

EXPORT COMPETITIVENESS OF NAMIBIA'S TIMBER SECTOR: IMPLICATION FOR FORESTRY SECTOR

Salomo Mbai¹, Epson Ndawedapo Noses¹,
and Yonas Tesfamariam Bahta²

¹Namibia University of Science and Technology, Department of Agriculture and Natural Resources Science, Windhoek, Namibia. E-mails: smbai@nust.na; epsonmoses@gmail.com

²University of the Free State, Department of Agricultural Economics, Bleoemfontiem 9300, South Africa. E-mail: Bahtay@ufs.ac.za

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Abstract

Analysing and understanding the timber sector export performance is essential for value chain role players to formulate strategies and policies to enhance the competitive export position and ensure forest sustainability. This study's main objective was to measure the export competitiveness of the Namibian timber (HS440799, HS4401, HS4402, and HS4403) and assess its implication for Forestry using secondary data (2001–2018), Revealed Comparative Advantage (RCA), and Revealed Symmetric Comparative Advantage indices (RSCA). The result shows that Namibia had a revealed comparative advantage for 17 years; however, all below one (except for commodity HS4402 from 2010–2018) means that Namibia timber exports are not internationally competitive. Comparing the four categories of timber, in 2007, the sub-sector (HS4402) recorded the lowest RCA (0.00001) and the lowest RSCA (0.99998) for timber (HS4402) in 2007, the same year. On the other hand, the same categories of timber (HS4402) score the highest RCA with a value of 2.73 in 2015 and the highest RSCA (0.46) for timber (HS4402) in the same year compared to the other categories of timber. RSCA indices results for all commodities show that Namibia's timber exports are not competitive for the study period. Timber's comparative export pattern heavily depends on export volumes and values of timber exports. Timber export competitiveness is not sustainable, given the heavy dependence on natural forests. Namibia should re-structure timber harvesting protocols to include replacement or replanting every tree species harvested for timber production to ensure timber and forest sustainability. The country's timber export sub-sector should focus more on adding value to timber than exporting to improved competitiveness. Further, the government should regulate the harvested wood and protect over-grazing, to promote timber and forest resources' sustainable utilization.

Key words: harvesting protocols, replanting, Reveal Comparative Advantage, Revealed Symmetric Comparative Advantage indices, sustainability.

Introduction

Forest plays an essential role in our environment, biodiversity, and Gross Domestic Product. (Brockerhoff et al. 2017). The contribution of agriculture and forestry to

Gross Domestic Product declined from 7.4 % in 1980 to 3.3 % in 2015. Agriculture and forestry's sector contribution increased from 3.4 % in 2016 to 4.6 % in 2018 (Laubscher et al. 2019). The forest asset of Namibia is estimated at US\$

288 million; it is high compared to other resources of Namibia. Overharvesting of forest was observed at the national level; however, at the national level, underutilized. Community forest management and trade-in products play an essential role in ameliorating over-harvesting (Barnes et al. 2010).

Namibia exports agricultural commodities to international partners in raw form such as timber and charcoal (Bojnec and Ferto 2014). Despite the precise rules and regulations (the Forest Act, 2000-indicated that it may not export any unprocessed forest produce without authorization of the director and relevant documents provided as a prerequisite for cultural and disease identification, education, and research), Namibia continues to export unprocessed or semi-processed timbers to Western countries. The ignorance of the law is an indication that the ministry officials are not ready to uphold and defend the Forest Act to protect Namibia's rare and slow-growing trees and fight climate changes.

Competitiveness is a measure of countries' advantage or disadvantage in selling its products in international markets (OECD 2015, Miteva-Kacarski 2018). Timber resources are part of Namibia's significant natural resources, which must be exploited for national benefits such as creating employment and mainly contributing to economic growth. Over the past few years (2015–2019), Namibia experienced a substantial increase in timber export. The country exported 3200 t of timber to China and 10,000 blocks of wood from northern Namibia to Vietnam since November 2018. According to Brandt (2019), in 2019, approximately 75,000 t of timber was exported from Namibia, and the government received 231 timber harvesting license applications to cut 47,847 trees per annum, 195,550, in

5 years for exportation (Shinovene 2019). The harvesting of timber could generate an income of approximately N\$24 million a year for local farmers. Due to irregularities in issuing permits and lobbying, local farmers lose N\$24 million per year instead.

