. The comparative disadvantage occurred during trade restriction as a result of FMD outbreaks. Therefore, the FMD outbreaks likely resulted in a decrease in South African comparative advantage in wool. Its control, thereof, is like to improve the livelihood of farmers who are depended of wool industry.

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Conflict of interest declaration: none

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