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## Export Competitiveness of Botswana's Beef Industry

Tebogo B. Seleka  
Pinkie G. Kebakile

**BOTSWANA INSTITUTE FOR DEVELOPMENT POLICY ANALYSIS**



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## **BIDPA**

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## Abstract

We investigate Botswana's beef export competitiveness using indices of Revealed Comparative Advantage (RCA) and data for the period 1961–2011. Results indicate that Botswana has been the most competitive SADC beef exporter, and that it has compared well with the leading world beef exporters. However, the country has recorded declining competitiveness since the mid 1970s. It is argued that, state trading export operations and non-reciprocal trade preferences with the EU have enhanced competitiveness through facilitating export market access. However, the single channel exportation arrangement, through a loss-making state trader, is a potential threat to beef export competitiveness. Further, recurrent outbreaks of cattle diseases and drought, and the rise in domestic demand for beef (coupled with stagnant domestic supply) have adversely impacted beef export competitiveness.

*JEL Classification:* F11, F13, F14, Q17, Q18

*Keywords:* Botswana, Beef exports, Competitiveness, Revealed comparative advantage

## 1. Introduction

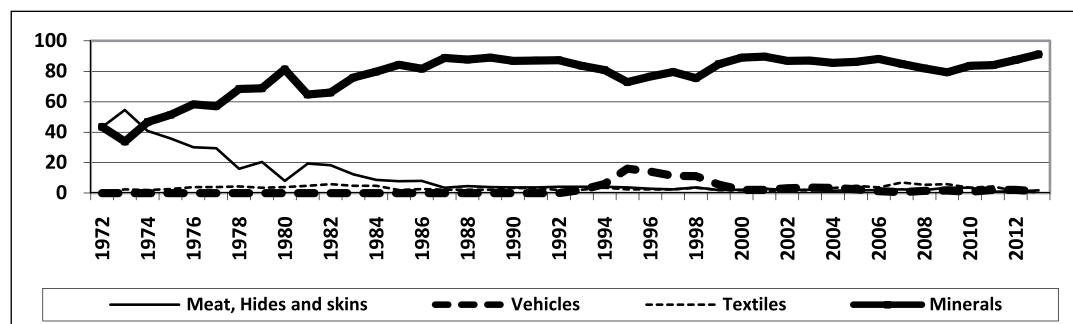
The beef industry in Botswana plays a pivotal role in the country's economy. First, it is one of the leading components of commodity exports and sources of foreign exchange for the country. In 1973, Meat, Hides and Skins (MHS) were the leading export commodity, with an export share of 55 percent (Figure 1). From 1974 to 1993, they assumed second place after minerals. Since 1994 however, MHS have assumed third place, surpassed by either Textiles or Vehicles, but still remained one of the key commodity exports.

Second, the cattle industry is a key component of agricultural value added. During the period from 1994 to 2013 (for example), the livestock industry (dominated by beef cattle production) accounted for 46 to 65 percent of agricultural value added (Figure 2), and has remained the leading agricultural activity (TRANSTEC and BIDPA 2010). Third, cattle production is one of the key economic activities in the rural economy, and an important source of livelihood amongst rural dwellers. This is evident from Table 1 where 36 (43) percent of Botswana's national (rural) population lived within households that owned cattle in 2011. Last, the industry is a significant component of a sector (agriculture) that accounts for the largest proportion of national and rural workforce (TRANSTEC and BIDPA 2010; Seleka, Mmopelwa and Lekobane 2014), and hence it is an important source of income, livelihood and welfare amongst rural dwellers.

Despite its significance in Botswana's economy, the beef industry has stagnated over time and has faced challenges that have threatened its sustainability and reduced its overall contribution to the economy. First, it underwent structural changes in the 1990s, when the commercial subsector cattle population shrank, leading to declining cattle sales for slaughter and beef exports (BIDPA 2006). This, together with recurrent outbreaks of livestock diseases and drought, has hindered the beef industry and its export performance. Second, the industry's ratio to agricultural value added has declined steadily over time; from 65 percent in 1994 to 46 percent in 2013 (Figure 2). While this was largely a result of the increase in non-traditional agricultural output, it was also partly due to stagnant growth in real livestock output (Figure 2).

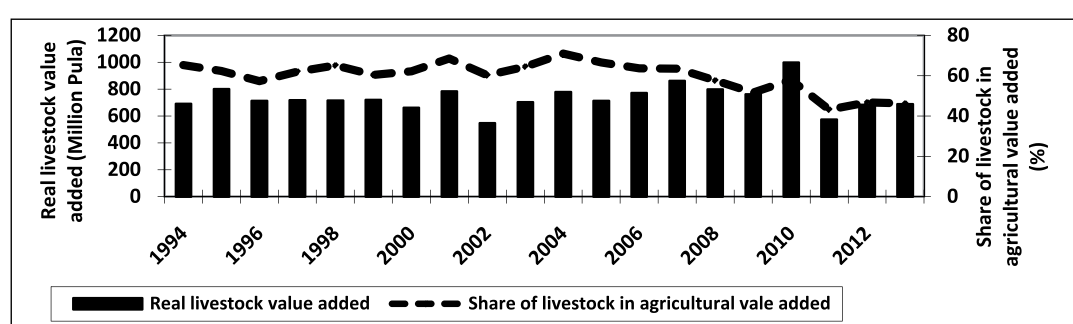
Third, beef exports have declined steadily since the 1970s. For example, boneless beef export value (real) and volume declined by 68 and 53 percent, respectively, during the period from 1976 to 2010 (Figure 3).<sup>1</sup> Consequently, the share of beef and beef by-products to total commodity exports declined from 43 percent in 1972 to only 2 percent in 2013, despite the steady increase in total real commodity exports during this period (Figure 4).

**Figure 1: Percent shares of non-mineral exports in total principal commodity exports, 1974-2013**



Source: Computed from CSO] (various<sup>a</sup>; various<sup>b</sup>) and SB (various<sup>a</sup>)

**Figure 2: Real livestock value added in 2006 prices and its share to agricultural value added, 1994-2013**

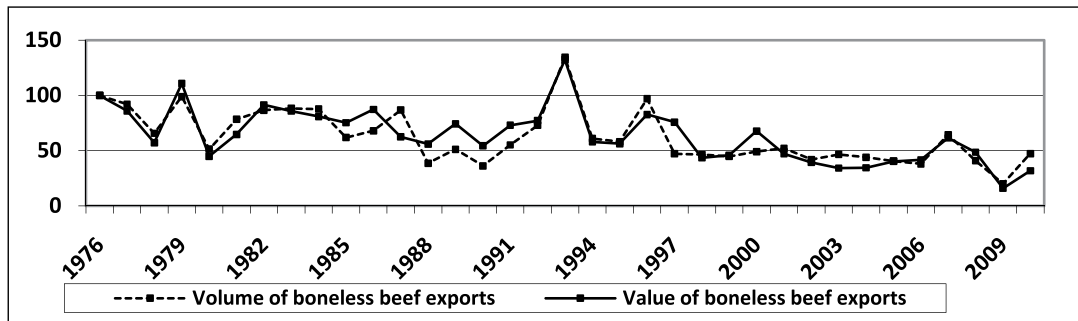


Source: Author computed from SB (2014a).