The Namibian government has implemented several policies and strategies geared towards improving the competitive market performance and taking advantage of the global open market for the Namibian agriculture sector, including timber, based on its perceived competitive advantage. Despite the policies, capital investment, and agriculture and forestry projects (including timber) that were implemented, little research has been conducted to assess the timber sector's export competitiveness and its implication for natural resources. Existing studies such as by Barnes et al. (2010), Propper and Vollan (2013), Nott et al. (2020) and others focused on evaluating timber industry economic and environmental sustainability; examine export taxes applied to the forest industry; assess the value and account of forest resources and awareness and self-governance of illegal harvesting of the forest. None of them consider the export competitiveness of the timber sector and its implication for natural resources. Therefore, the present study attempts to fill this gap in knowledge and literature.

Material and Methods

Revealed Comparative Advantage (RCA) and the Revealed Symmetric Comparative Advantage (RSCA)

The competitiveness of the Namibian timber sector export was measured by applying two indexes, i.e., the: Revealed

Comparative Advantage (RCA) and the Revealed Symmetric Comparative Advantage (RSCA). The RCA proposed by Balassa (1965) calculates if the export participation of a certain product (in this case, timber) on the export schedule of the analysed country is (in this case Namibia) higher or lower for the participation of the country in the global market. The RCA index represents the comparative advantage or disadvantage of an exporting country and its competitiveness. In other words, RCA demonstrates whether the input of a certain product reveals an advantage or disadvantages regarding the export schedule of Namibia.

RCA index, which is measured by the product's share in the country's exports with its stake in the world trade, was calculated using the RCA model – equation (1):

$$RCA_{ij} = \frac{\frac{Y_{ij}}{\sum_i Y_{ij}}}{\frac{\sum_j Y_{ij}}{\sum_i \sum_j Y_{ij}}}, \quad (1)$$

where: RCA_{ij} country j 's revealed comparative advantage for good i ; Y_{ij} is the exports of sector i of county j ; $\sum_i Y_{ij}$ is the total exports of country j ; $\sum_j Y_{ij}$ is the world exports of sector i ; and $\sum_i \sum_j Y_{ij}$ is the total world export.

The results of indicator RCA mean:

- $RCA < 0$ indicates revealed comparative disadvantages in the sector or commodity group;
- $RCA > 0$ indicates that there are revealed comparative advantages in the country for export commodities for that sector or commodity group; and
- $RCA > 1$ identifies the commodity and sector as internationally competitive.

The Revealed Symmetric Comparative Advantage, an RCA index, is modified

to normalize the RCA's very high values. The RSCA is calculated using the following model – equation (2):

$$RSCA_{ij} = (RCA-1)/(RCA+1) \quad (2)$$

RSCA values vary in the interval from -1 to +1. RSCA index measuring more than '0' reveals a competitive advantage of i^{th} product being exported by j^{th} country and indicates a competitive disadvantage if RSCA is -1. It provides information to how much extent a country is specialised in exporting a particular commodity.

Data sources

The study employed time series secondary data from 2001 to 2018 obtained from U.N. Comtrade statistics (2019) and Namibia Statistics Agency (2019). The study used export trade data classified according to Harmonized Commodity Description and Coding (HS) system, HS440799 that includes wood, sawn or chipped lengthwise, sliced or peeled, whether or not planed, sanded or end-jointed, of a thickness > 6 mm (excluding tropical wood, oak *Quercus* spp., beech *Fagus* spp., maple *Acer* spp., cherry *Prunus* spp., ash *Fraxinus* spp., birch (*Betula* spp.), poplar and aspen *Populus* ssp.); Harmonized Commodity Description and Coding (HS) system, HS4401 that includes fuel wood in logs, billets, twigs, faggots or similar forms; wood in chips or particles; sawdust and scrap, whether or not agglomerated in logs, briquettes, pellets or similar forms; Harmonized Commodity Description and Coding (HS) system, HS4402 that includes wood charcoal (including shell or nut charcoal), whether or not agglomerated, and Harmonized Commodity Description and Coding (HS) system, HS4403 includes wood in the rough, whether or not stripped of bark or sapwood, or roughly squared.

Results and Discussion

Namibia's timber export (net weight and export value)

In recent years (2014–2018), a high number of trees were harvested in Namibia. Table 1 presents volumes in tons and values in US Dollar thousand of all categories of timber. In 2002, Namibia HS 440799 exported 11.2 tons of timber: the lowest volume exported, followed by 22.8 t in 2001 and 62.5 t in 2003. From 2004–2018 export of timber exceeded 100 t. The volume of timber (HS 440799) increase steadily by 99 % $((1668-11.2)/1668) \cdot 100$ from 2002 to 2018.

Timber (HS4401), the lowest volume (335 t) export was observed in 2003, followed by 695 t in 2002, and the highest volume of export (20,513 t) took place in 2016. The volume of timber (HS 4401) increase steadily by 107 % $((20,513-1451)/20,513) \cdot 100$ from 2001 to 2016.

Timber HS 4402, the lowest export takes place in 2007 with 0.18 t followed by in 2008 with 18 t, and the highest export volume takes place in 2017 with 124436 t. The volume of timber (HS 4402) increase by 77 % $((109337-25143)/109337) \cdot 100$ from 2001 to 2018.

Timber HS4403, the lowest export volume, takes place in 2002 with 778 t, followed by 828 t in 2002, and the highest volume export takes place in 2018 with 22651 t. The volume of timber (HS 4402) increase by 97 % $((22651-778)/22651) \cdot 100$ from 2002 to 2018.

In a comparison of the four types of timber, commodity HS4402 have the highest volume export with 124436 t in 2017, followed by timber HS4403 with volume export of 22651t in 2018, timber HS4401 followed by 20513 t in 2016, the commodity HS440799 the lowest volume export of

1668 t in 2018 (Table 1).

Namibian annual timber export value growth calculated using Table 1. Annual timber export value growth (HS440799) decline by 20 % $((50-40)/50) \cdot 100$ from 2001 to 2002; this was caused by import and export bans of timber export by Namibia, global demand, and supply. Namibia's annual timber export growth from 2017 to 2018 increased by 290 % $((1250-320)/320) \cdot 100$, this directly and directly closely linked to an increase in export of timber from Namibia in general and increase timber harvesting activities in Zambezi district municipality and the two Okavango district municipality of northern Namibia in particular.

Regarding HS4401, timber export growth increase steadily from 2001 to 2011 by 95 % $((2648-128)/2648) \cdot 100$. Consequently, export growth declined from 2011 to 2015 by 23 % $((2648-2027)/2648) \cdot 100$, then increase in 2016. From 2016 to 2018 timber (HS4401) decrease by 88 % $((2748-342)/2748) \cdot 100$.

Namibia, annual timber export growth (HS4402) decline by 14 % $((1164-1001)/1164) \cdot 100$ from 2001 to 2002. However, Namibia's annual timber export growth of HS 4402 from 2017 to 2018 increase by 19 % $((31,928-25901)/31,928) \cdot 100$). Further, different export growth trends were observed from one year to another. For commodity HS4403, the highest export value observed in 2017 and 2018, the trend increased by 54 % $((3564-1642)/3564) \cdot 100$ from 2017 to 2018. One of the reason could be the Namibian government lifted the ban on the harvesting, transport, and export of timber.

As indicated in Table 1, the trend of growth in timber export is not consistent, possibly due to the global recession of 2007–2009 and the Namibian government

Table 1. Namibia's Timber quantity net weight and export value (2001 to 2018).

Years	HS440799		HS4401		HS4402		HS4403	
	Net weight, t	Export value, USD 10 ³	Net weight, t	Export value, USD 10 ³	Net weight, t	Export value, USD 10 ³	Net weight, t	Export value, USD 10 ³
2001	22.8	50	1451.227	128	25142.89	1164	828.043	89
2002	11.2	40	695.157	195	20871.07	1001	778.399	117
2003	62.5	344	335.006	134	22422.63	2968	924.273	74
2004	150.5	425	2222.502	352	12630.08	5299	1463.044	230
2005	195.5	285	3872.953	612	12913.28	5418	1205.288	190
2006	176.6	269	7962.397	737	50441.48	6690	3631.524	302
2007	110.7	590	8098.118	1158	0.18	0.107	6888.801	868
2008	109.4	1234	11227.24	1527	18	7	6275.46	919
2009	667.3	1803	14788.29	1759	84.358	11	6457.379	1298
2010	356.3	844	14729.06	2163	92958.48	19,413	3513.064	755
2011	247.4	400	14819.76	2648	83172.4	17,266	2428.037	619
2012	146.9	503	15391.36	2396	84756.54	17,410	4089.897	1001
2013	431.3	567	15468.43	2188	100376.2	23,505	3663.098	851
2014	1007.6	706	16455.99	2138	109526.6	25,070	4860.428	598
2015	700.7	755	19800.29	2027	119297	25,386	3139.921	363
2016	406	125	20513.28	2748	117651.8	24,241	3423.216	423
2017	951.8	320	6978.005	1103	124436.1	25901	10433.39	1642
2018	1668	1250	2777.561	342	109337.4	31,928	22651.14	3564