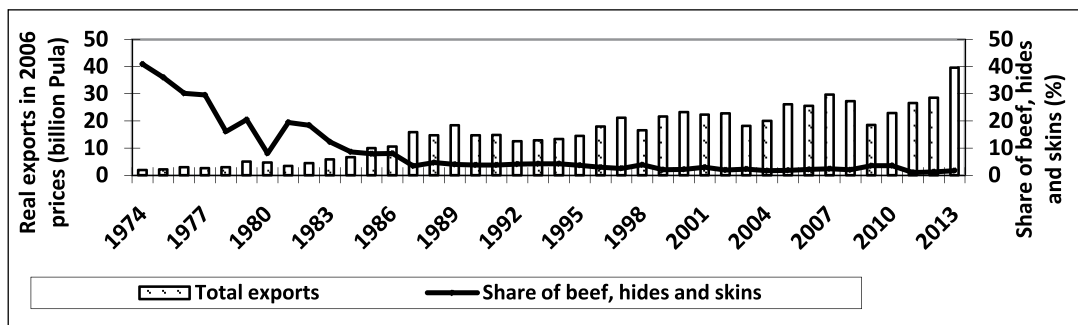
**Table 1: Ratio of cattle owners to total households and population, 2011**

Locality	Households			Population		
	Total	Cattle Owners	Ratio of cattle owners (%)	Total	Cattle owners	Ratio of cattle owners (%)
Cities/towns	141,950	36,974	26.0	440,108	123,107	28.0
Urban Villages	215,621	75,783	35.1	857,179	304,464	35.5
Rural Villages	193,373	79,566	41.1	727,617	309,779	42.6
National	550,944	192,323	34.9	2,024,904	737,421	36.4

Source: Author computed from SB (2014b)

**Figure 3: Indices of boneless beef exports (1976=100): 1976-2010**

Source: Author Computed from CSO (various<sup>a</sup>; various<sup>b</sup>) and SB (various<sup>a</sup>).

**Figure 4: Real principal commodities exports in 2006 prices and share of meat, hides and skins**

Source: Author computed from CSO (various<sup>a</sup>; various<sup>b</sup>) and SB (various<sup>a</sup>).

With the government intensifying its efforts to diversify the economy to reduce its over-dependence on the mining sector, the need to bolster growth of non-mining sectors remains an urgent national priority. This became more apparent in the aftermath of the 2008-09 global economic crises, which yielded substantial reductions in mining GDP, government revenue, and mineral exports, consequently leading to an economic recession in 2009 (SB 2014c). Through its Strategy for Economic Diversification and Sustainable Growth, Government has made a commitment to commercialize and restructure the agricultural sector and the Botswana Meat Commission (BMC), a state trading beef export monopoly, to improve beef industry performance (GoB 2008). The priority given to livestock industry development is also reflected through the high budget allocations accorded the industry within the Ministry of Agriculture (TRANSTEC and BIDPA 2010).

A fundamental question relates to the implications of the above stated performance indicators on the export competitiveness of Botswana's beef industry. To answer



this question, this paper examines the competitiveness of Botswana's beef industry within the Southern African Development Community (SADC) region and relative to major world beef exporters. Export competitiveness is important for the sustenance of the beef industry in Botswana, and to further ensure that the industry continues to contribute to improvements in rural livelihoods, exports and foreign exchange in the country.

This paper adopts several measures of Revealed Comparative Advantage (RCA) to examine the export competitiveness of Botswana's beef industry. It is widely accepted that RCA indices can be used to measure competitiveness amongst countries exporting the same commodity (Serin and Civan 2008). While such indices have been criticized for not performing well for countries with trade restricting policies, they can shed light on how a country has relatively fared and how its relative performance has evolved over time, subject to such policies. This may provide useful information, particularly where such policies have not been altered substantially over time, as has been the case in Botswana.<sup>2</sup>

The rest of the paper is structured as follows. Sections 2 and 3 respectively discuss the methodology and data used to measure export competitiveness of the beef industry in Botswana. Section 4 then discusses the empirical results, showing how Botswana has fared within the SADC region and amongst the leading world beef exporters. Next, section 5 provides a qualitative assessment of institutional, supply-side and demand-side factors underlying export competitiveness of Botswana's beef industry, and section 6 provides conclusions.

## 2. Methodology

### 2.1 Trade-only measures

Although the "trade only" measures of RCA are anchored on the Balassa index, several other versions have emerged. The Balassa index expresses RCA "as the share of country  $i$ 's exports in world trade of product  $j$  divided by that country's share of world trade in manufactures" (Ballance 1988; pp 12). The Balassa index and its several versions have been criticized for not taking into account the different levels of economic development pertaining to the concerned countries, including country size and influences in the export flows (Ballance 1988). The difficulty in interpreting the index and its extensions has also been noted, to an extent that "*a priori* it is not clear that a particular value for the Balassa index implies the same extent of comparative advantage for different countries" (Hinloopen et al. 2000; pp 1).

We adopt three trade-only measures of competitiveness, namely RCA1, RCA2 and RCA3. These were expressed as:

$$RCA1_{ij} = x_{ij} / x_{nj} \quad (1)$$

$$RCA2_{ij} = (x_{ij} / x_{nj}) / (x_{ik} / x_{nk}) \quad (2)$$

$$RCA3_{ij} = (x_{ij} - m_{ij}) / (x_{ij} + m_{ij}) \quad (3)$$

where  $x_{ij}$  represents exports of commodity  $j$  (beef) by country  $i$ ,  $x_{nj}$  denotes exports of commodity  $j$  by a set of countries  $n$ ,  $x_{ik}$  is exports of a set of commodities  $k$  (all agricultural commodities) by country  $i$ ,  $x_{nk}$  represents exports of a set of commodities  $k$  by a set of countries  $n$ , and  $m_{ij}$  denotes imports of commodity  $j$  by country  $i$  (Utkulu and Seymen 2004).<sup>3</sup>

Two sets of countries are identified in this study, SADC countries and the leading beef exporters. Thus,  $RCA1$  measures the ratio of exports of beef by a SADC country (leading beef exporters) to total beef exports by the SADC region (leading beef exporters). The range of  $RCA1$  is  $0 \leq RCA1 \leq 1$ , where  $RCA1=0$  implies that the country does not export beef and  $RCA1=1$  implies that the country is the only beef exporter amongst the considered set of countries. Therefore, the higher (i.e. the closer to 1) the  $RCA1$  the more competitive is the respective country amongst the considered group of countries.  $RCA2$  measures relative beef export performance of a country. Its numerator is the ratio of beef exports for country  $i$  to beef exports in region  $n$  while its denominator is the ratio of agricultural exports of country  $i$  to agricultural exports of region  $n$ .  $RCA2 > 1$  implies that country  $i$  has comparative advantage while  $RCA2 < 1$  implies comparative disadvantage.

$RCA3$  measures the ratio of country  $i$ 's net beef exports to its total trade of beef (imports plus exports). The range of the index is therefore  $-1 \leq RCA3 \leq 1$ , where  $RCA3 > 0$  implies that the country is a net beef exporter,  $RCA3 < 0$  implies a net beef importer and  $RCA3 = 0$  means that imports and exports are equal.<sup>4</sup>  $RCA3 = -1$  implies zero exports and comparative disadvantage, whereas  $RCA3 = 1$  implies zero imports and comparative advantage. The limitation of  $RCA3$  is that, in a country where there are import bans, the value of the index would equal unity, which may be misinterpreted to imply that such a country has comparative advantage. Similarly, other import restricting policies would tend to increase the value of the numerator and reduce the value of the denominator of  $RCA3$ , further leading to higher  $RCA3$  estimates, which may be misinterpreted to imply increased comparative advantage.

## 2.2 Alternative measures of RCA

Alternative measures of RCA include the relative trade advantage, relative export advantage and revealed competitiveness (Vollrath 1991). These indices have been applauded for their ability to distinguish between countries that enjoy a relative advantage in a particular commodity from those that do not. This paper adopts the relative export advantage, which is expressed as:

$$RCA7_{ij} = \ln(x_{ij}/x_{nj})/(x_{ik}/x_{nk}) \quad (4)$$

where  $\ln$  denotes natural logarithm and the other variables are as previously defined.<sup>5</sup> As evident,  $RCA7$  is the natural logarithm of  $RCA2$ .  $RCA7 > 0$  implies comparative advantage whereas  $RCA7 < 0$  implies comparative disadvantage (Utkulu and Seymen 2004; Vollrath 1991).