Source: Author's computation based on Namibia Statistics Agency (2019) and U.N. Comtrade data (2019).

issues a ban on the harvesting, transport, and export of timber. A significant spike in export value was observed in 2018 for commodity HS440799. For commodity HS4401, a considerable increase was observed in 2011 and 2016; for commodity HS4402 and HS4403, significant growth was observed from 2017 to 2018, respectively. These findings were consistent with the findings of Lukumbuzya and Sianga (2017).

RCA and RSCA

Tables 2 to 5 presents the RCA and RSCA indexes of the timber sector (HS440799, HS4401, HS4402, and HS4403) exports from Namibia, respectively. The results of Table 2 shows that Namibia had a comparative advantage over the past 17 years for the timber sector's export commodities (HS440799). In 2001, the sub-sector (HS440799) recorded the lowest RCA (0.010), and the lowest RSCA (-0.98) was observed in 2001, 2002, and 2016. The highest RCA value of 0.16 was recorded in 2009 and an RSCA -0.73 in the same year. For a 17-year retrospective, the Namibia timber sector recorded an average RCA value of 0.062, revealing competitiveness. Comparative advantage and competitive advantage are inextricable; thus, they both affect each other. The timber sector had a comparative advantage at the national level from 2001 to 2018, and it had a competitive disadvantage for the same period. The timber sector had no revealed competitive advantage throughout the analysis period. Namibia has had a revealed comparative disadvantage for the past 17 years on the international market. This implies that Namibia does not maintain Timber's share in the global market; thus, Namibia loses competitiveness. These findings concurred with Almeida et

al. (2010) and de Souza et al. (2018); they found that Brazil did not enjoy a comparative advantage.

Table 3 indicates RCA and RSCA indexes of the timber sector (HS4401). In 2018, Namibia recorded the lowest RCA of 0.021 and RSCA of -0.96 (2018), respectively. The highest RCA value of 0.263 was recorded in 2012 and an RSCA -0.58 in the same year. For a 17-year retrospective, the Namibia timber sector recorded an average RCA value of 0.14, revealing competitiveness. Comparative advantage and competitive advantage are inextricable; thus, they both affect each other.

Table 4 indicates RCA and RSCA indexes of the timber sector (HS4402). Namibian timber (HS4402) have a noticeable advantage in the regional and global market from 2010–2018. In 2007, Namibia recorded the lowest RCA of 0.00001 and RSCA of -0.99998 in the same year. The highest RCA value of 2.73 was recorded in 2015 and an RSCA of 0.46 in the same year. For a 17-year retrospective, the Namibia timber sector recorded an average RCA value of 1.22, revealing competitiveness. Comparative advantage and competitive advantage are inextricable; thus, they both affect each other.

Table 5 indicates RCA and RSCA indexes of the timber sector (HS4403). In 2003, Namibia recorded the lowest RCA of 0.01771 and RSCA of -0.97 the same year. The highest RCA value of 0.222 was recorded in 2018 and an RSCA -0.64 the same year. For a 17-year retrospective, the Namibia timber sector recorded an average RCA value of 0.069, revealing competitiveness. Comparative advantage and competitive advantage are inextricable; thus, they both affect each other.

RCA changes are caused by import and export bans of timber export by Namibia, global demand, and supply. To deal

Table 2. Namibia's Timber RCA and RSCA (2001 to 2018) (HS440799).

Year	World export, USD 10 ³		Namibia export, USD 10 ³		Ratios				RCA of Namibia	RSCA of Namibia
	World timber	All commodities	Timber	All commodities	6=4/5	Namibia ratio	World ratio	7=2/3		
1	2	3	4	5	6=4/5	7=2/3	8=6/7	9=(8-one)/(8+one)		
2001	21,732,755	6,127,467,761	50	1,362,662	0.00004	0.00355	0.010	-0.98		
2002	22,471,983	6,424,391,781	40	1,282,913	0.00003	0.00350	0.090	-0.98		
2003	24,036,779	7,486,202,969	344	1,303,668	0.00026	0.00321	0.082	-0.85		
2004	29,367,976	9,099,996,891	425	2,544,642	0.00017	0.00323	0.052	-0.90		
2005	30,619,164	10,340,858,415	285	2,725,999	0.0001	0.00296	0.035	-0.93		
2006	32,838,531	11,956,256,558	269	3,375,927	0.00008	0.00275	0.029	-0.94		
2007	35,887,349	13,832,342,053	590	4,040,274	0.00015	0.00259	0.056	-0.89		
2008	30,964,513	15,969,594,225	1234	4,729,337	0.00026	0.00194	0.135	-0.76		
2009	23,821,353	12,346,656,501	1803	5,870,620	0.00031	0.00193	0.159	-0.73		
2010	28,788,442	15,095,502,449	844	5,848,292	0.00014	0.00191	0.076	-0.86		
2011	31,932,703	18,103,987,370	400	5,900,941	0.00007	0.00176	0.038	-0.93		
2012	31,193,788	18,395,803,866	503	5,376,995	0.000094	0.00170	0.055	-0.90		
2013	35,264,192	18,881,587,009	567	6,337,216	0.000089	0.00187	0.048	-0.91		
2014	37,761,001	18,878,970,324	706	5,983,840	0.00012	0.00200	0.059	-0.89		
2015	32,943,620	16,399,773,904	755	4,628,292	0.00016	0.00201	0.081	-0.85		
2016	34,640,029	15,881,855,749	125	4,815,846	0.00003	0.00218	0.012	-0.98		
2017	38,554,446	17,550,866,220	320	5,229,361	0.00006	0.00220	0.028	-0.95		
2018	41,333,460	19,284,580,098	1250	7,488,296	0.00017	0.00214	0.078	-0.86		

Note: The last column is addition and subtraction of number one from RCA and to RCA (please refer equation number 2).
Source: Author's computation based on U.N. Comtrade data (2019).

Table 3. Namibia's Timber RCA and RSCA (2001 to 2018) (HS4401).

Year	World export, USD 10 ³		Namibia export, USD 10 ³		Ratios				RCA of Namibia	RSCA of Namibia
	World timber	All commodities	Timber	All commodities	6=4/5	Namibia ratio	World ratio	7=2/3		
1	2	3	4	5	6=4/5	7=2/3	8=6/7	9=(8-one)/(8+one)		
2001	21,732,755	6,127,467,761	128	1,362,662	0.00009	0.00355	0.026	-0.95		
2002	22,471,983	6,424,391,781	195	1,282,913	0.00015	0.00350	0.043	-0.92		
2003	24,036,779	7,486,202,969	134	1,303,668	0.00010	0.00321	0.032	-0.94		
2004	29,367,976	9,099,996,891	352	2,544,642	0.00014	0.00323	0.043	-0.92		
2005	30,619,164	10,340,858,415	612	2,725,999	0.00022	0.00296	0.076	-0.86		
2006	32,838,531	11,956,256,558	737	3,375,927	0.00022	0.00275	0.079	-0.85		
2007	35,887,349	13,832,342,053	1158	4,040,274	0.00029	0.00259	0.110	-0.80		
2008	30,964,513	15,969,594,225	1527	4,729,337	0.00032	0.00194	0.167	-0.71		
2009	23,821,353	12,346,656,501	1759	5,870,620	0.00030	0.00193	0.155	-0.73		
2010	28,788,442	15,095,502,449	2163	5,848,292	0.00037	0.00191	0.194	-0.68		
2011	31,932,703	18,103,987,370	2648	5,900,941	0.00045	0.00176	0.254	-0.59		
2012	31,193,788	18,395,803,866	2396	5,376,995	0.00045	0.00170	0.263	-0.58		
2013	35,264,192	18,881,587,009	2188	6,337,216	0.00035	0.00187	0.185	-0.69		
2014	37,761,001	18,878,970,324	2138	5,983,840	0.00036	0.00200	0.179	-0.70		
2015	32,943,620	16,399,773,904	2027	4,628,292	0.00044	0.00201	0.218	-0.64		
2016	34,640,029	15,881,855,749	2748	4,815,846	0.00057	0.00218	0.262	-0.59		
2017	38,554,446	17,550,866,220	1103	5,229,361	0.00021	0.00220	0.196	-0.82		
2018	41,333,460	19,284,580,098	342	7,488,296	0.00005	0.00214	0.021	-0.96		

Note: The last column is addition and subtraction of number one from RCA and to RCA (please refer equation number 2).