### 2.3 Trade-cum-production indices

Trade-cum production indices are renowned for their ability to adjust for country size. The indices are also applauded for recognising that it is not unusual that most countries can be both importers and exporters of the same commodity. Four trade-cum-production indices, namely, the ratio of exports to production, the ratio of imports to consumption, the ratio of net trade to production and the ratio of production to consumption have been identified in the RCA literature.

This paper adopts the ratio of net trade to production  $NP$  and the ratio of production to consumption  $PC$ , which are expressed as:

$$NP_{ij} = (x_{ij} - m_{ij})/p_{ij} \quad (5)$$

$$PC_{ij} = p_{ij}/c_{ij} \quad (6)$$

where  $p$  represents domestic production,  $c$  denotes domestic consumption and other variables are as previously defined (Ballance, Forestner and Murray 1989; Ballance 1988).<sup>6</sup>

$NP > 0$  implies that the country is a net beef exporter,  $NP < 0$  implies a net importer and  $NP = 0$  means that imports and exports are equal. Thus, positive values imply comparative advantage while negative values signify comparative disadvantage.  $NP = 1$  implies that all beef produced in a country is exported and that there are no beef imports and domestic consumption. Since net imports can exceed domestic production,  $NP$  has no lower limit, but its upper limit is unity (1). The higher (i.e. the closer to 1) the  $NP$ , the more competitive is the country in question.

$PC = 1$  implies that all the beef produced in a given country is consumed in that country; that there is no trade. However,  $PC > 1$  implies that domestic production exceeds domestic consumption, signifying positive net exports and comparative advantage. Conversely,  $PC < 1$  implies that domestic consumption exceeds domestic production, further signifying positive net imports and comparative disadvantage.

## 3. Data

For each export competitiveness measure, two sets of indices are computed, one for SADC countries and the other for the leading world beef exporters. SADC countries include

Angola, Botswana, Democratic Republic of Congo (DRC), Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe. The leading beef exporters are Argentina, Australia, Botswana, Brazil, Canada, Namibia, New Zealand, United States and Uruguay.

Required data included country-level beef imports, exports, production, consumption, and aggregate imports and exports of agricultural commodities. Indices 1 to 4 were computed using beef import and export values while indices 5 and 6 were computed based on import, export, production and consumption volumes. For consistency, all data used in this study were obtained from the FAO (2014), covering the period from 1961 to 2011. Two categories of imports and exports, (1) meat, cattle and (2) meat, cattle, boneless (beef and veal), were distinguished in the FAO datasets. These were added to derive imports and exports for each country included in the analysis.

Two categories of beef production estimates are found in the FAO datasets: (1) meat, indigenous cattle and (2) meat, cattle. The reported production volumes across the two categories were similar in magnitude and were in certain cases equivalent. This study however, adopted production estimates reported for the classification, meat, cattle. Beef consumption was estimated by summing domestic production with net imports (imports less exports). Ideally, stock carried-in should have been added and stock carried-out subtracted if such data were available.

## 4. Empirical Results

### 4.1 Trade-only measures

Table 2 reports *RCAI* results for selected SADC countries.<sup>7</sup> Zimbabwe dominated the region's beef exports for the periods 1966-1970 and 1971-1975, with mean export shares of 35 and 29 percent, respectively. Moreover, it was the second leading SADC beef exporter during the periods 1961-1965 and 1976-1980. However, the country's mean export shares had declined to the range of between zero and 14 percent for the remaining periods.<sup>8</sup> Similarly, South Africa was amongst the leading SADC beef exporters during the periods from 1961 to 1975, with mean export shares ranging from 21 to 27 percent, but had declined to shares ranging from zero to 15 percent during the periods from 1976 to 2010.

While it captured only 9 percent of SADC beef exports during the period 1966-1970, Botswana experienced increasing mean export shares thereafter; which rose to 63 percent in 2006-2010. Namibia's mean export shares were the second highest, after those for Botswana, during most of the review period. They ranged from 23 to 26 percent during the periods from 1961 to 1970 and 24 to 53 percent during those from 1986 to 2010. Hence, Namibia and Botswana were the leading SADC beef exporters during most of the review periods. Botswana was the leader since 1976-1980, except for 1991-1995

when it was surpassed by Namibia. Consequently, Botswana has historically been the most competitive of the SADC beef exporters, based on *RCAI* estimates.

**Table 2: Estimates of *RCAI* among SADC beef exporters (values)**

Country	1961-65	1966-70	1971-75	1976-80	1981-85	1986-90	1991-95	1996-00	2001-05	2006-10
Botswana	0.16	0.09	0.22	0.32	0.62	0.45	0.35	0.49	0.55	0.63
Namibia	0.26	0.23	0.12	0.13	0.19	0.34	0.53	0.33	0.24	0.24
SA	0.21	0.24	0.27	0.15	0.00	0.03	0.04	0.10	0.16	0.12
Swaziland	0.00	0.01	0.02	0.04	0.04	0.03	0.02	0.02	0.03	0.01
Zimbabwe	0.24	0.35	0.29	0.30	0.13	0.14	0.03	0.05	0.01	0.00

SA: South Africa

Table 3 reports *RCAI* indices for the leading world beef exporters. Botswana and Namibia recorded insignificant export shares amongst the leading beef exporters; their individual mean export shares ranged from zero to 2 percent. Similarly, Canada and Uruguay have generally maintained low export market shares. Australia was consistently the leading beef exporter, except for 1961-1965 and 1996-2000 when it was respectively surpassed by Argentina and USA. USA saw an increasing trend in export market share from 1961-1965 to 1996-2000, after which its shares declined. Argentina generally experienced declining market share throughout the review period. Brazil's beef export market shares were insignificant for most of the period, except after 2001-2005 and 2006-2010. Thus, in sum, Botswana is an insignificant player in the world beef market, in terms of market share. However, as noted before, *RCAI* is limited in that it does not factor in the country size.

**Table 3: Estimates of *RCAI* among the leading world beef exporters (values)**

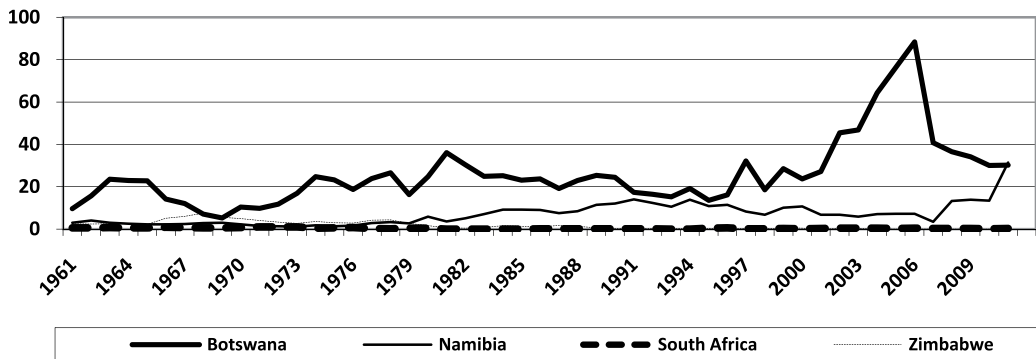
Country	1961-65	1966-70	1971-75	1976-80	1981-85	1986-90	1991-95	1996-00	2001-05	2006-10
Argentina	0.37	0.31	0.20	0.18	0.11	0.08	0.07	0.07	0.06	0.09
Australia	0.33	0.35	0.40	0.45	0.38	0.34	0.34	0.26	0.29	0.27
Botswana	0.01	0.01	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01
Brazil	0.02	0.04	0.06	0.01	0.07	0.05	0.04	0.04	0.14	0.24
Canada	0.03	0.04	0.03	0.03	0.05	0.04	0.05	0.11	0.14	0.08
Namibia	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00
NZ	0.16	0.15	0.18	0.17	0.17	0.15	0.12	0.09	0.10	0.09
USA	0.02	0.02	0.04	0.08	0.14	0.26	0.33	0.35	0.22	0.16
Uruguay	0.06	0.06	0.06	0.05	0.06	0.04	0.03	0.05	0.04	0.07
Total	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