Source: Author's computation based on U.N. Comtrade data (2019).

Table 4. Namibia's Timber RCA and RSCA (2001 to 2018) (HS4402).

Year	World export, USD 10 ³		Namibia export, USD 10 ³		Ratios				RCA of Namibia	RSCA of Namibia
	World timber	All commodities	Timber	All commodities	6=4/5	7=2/3	8=6/7	9=(8-one)/(8+one)		
1	2	3	4	5	6=4/5	7=2/3	8=6/7	9=(8-one)/(8+one)		
2001	21,732,755	6,127,467,761	1164	1,362,662	0.00085	0.00355	0.24084	-0.61		
2002	22,471,983	6,424,391,781	1001	1,282,913	0.00078	0.00350	0.22306	-0.64		
2003	24,036,779	7,486,202,969	2968	1,303,668	0.00228	0.00321	0.70906	-0.17		
2004	29,367,976	9,099,996,891	5299	2,544,642	0.00208	0.00323	0.64526	-0.22		
2005	30,619,164	10,340,858,415	5418	2,725,999	0.00199	0.00296	0.67124	-0.20		
2006	32,838,531	11,956,256,558	6690	3,375,927	0.00198	0.00275	0.72151	-0.16		
2007	35,887,349	13,832,342,053	0.107	4,040,274	0.00000003	0.00259	0.00001	-0.99998		
2008	30,964,513	15,969,594,225	7	4,729,337	0.000001	0.00194	0.00076	-0.9985		
2009	23,821,353	12,346,656,501	11	5,870,620	0.000002	0.00193	0.00097	-0.9981		
2010	28,788,442	15,095,502,449	19,413	5,848,292	0.00332	0.00191	1.74058	0.27		
2011	31,932,703	18,103,987,370	17,266	5,900,941	0.00293	0.00176	1.65886	0.25		
2012	31,193,788	18,395,803,866	17,410	5,376,995	0.00324	0.00170	1.90946	0.31		
2013	35,264,192	18,881,587,009	23,505	6,337,216	0.00371	0.00187	1.98594	0.330		
2014	37,761,001	18,878,970,324	25,070	5,983,840	0.00419	0.002	2.09464	0.35		
2015	32,943,620	16,399,773,904	25,386	4,628,292	0.00548	0.00201	2.73049	0.46		
2016	34,640,029	15,881,855,749	24,241	4,815,846	0.00503	0.00218	2.30781	0.40		
2017	38,554,446	17,550,866,220	25901	5,229,361	0.00495	0.00220	2.25472	0.39		
2018	41,333,460	19,284,580,098	31,928	7,488,296	0.00426	0.00214	1.9893	0.331		

Note: The last column is addition and subtraction of number one from RCA and to RCA (please refer equation number 2).
Source: Author's computation based on U.N. Comtrade data (2019).

Table 5. Namibia's Timber RCA and RSCA (2001 to 2018) (HS4403).

Year	World export, USD 10 ³			Namibia export, USD 10 ³			Ratios			RCA of Namibia	RSCA of Namibia
	World timber	All commodities	Timber	All commodities	Timber	Namibia ratio	World ratio	7=2/3	8=6/7		
1	2	3	4	5	6=4/5	7=2/3	8=6/7	9=(8-one)/(8+one)			
2001	21,732,755	6,127,467,761	89	1,362,662	0.00007	0.00355	0.0184	-0.96			
2002	22,471,983	6,424,391,781	117	1,282,913	0.000091	0.00350	0.026	-0.949			
2003	24,036,779	7,486,202,969	74	1,303,668	0.00006	0.00321	0.0177	-0.97			
2004	29,367,976	9,099,996,891	230	2,544,642	0.00009	0.00323	0.028	-0.946			
2005	30,619,164	10,340,858,415	190	2,725,999	0.00007	0.00296	0.024	-0.954			
2006	32,838,531	11,956,256,558	302	3,375,927	0.000089	0.00275	0.033	-0.94			
2007	35,887,349	13,832,342,053	868	4,040,274	0.00021	0.00259	0.083	-0.85			
2008	30,964,513	15,969,594,225	919	4,729,337	0.00019	0.002	0.100	-0.82			
2009	23,821,353	12,346,656,501	1298	5,870,620	0.00022	0.0019	0.115	-0.79			
2010	28,788,442	15,095,502,449	755	5,848,292	0.00013	0.0019	0.068	-0.87			
2011	31,932,703	18,103,987,370	619	5,900,941	0.000105	0.0018	0.059	-0.89			
2012	31,193,788	18,395,803,866	1001	5,376,995	0.00019	0.0017	0.110	-0.80			
2013	35,264,192	18,881,587,009	851	6,337,216	0.00013	0.0019	0.072	-0.87			
2014	37,761,001	18,878,970,324	598	5,983,840	0.00010	0.002	0.050	-0.90			
2015	32,943,620	16,399,773,904	363	4,628,292	0.00008	0.002	0.039	-0.925			
2016	34,640,029	15,881,855,749	423	4,815,846	0.000088	0.0022	0.040	-0.923			
2017	38,554,446	17,550,866,220	1642	5,229,361	0.00031	0.0022	0.143	-0.75			
2018	41,333,460	19,284,580,098	3564	7,488,296	0.00048	0.00214	0.222	-0.64			

Note: The last column is addition and subtraction of number one from RCA and to RCA (please refer equation number 2).
Source: Author's computation based on U.N. Comtrade data (2019).

with the asymmetry problem in RCA, the index was transformed into a Symmetric Reveal Comparative advantage (RSCA). The main advantage of RSCA is it adjusted the weight and unity Hoang et al. (2017).

Namibia's RSCA over 17 years shows Namibia exports of timber showed varying levels of comparative disadvantage for all categories of timber. This finding concurred with Petruski et al. (2012).

Conclusions

The results showed that Namibia's timber sector has revealed comparative advantage or competitiveness for the past 17 years but not internationally competitive. Namibia's annual timber export (HS440799) growth declined by 20 % from 2001 to 2002; this was caused by import and export bans of timber export by Namibia, global demand, and supply. Namibia's annual timber export growth from 2017 to 2018 increased by 290 %; this is directly and directly closely linked to an increase in timber export from Namibia in general and an increased timber harvesting activities in northern Namibia in particular.

The result shows that Namibia had a revealed comparative advantage for 17 years; however, all below one (except for commodity HS4402 from 2010–2018) means that Namibia timber exports are not internationally competitive. In 2001, the sub-sector (HS440799) recorded the lowest RCA (0.010), and the lowest RSCA (-0.98) was observed in 2001, 2002, and 2016. The highest RCA value of 0.16 was recorded in 2009 and an RSCA -0.73 in the same year. The highest RCA and RSCA of 0.263 and -0.58 respectively was achieved in 2018 for commodity

(HS4401), Namibia recorded the lowest RCA of 0.021 (in 2018) and RSCA of -0.96 (2018), in the same year. Namibian timber (HH4402) have a noticeable advantage in the regional and global market from 2010–2018. In 2007, Namibia recorded the lowest RCA of 0.00001 and RSCA of -0.99998 in the same year. The highest RCA value of 2.73 was recorded in 2015 and an RSCA of 0.46 in the same year. For timber HS4403, in 2003, Namibia recorded the lowest RCA of 0.01771 and RSCA of -0.97 the same year. The highest RCA value of 0.222 was recorded in 2018 and an RSCA -0.64 the same year.

Namibia's RCA and RSCA over 17 years shows Namibia exports of timber showed varying levels of comparative disadvantage for all categories of timber commodities, except for commodity HS4402 from 2010–2018). Thus, it can be concluded that Namibia's timber sector is not internationally competitive, and the country does not specialize in international exports, especially when considering the results of RSCA. This implies that Namibia does not maintain Timber's share in the global market; thus, Namibia loses competitiveness.

Timber exports are a natural-resource-intensive sector based on renewable commodities. RCA and RSCA prove that, overall, timber comparative export pattern heavily depends on export volumes and timber exports' values. Timber export competitiveness is not sustainable, given the heavy dependence on natural forests. This implies that unsustainable timber harvesting will deplete natural forests; the country will lose out on timber export earnings.

Namibia should re-structure timber harvesting protocols to include replacement or replanting every tree species harvested for timber production to ensure

the sub-sector's sustainability. The country's timber export sub-sector should focus more on adding value to timber than exporting for improved competitiveness. Further, the government should regulate the harvested timber to promote timber and forest resources' sustainable utilization and stimulate ongoing and sustainable economic growth and employment creation.