NZ: New Zealand

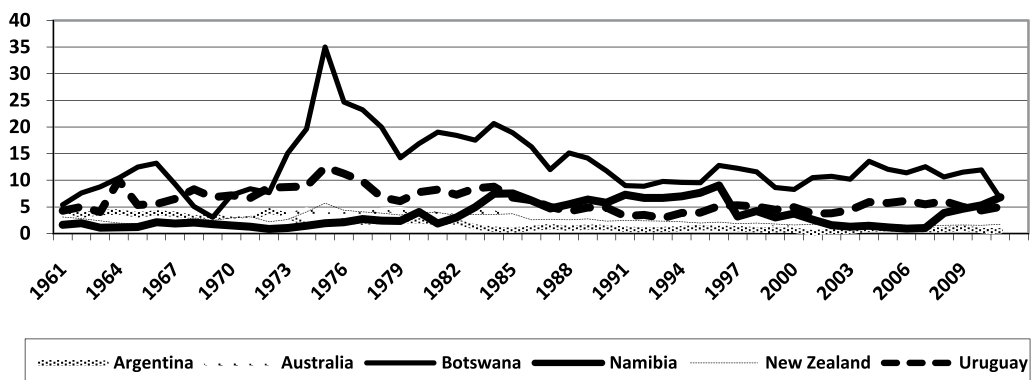
Figure 5 plots *RCA2* indices for selected SADC beef exporters. Botswana was consistently the most competitive SADC beef exporter, and it experienced increasing competitiveness against SADC countries when considering the entire period. However, Botswana experienced declining relative competitiveness during the periods from 1981 to 1995 and 2006 to 2011. Namibia maintained the second position during most of the review period, except for the period from 1965 to 1979 when it was surpassed by either Swaziland (not shown) or Zimbabwe. South Africa was consistently the least competitive amongst the selected countries.

Figure 6 plots *RCA2* indices for the leading beef exporters. Although Botswana's beef was consistently the most competitive during the review period, the index steadily declined after 1975, signifying loss of competitiveness against the leading world beef exporters. The level of competitiveness during the period from 1991 to 2011 was comparable to that for 1963 to 1967, representing a reversal in competitiveness. After Botswana, Uruguay was consistently the first runner-up, except for 1985 and for the period from 1988 to 1996 when it was surpassed by Namibia. New Zealand, Argentina and Australia were the least competitive.

**Figure 5: *RCA2* indices for selected SADC beef exporters, 1961-2011**



**Figure 6: *RCA2* for selected leading beef exporters, 1961-2010**



Mean *RCA3* indices reported in Table 4 indicate that Botswana and Namibia were by far the leading beef exporters in the SADC region. The estimated indices are at unity for both countries, except that Namibia recorded estimates slightly lower than unity during the periods 1996-2000, 2001-2005 and 2006-2010. Zimbabwe was at par with Botswana and Namibia during most of the periods, but had lost competitiveness during the periods 2001-2005 and 2006-2010, and recorded a negative mean index for the latter period, which indicates comparative disadvantage. South Africa was at par with the most competitive countries during the period 1961-1965, but its competitiveness was eroded thereafter. A similar pattern was observed for Swaziland.

Table 5 shows mean *RCA3* indices for the leading world beef exporters. Argentina, Australia, Botswana, Namibia, New Zealand, and Uruguay recorded impressive competitiveness levels, with *RCA3* estimates close to unity for most of the considered periods, except for Namibia during the periods 1996-2000, 2001-2005 and 2006-2010. The USA recorded negative estimates for most of the review periods, despite experiencing increasing competitiveness over time. This owes to the fact that, despite being a significant beef exporter in terms of volume, the USA has remained a net importer. Overall, Botswana's export competitiveness trends follow those for the major world beef exporters.

*RCA3* indices should however be taken with caution because they may be capturing the effects of wide ranging trade restricting policies across the beef exporters. For example, beef exporting countries with import bans would produce *RCA3* estimates of unity, which may be misinterpreted to signify comparative advantage when they instead reflect such import bans.

**Table 4: Mean *RCA3* indices for leading SADC beef exporters, 1961-1965 to 2006-2010**

Country	1961-65	1966-70	1971-75	1976-80	1981-85	1986-90	1991-95	1996-00	2001-05	2006-10
Botswana	1.00	1.00	1.00	0.99	1.00	1.00	1.00	0.98	0.99	1.00
Namibia	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.84	0.83	0.83
SA	0.99	0.17	0.26	0.57	-1.00	-0.78	-0.82	-0.11	0.12	-0.02
Swaziland	-	-	0.55	0.50	0.12	-0.32	-0.39	-0.04	-0.60	-0.92
Zimbabwe	0.91	1.00	1.00	0.95	0.88	0.85	1.00	0.99	0.06	-0.97

SA: South Africa

**Table 5: Mean RCA3 indices for leading world beef exporters, 1961-65 to 2006-10**

Country	1961-65	1966-70	1971-75	1976-80	1981-85	1986-90	1991-95	1996-00	2001-05	2006-10
Argentina	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.92	0.94	0.99
Australia	1.00	1.00	1.00	1.00	0.99	0.99	0.99	0.99	1.00	0.99
Botswana	1.00	1.00	1.00	0.99	1.00	1.00	1.00	0.98	0.99	1.00
Brazil	1.00	1.00	0.43	-0.43	0.68	-0.02	0.36	0.34	0.89	0.94
Canada	0.23	0.11	-0.38	-0.29	-0.10	-0.30	-0.22	0.30	0.52	0.28
Namibia	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.84	0.83	0.83
NZ	1.00	1.00	1.00	1.00	1.00	1.00	0.98	0.98	0.97	0.97
USA	-0.90	-0.92	-0.85	-0.74	-0.52	-0.21	0.11	0.19	-0.25	-0.09
Uruguay	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	0.99	0.99

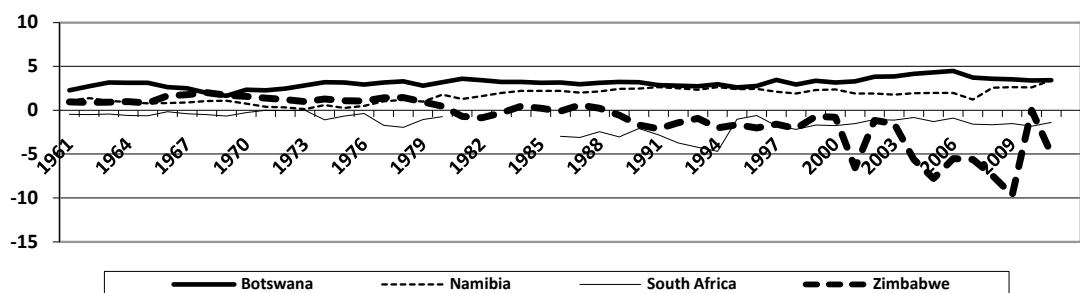
NZ: New Zealand

## 4.2 Alternative indices

*RCA7* indices depicted in Figure 7 show that Botswana and Namibia were the most competitive SADC beef exporters, with Botswana having an edge over Namibia. Zimbabwe lost competitiveness over time and began showing negative values in 1981, after its independence. Similarly, South Africa lost competitiveness over time and was the least performer, except after 2000 when it surpassed Zimbabwe. Moreover, South Africa recorded negative values throughout the review period