References

- ALMEIDA A.N., ANGELO H., SILVA J.C.G.L., HOEFlich V.A. 2010. Mercado de madeiras tropicais: substituição na demanda de exportação. *Revista Acta Amazônica* 40(1): 119–126 (in Portuguese).
- BALASSA B. 1965. Trade liberalization and 'revealed' comparative advantage. *The Manchester School of Economic and Social Studies* 33(2): 99–123.
- BARNES J.I., MACGREGOR J., NHULEIPO O., MUTEYALI P.I. 2010. The value of Namibia's forest resources: Preliminary economic asset and flow accounts. *Development South Africa* 27(2): 159–176.
- BOJNEC S., FERRO I. 2014. Meat export competitiveness of European Union countries on global markets. *Agricultural and Food Science* 23(4): 194–206.
- BRANDT E. 2019. N\$94m worth of timber exported in the first two months of 2019. No policy for timber harvesters to plant trees. *New Era Live*, Electronic Newspaper 2019-06-17. Available at: <https://neweralive.na/posts/n94m-worth-of-timber-exported-in-first-two-months-of-2019-no-policy-for-timber-harvesters-to-plant-trees> (Accessed on 10 July 2020).
- BROCKERHOFF E.G., BARBARO L., CASTAGNEY ROLD., FORRESTER D.I., GARDINER B., GONZÁLEZ-OLABARRIA J.R., LYVER P.O'B., MEURISSEN., OXBROUGH A., TAKI H., THOMPSON I.D., VANDER PLAS F., JACTEL H. 2017. Forest biodiversity, ecosystem functioning and the provision of ecosystem services. *Biodiversity and Conservation* 26: 3005–3035.
- DE SOUZA S.N., ANGELO H., DE ALMEIDA A.N., DE SOUZA A.N., DE PAULA M.F. 2018. Competitiveness of Brazilian Tropical Wood on the International Market. *Floresta e Ambiente* 25(1): 1–8.
- HOANG V.V., TRAN K.T., TU B.V., NGUYEN V.N., NGUYEN A.Q. 2017. Agricultural competitiveness of Vietnam RCA and the NRCA indices, and Consistency of Competitiveness Indices. *AGRIS on-line papers in Economics and Informatics* 9(4): 53–67.
- LAUBSCHER K., OOSTHUIZEN H., MBAI S., IDSARDI E., UCHEZUBA D.E., NEWBORN R. 2019. *Competitive Analysis of the Namibian Meat Sector*. Meat Board of Namibia. Windhoek. Namibia. 50 p.
- LUKUMBUZYAK., SIANGAC. 2017. Overview of the Timber Trade in East and Southern Africa: national perspectives and regional trade Linkages. *TRAFFIC and the wildlife trade monitoring network*. Cambridge, UK. 79 p.
- MITEVA-KACARSKI E. 2018. Revealed comparative advantage in trade between the Republic of Macedonia and CEFTA 2006: *Economic Review. Journal of Economics and Business* 16(1): 59–70.
- NAMIBIA STATISTICS AGENCY (NSA) 2019. *Namibia Trade data*. Windhoek. Namibia. Available at: <https://nsa.org.na/> (Accessed 11 June 2020).
- NOTT K., NOTT A., NEWTON D. 2020. A critical assessment of the economic and environmental sustainability of the Namibian Indigenous Forest/Timber industry with reference to Zambia and Angola. *Traffic East/Southern Africa (TESA) project (ESA164.00)*. 101 p.
- OECD 2015. *Glossary of Statistical terms. Competitiveness*. Available at: <https://stats.oecd.org/glossary/detail.asp?ID=399> (Accessed 20 June 2020).
- PETRAUSKI S.M., MARQUES G.M., SILVA M.L., CORDEIRO S.A., SOARES N.S. 2012. Competitividade do Brasil no mercado internacional de madeira serrada. *Cerne* 18(1): 99–104 (in Portuguese).
- PROPPER M., VOLLAN B. 2013. *Beyond Awareness and Self-Governance: Approaching Kavango Timber Users' Real-Life Choices*.

Land 2(3): 392–418.

SHINOVENE I. 2019. Timber traders want to cut 550 trees. Available at: <https://www.namibian.com.na/185578/archive-read/Timber-traders-want-to-cut-195-550-trees>

UNITED NATIONS COMMODITY TRADE STATISTICS DATABASE (UNCOMTRADE) 2019. United Nations Commodity Trade Statistics 2019. Available at: <http://comtrade.un.org/data> (Accessed 11 May 2020).