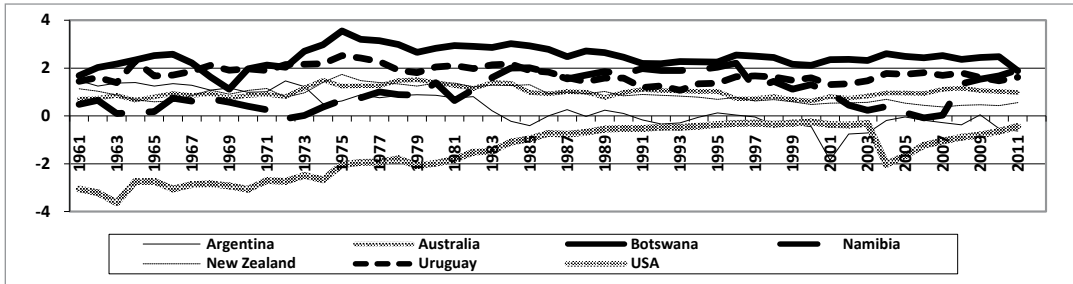
Likewise, Figure 8 shows that Botswana was the most competitive world beef exporter, followed by Uruguay. However, Botswana's relative competitiveness began declining after reaching a peak in 1975. Argentina lost competitiveness over time and began recording negative values from 1984. USA was the least competitive and registered negative values throughout, despite its competitiveness levels improving over time.

**Figure 7: The logarithm of the relative export advantage (*RCA7*) for selected SADC countries, 1961-2011**





**Figure 8: The logarithm of the relative export advantage (*RCA7*) for leading beef exporters, 1961-2011**



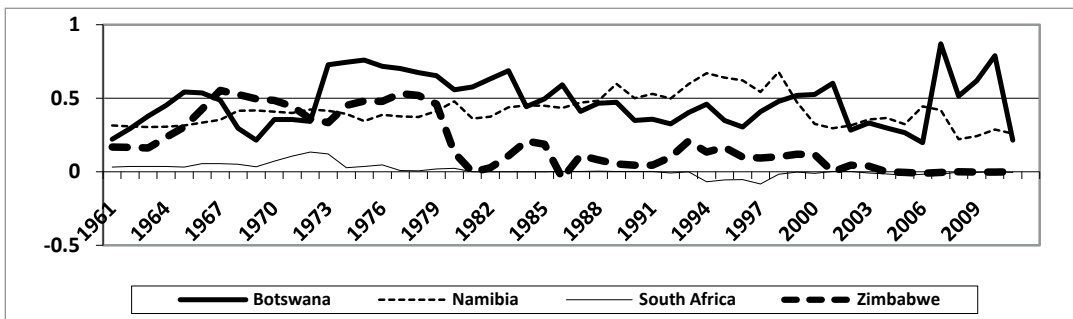
### 4.3 Trade-cum-production indices

Figure 9 plots the ratios of net trade to domestic production (*NPs*) for selected SADC countries. Botswana and Namibia are the most competitive SADC beef exporters. Botswana exported about 20 percent of its beef in 1961 and reached a peak of 75 percent in 1975. Thereafter, its *NPs* got eroded until reaching 20 percent in 2011 (except for the high outliers recorded from 2007 to 2010). Therefore, Botswana experienced declining competitiveness from the mid 1970s, although it still outperformed most of the SADC countries.

Namibia's *NP* rose steadily from 1961, reaching a peak of 68 percent in 1998. Thereafter, its *NP* fell, reaching 26 percent by 2011. Zimbabwe's performance was impressive from 1961 to 1979, but sharply declined thereafter to very low levels. South Africa on the other hand remained the least performer of the four countries throughout the review period.

Table 6 shows that Botswana was the most competitive of the leading beef exporters during most of the periods from 1961-1965 to 1981-1985. However, it had been surpassed by Australia and New Zealand during the periods from 1991-1995 to 2001-2005 and by Namibia during 1991-1995 and 1996-2000. When considering annual estimates (not shown), it became apparent that Botswana began experiencing declining competitiveness from the mid 1970s, except for 2007-2010 when its *NP* estimates were considerably high.

**Figure 9: Ratio of net trade to production for selected SADC beef exporters, 1961-2011**

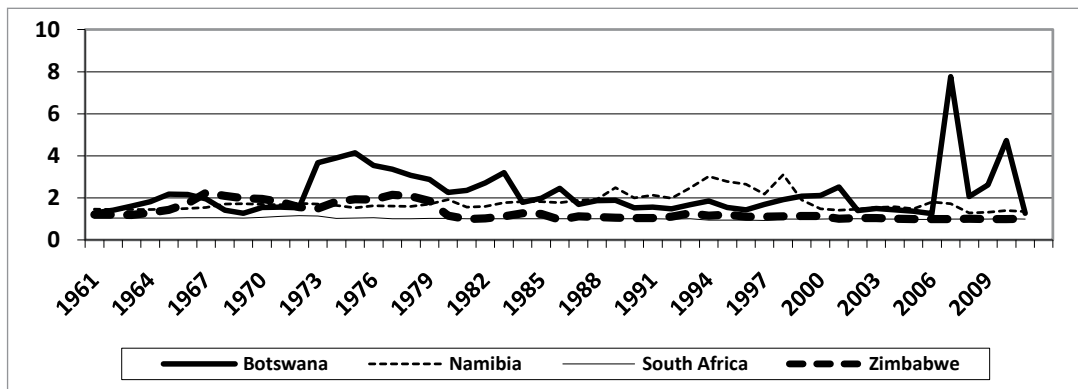


**Table 6: Mean ratios of net trade to production for leading beef exporters, 1961-1965 to 2006-2010**

Country	1961-65	1966-70	1971-75	1976-80	1981-85	1986-90	1991-95	1996-00	2001-05	2006-10
Argentina	0.18	0.14	0.10	0.09	0.06	0.04	0.04	0.06	0.08	0.09
Australia	0.27	0.29	0.35	0.35	0.35	0.38	0.44	0.46	0.45	0.46
Botswana	0.38	0.38	0.59	0.66	0.57	0.46	0.38	0.45	0.36	0.60
Brazil	0.01	0.03	0.03	-0.02	0.02	-0.03	0.00	0.00	0.08	0.12
Canada	0.01	0.00	-0.03	-0.02	0.01	-0.03	-0.03	0.13	0.18	0.17
Namibia	0.31	0.39	0.40	0.40	0.41	0.50	0.59	0.53	0.33	0.32
NZ	0.42	0.38	0.44	0.43	0.46	0.49	0.55	0.55	0.57	0.56
USA	-0.04	-0.04	-0.05	-0.05	-0.04	-0.04	-0.02	-0.01	-0.04	-0.02
Uruguay	0.22	0.28	0.30	0.30	0.32	0.31	0.21	0.36	0.41	0.47

NZ: New Zealand

All countries depicted in Figure 10, except for South Africa, were net beef exporters, but Botswana and Namibia were the regional leaders. As before, Botswana recorded increasing competitiveness from 1961 to 1975, after which it registered declining competitiveness (except for the period from 2007 to 2010). Namibia experienced increasing competitiveness from 1961 to 1998, but recorded declining performance for the remainder of the period. Table 7 shows that Botswana's beef exports were the most competitive for the periods from 1961-65 to 1981-85. It was then surpassed by Namibia and New Zealand for most of the remaining periods, and Australia for some of the remaining periods.

**Figure 10: Ratio of production to consumption for SADC beef exporters, 1961-2011**

**Table 7: Mean ratio of production to consumption for leading world beef exporters, 1961-1965 to 2006-2010**

Country	1961-65	1966-70	1971-75	1976-80	1981-85	1986-90	1991-95	1996-00	2001-05	2006-10
Argentina	1.22	1.16	1.12	1.10	1.06	1.04	1.04	1.06	1.09	1.10
Australia	1.37	1.42	1.56	1.54	1.53	1.61	1.80	1.84	1.83	1.86
Botswana	1.66	1.67	2.96	3.02	2.41	1.89	1.62	1.85	1.64	3.68
Brazil	1.01	1.03	1.03	0.98	1.02	0.97	1.00	1.00	1.09	1.13
Canada	1.01	1.00	0.97	0.98	1.01	0.97	0.97	1.15	1.23	1.20
Namibia	1.45	1.63	1.66	1.69	1.72	2.02	2.48	2.26	1.50	1.50
NZ	1.73	1.62	1.79	1.76	1.87	2.00	2.21	2.21	2.35	2.26
USA	0.96	0.96	0.95	0.95	0.96	0.96	0.98	0.99	0.96	0.98
Uruguay	1.29	1.39	1.44	1.43	1.48	1.46	1.27	1.56	1.73	1.90

NZ: New Zealand

## 5. Factors Underlying Botswana's Beef Export Competitiveness

As evident from the construction of export competitive indices, the relative competitiveness of any particular country depends on factors internal and external to the country in question. Therefore, factors underlying the export competitiveness of a particular country's industry may be intractable as they include demand and supply variables in importing and exporting countries, as well as domestic supply and demand factors in the country of concern. Institutional environments in importing and exporting countries, as well as domestically, also do affect a country's export competitiveness. Despite the possible intractability of the causal factors, this section provides a qualitative assessment of institutional, supply-side, and demand-side factors that have influenced beef export competitiveness in Botswana.

### 5.1 Institutional factors

The BMC, a state trading enterprise, has been the sole exporter of beef since its establishment in 1965, which was made possible through a statutory instrument establishing the entity (GoB, 1965). Its establishment was geared at exporting beef to Britain, owing to colonial ties of the two countries. Botswana beef has also been accorded preferential access into the EU market through various trade arrangements. Before 1975, preferential access was made possible through the Commonwealth Preferential System, which allowed for duty free access of Botswana beef to the British market (Dunlop 1999; Solignac-Lecomte 2001). From 1975 to 2000, non-reciprocal preferential access was made through the beef protocol of the Lomé Convention, signed between the European Commission (EC) and the African, Caribbean and

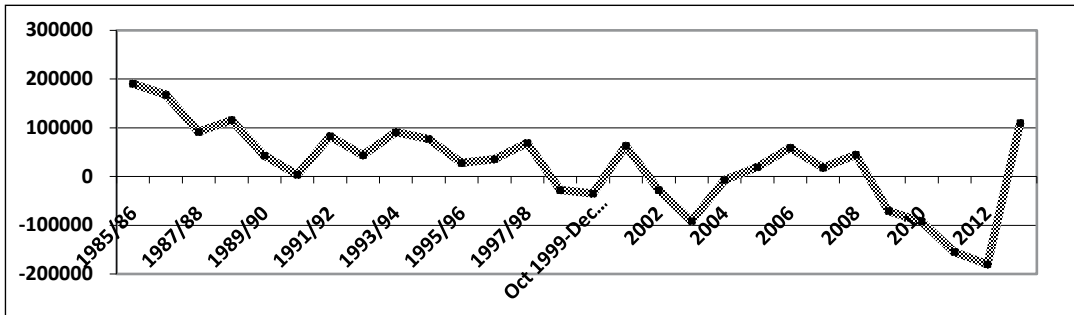
Pacific (ACP) countries, which exempted ACP beef exports from *ad valorem* duties levied to non-ACP beef imports into the EC.<sup>9</sup>

Non-reciprocal trade preferences were further extended through the Cotonou Agreement (CA) during the period from 2001 to 2007, to give the EU and ACP countries time to negotiate WTO compatible Regional Economic Partnership Agreements.<sup>10</sup> In 2009, Botswana, Lesotho and Swaziland signed an interim Economic Partnership Agreement (EPA) with the EU, which allowed for the continuation of non-reciprocal preferences. The interim EPA allowed for duty free/ quota free access of Botswana's beef into the EU market while EU/SADC EPA negotiations were ongoing. The successful conclusion of negotiations on an EPA between the EU and the SADC EPA Group (Angola, Botswana, Lesotho, Mozambique, Namibia, South Africa and Swaziland) on 15 July 2014 will result in the signing of a substantive EPA in the near future to facilitate the continuation of the ongoing preferential access of Botswana's beef in the EU market.

Without doubt, the above institutions have played critical roles in stimulating the development of a competitive beef industry in Botswana, through promoting export market access. However, the same institutions are potential threats to beef export competitiveness in Botswana. First, the single export channel, through a state trading export monopoly, means that the collapse of the state trader may lead to an instant collapse of the beef industry in Botswana. This potential threat is not farfetched in that the BMC has operated at idle capacity since the 1980s when its throughput began to steadily decline. Such eminent threat is also reflected in the poor financial performance of the BMC, characterized by declining and negative profits (Figure 11).

Second, Botswana's competitiveness is enhanced by duty free/quota free access of its beef exports to the EU market, while the country's key competitors are subject to high import duties in the same market. Therefore, Botswana's beef exports are priced higher than world market prices because of trade restricting protectionist policies in the EU market. Trade reforms in the EU that ease trade restrictions would lower beef prices in the EU market, further leading to preference erosion and reduced beef export competitiveness in Botswana.

Finally, changes in standards in the EU market pose risks to Botswana's beef industry, particularly where compliance capacity is limited or compliance costs are prohibitive amongst communal farmers. For example, the requirement that cattle should have been kept in a single enclosed area for a given period before they are slaughtered for the EU market is not practical under communal arrangements and serves as a trade barrier. Given that over 80 percent of Botswana's cattle are in the communal production system, this requirement would therefore lead to reduced exports to the lucrative EU market, impacting adversely on beef industry competitiveness.

**Figure 11: Real BMC Profitability (2006 prices); 1985/86-2013**

Source: Author computed from BMC (various)

## 5.2 Supply-side factors

As evident from the analysis, countries that are competitive in the export market have the following characteristics: (1) they are net exporters, (2) they account for significant shares of exports within a set of countries, and (3) they export a high ratio of domestic production or consume a small ratio of domestic production compared to comparator countries. Therefore, domestic production and productivity are amongst the key factors influencing export competitiveness.

Botswana's beef cattle are produced under two distinct production systems of communal and commercial (ranching). The communal system is the most prominent and accounted for more than 80 percent of the country's cattle population during the period from 1979 to 2012 (Figure 12). However, the communal system is less productive than its commercial counterpart. Mean cattle mortality rates were estimated at 12 percent for the communal sector during the period from 1979 to 2012, compared to 6 percent for the commercial production system (Seleka and Mmopelwa, 2014). However, communal cattle mortality rates declined by 3.3 percent per year during the considered period compared to 1.9 percent for the commercial system. This signifies an improvement in cattle management practices and protocols over time, particularly for the communal system.

The mean calving rate was however higher for the communal system (57 percent) than the commercial system (53 percent), and was stagnant for the communal system while it declined (at 1.3 percent per year) for the commercial system. Mean off-take rates were estimated at only 8 percent for the communal system, compared to 16 percent for the commercial system. However, they remained stagnant for both production systems during the review period. Despite low off-take rates, the cattle population in Botswana has remained largely stagnant during the period from 1979 to 2011 (Figure 12).

Given low off-take rates and high mortality rates in the communal system, stagnant cattle population, and the predominance of communal cattle farming, prospects for improving

Botswana's beef export competitiveness are limited, unless effective interventions are devised for reducing communal mortality rates and increasing communal off-take rates substantially. This is also evident from the fact that productivity targets set in Botswana's successive National Development Plans (NDPs) have not been realized (TRANSTEC and BIDPA 2010).

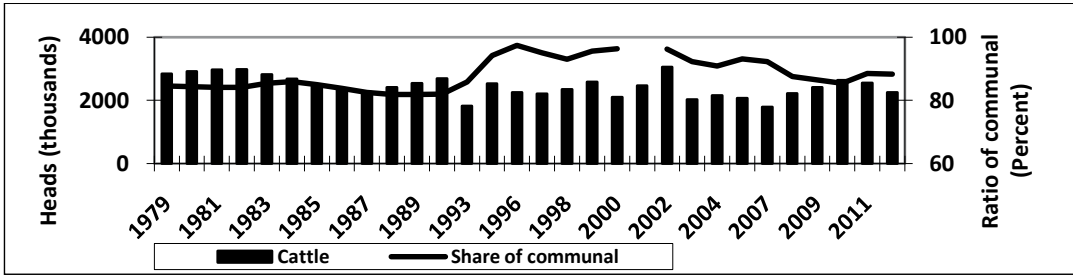
Other supply side factors affecting the export competitiveness of Botswana's beef industry are producer prices of cattle, and recurrent outbreaks of cattle diseases and drought (BIDPA 2006). These factors influence household decisions to market cattle as well as to accumulate cattle inventory. BIDPA (2006) found positive cattle supply response to producer prices for the BMC market, but such response was inelastic and lagged. However, the steady and consistent fall in real cattle producer prices, from P1,228 per 100kg of carcass in 1974 to P776 per 100kg of carcass in 2005 (Figure 12), has had long-term adverse effects on beef export competitiveness in Botswana. This period largely coincides with the reduction in export competitiveness against SADC countries and the leading beef exporters (Figures 6, 8, 9 and 10; Table 6 and 7).

Empirical evidence has also shown that the occurrence of drought in Botswana causes farmers to increase cattle sales, as a strategy to minimize the risk of inventory loss from drought-induced cattle mortalities (BIDPA 2006). However, in subsequent good years following drought, farmers engage in inventory accumulation to rebuild their breeding stock, and thereby reducing cattle sales. Thus, such drought-induced decisions have had both short- and long-term adverse impacts on beef export competitiveness. Foot and Mouth Disease (FMD) outbreaks have also impacted adversely on cattle sales directly through the banning of trade from affected areas. Moreover, FMD outbreaks have had long-term adverse impacts on the beef industry where they have led to the imposition of mandatory cattle destruction in the affected areas to halt further FMD spread.

Mandatory cattle destruction impacts adversely on cattle sales to the BMC and overall beef exports. It also reduces the breeding stock now, leading to a reduction in future cattle sales, as these (cattle sales) positively relate with cattle inventory. Moreover, subsequent restocking exercises with cattle from disease free areas divert cattle sales from slaughter, further impacting adversely on cattle sales and beef exports. All these decisions adversely affect beef industry competitiveness in both the short- and long-term.

In sum, the predominance of the communal production system, stagnant cattle population, high communal cattle mortality rates, low communal cattle off-take rates, declining cattle producers' prices, and recurrent outbreaks of drought and livestock diseases have collectively contributed to the observed decline in the competitiveness of the beef industry in Botswana. If these factors are not effectively addressed, Botswana's beef industry is likely to continue to experience declining competitiveness in future.

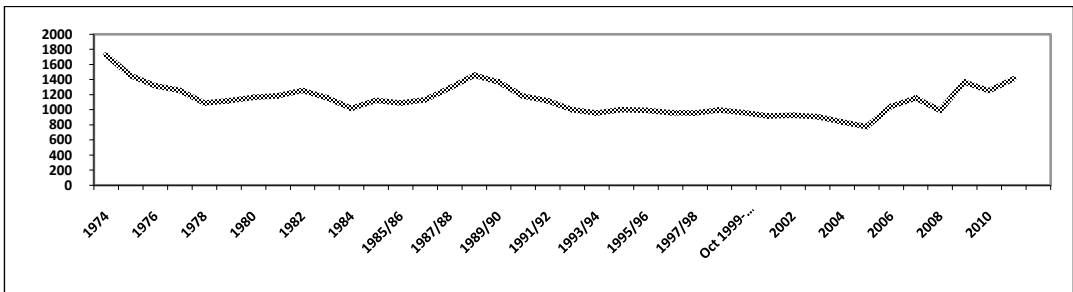
**Figure 12: Total Cattle Population: 1979-2012<sup>†</sup>**



Source: CSO (various<sup>c</sup>) and SB (various<sup>b</sup>).

<sup>†</sup>Data for years 1991, 1992, 1994 and 2005 are missing.

**Figure 13: BMC's Real Average Producer Prices (per 100KG) (2006 prices); 1974-2011**



Source: Author computed from BMC (various)

### 5.3 Demand-side factors

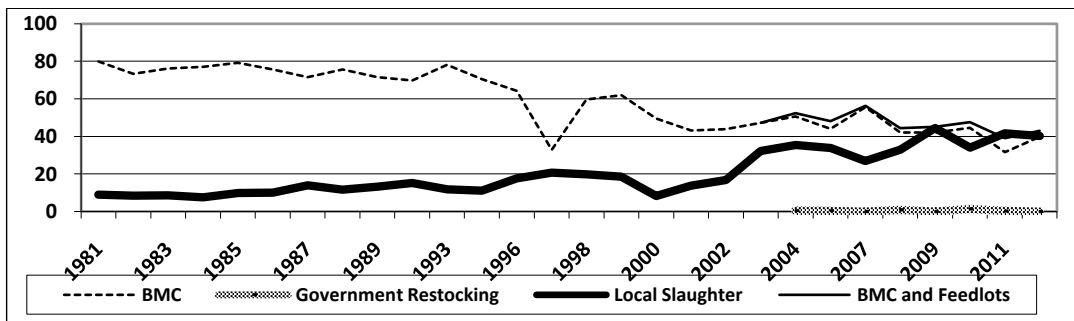
The live cattle market in Botswana may be described as oligopsonistic, with the BMC being a price leader and a residual buyer of live cattle and numerous other buyers constituting the price-taking fringe firms (BIDPA 2006). Given stagnant cattle supply, an increase in domestic demand for beef in Botswana, due to increasing per capita income, would yield a reduction in cattle sales to the BMC. Since BMC is the sole exporter of beef in Botswana, this would further yield a reduction in beef exports.

The above hypothesis is qualitatively depicted in Figure 14 where BMC's share of cattle sales declined from about 80 percent in 1981 to 40 percent in 2012, representing a significant loss of market share. If we add the share of feedlots to that of BMC, assuming they sell cattle to BMC, the share for 2012 is estimated at 43 percent. This can be contrasted from the share of local abattoirs, which rose from 9 percent in 1981 to about 40 percent in 2012. Given that BMC slaughters cattle primarily for the export market and that local abattoirs slaughter solely for the domestic market, it then follows that the rising demand for beef in Botswana,

which is propelled by increasing per capita income, has contributed to declining beef exports (Figure 3).

This is also evident from a different dataset published by BMC, which reveals that BMC throughput declined about double-fold from its peak of about 240 thousand heads in 1984 to only 120 thousand heads in 2012 (Figure 15). Since the BMC is the sole exporter of beef, this is translated into a reduction in beef exports (Figure 3). In sum, the continued rise in domestic demand for beef in Botswana, combined with stagnant to declining cattle supply, will ultimately make Botswana uncompetitive in the export market, due to its adverse effects on cattle supply for export slaughter.

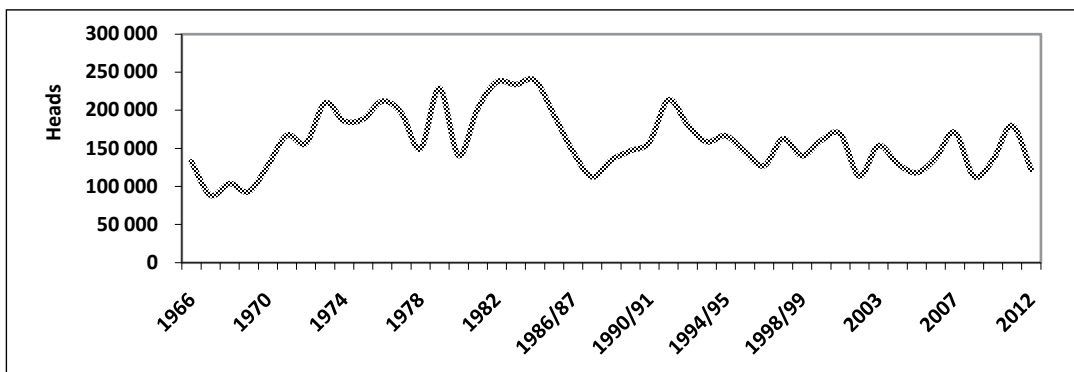
**Figure 14: Live Cattle Market Shares by Selected Outlets, 1981-2012**



Source: Author computed from CSO (various<sup>a</sup>), SB (various<sup>b</sup>).

NB: Local slaughter includes sales to Local Abattoirs, Butcheries, Municipal Abattoirs and Trader

**Figure 15: Cattle Sales to BMC, 1966-2012**



Source: BMC (various)



## 6. Conclusions

The beef industry in Botswana plays an important role as a source of foreign exchange, rural livelihoods and employment. However, the industry has experienced declining output since the 1970s, leading to a steady fall in exports. This scenario questions the industry's sustainability and its continued role as one of the country's leading sources of foreign exchange. For the continued sustenance of the beef industry in Botswana, it is important that beef exports remain competitive in the export market. However, the fall in exports experienced since the 1970s may have contributed to declining export competitiveness over time. This paper therefore tackled this issue by assessing the export competitiveness of the beef industry in Botswana, employing various indices of RCA.

Results revealed that Botswana has been the most competitive beef exporter in the SADC region, followed by Namibia. Export shares against the leading beef exporters indicate that Botswana is an insignificant player in the world beef market. However, all other RCA indices suggest that the performance of Botswana's beef exports was generally impressive, with its competitiveness trends following those for major world beef exporters. Botswana's beef industry was the most competitive from the early 1960s to the late 1980s, after which it was surpassed by some of the leading beef exporters. Despite Botswana's impressive performance, most indices show that the country has experienced declining export competitiveness since the mid 1970s. Botswana's neighbor, Namibia, however recorded increasing export competitiveness from the 1960s to the late 1990s, after which it also saw declining competitiveness.

A qualitative assessment reveals that beef export competitiveness in Botswana could have been influenced by institutional, supply-side, and demand-side factors. Two key institutional factors affecting beef industry competitiveness have been identified. The first entails state trading export operations through the BMC, which have facilitated access of Botswana beef in the EU market. This has undoubtedly enhanced the competitiveness of Botswana's beef exports. However, the single statutory export market channel through the BMC is also a risk factor in that the collapse of the entity would lead to abrupt discontinuation of beef exports to the lucrative EU market. Given that BMC has been experiencing declining and negative profits in the past, this threat may be eminent, unless perpetual bailouts of the BMC by taxpayers are indefinitely continued. The second institutional factor is the preferential access of Botswana beef in the EU market, which has been facilitated through various trade agreements since the 1960s. Such trade arrangement, which currently allows for duty free/quota free access of Botswana's beef in the EU market, has undoubtedly improved the competitiveness and sustainability of Botswana's beef industry.

Supply-side factors such as the predominance of the communal subsector (with low cattle off-take rates and high cattle mortality rates), recurrent outbreaks of drought and

cattle diseases (FMD in particular), and declining cattle prices may have also contributed to declining export competitiveness since the mid 1970s. A demand-side factor that has contributed to declining beef export competitiveness has entailed increasing domestic demand for beef, which was due to increasing consumer incomes in Botswana. Given stagnant cattle supply, this has led to declining beef exports. The continued rise in domestic demand for beef may ultimately render it uncompetitive for the country to export beef, and may lead to the total collapse of beef exports. Public policy should place increased emphasis on improving farm-level productivity, including off-take, and thereby further stimulating cattle supply for export slaughter.

## Notes

1. In 2009, beef export volume and real exports respectively stood at only 20 and 16 percent of their 1976 levels, implying an 80 and 84 percent fall in export volume and real exports, respectively.
2. It is beyond the scope of this paper to assess trade policy changes in comparator countries used in this study.
3. Two other trade-only *RCA* indices, *RCA4* and *RCA5*, have been proposed.  $RCA4_{ij} = (x_{ij}/m_{ij}) / (x_{ik}/m_{ik})$  and  $RCA5 = \ln RCA4$ , where *ln* denotes natural logarithm and other variables are as defined herein (Utkulu and Seymen 2004). *RCA4* and *RCA5* were not computed because of zero imports for most countries.
4. There however exist ambiguities surrounding  $RCA3=0$ , to the extent that it would appear to imply that there is no trade involved (Greenaway et al. 1993).
5. Two other alternative measures of *RCA* have been proposed, *RCA6* and *RCA8*.  $RCA6 = (x_{ij}/x_{ik}) / (x_{nj}/x_{nk}) - (m_{ij}/m_{ik}) / (m_{nj}/m_{nk})$  and  $RCA8 = \ln(x_{ij}/x_{ik}) / (x_{nj}/x_{nk}) - \ln(m_{ij}/m_{ik}) / (m_{nj}/m_{nk})$ , where variables are as defined in the paper (Utkulu and Seymen 2004; Vollrath 1991). *RCA6* and *RCA8* were not computed because of zero imports for some countries, including Botswana. If computed, *RCA6* and *RCA8* would have therefore collapsed into *RCA2* and *RCA7*, respectively.
6. Two other variations of trade-cum-production indices, ratio of exports to production *XP* and ratio of imports to consumption *IP*, have been proposed (Ballance, Forstner and Murray 1987; Ballance 1988). These are not computed because they would have yielded the same qualitative conclusions as *NP* and *PC*.
7. The excluded SADC countries have either weak comparative advantage or comparative disadvantage in beef exports.
8. While the exact reasons for the collapse of Zimbabwe's beef exports are unknown, and their examination is beyond the scope of this paper, it appears that such collapse occurred after the country's independence in 1980.
9. The legitimacy of such non-reciprocal preferential trade arrangement was however successfully challenged within World Trade Organization (WTO) and EU circles on the basis that it contravened Article I of the GATT on non-discrimination amongst WTO members. According to Article XXIV of the GATT however, preferences are legitimate in the case of Free Trade Areas (FTAs), where members of the WTO within an FTA are allowed to discriminate against non-FTA members of the WTO through the adoption of a system of preferences within the FTA. To legitimize preferences, the EU was granted permission by WTO to continue its preferences from 1995 to 2000, during which period it would also negotiate WTO compliant FTAs with ACP regional blocs based on WTO rules of reciprocity.
10. Subsequently, Botswana negotiated an EPA with the EU as part of SADC. However, SADC/EU EPA negotiations were not concluded by 2007, although non-reciprocal preferences were continued beyond the CA period.

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