Original Research Article

Trends in Export and Import of Beer of Barley in Nigeria from 1961-2014

ABSTRACT

The importance of Beer of Barley is due to Nigeria being Africa's largest beer consuming country, hence; require increasing output to meet up with domestic beer production since importation of bottled beer is banned. At present, Beer of Barley is exported and imported, this study aimed to measure growth rate between import and export over a 54 year period divided into three policy periods centred on Structural Adjustment policies (SAP) namely: Pre-SAP (1961-1985), SAP (1986-1998) and Post-SAP (1999-2014) with the sole purpose of identifying period associated with rising exports and falling imports. Log-linear and log-quadratic models are used to determine growth rates and patterns of growth respectively. Findings show that while the Post-SAP period experienced rising exports and falling imports, the period was also associated with a stagnated growth pattern. Therefore, institutions that support Post-SAP policy measures, in particular import ban on bottled/canned beer should be vigorously sustained and strengthened in order to accelerate growth.

Key words: Beer of Barley, Export, Growth rate, Import, Structural Adjustment Policies or programmes (SAP).

1. INTRODUCTION

Beer of Barley (hereafter referred to as BoB) is a major constituent in beer production. BoB is obtained when Barley is industrially processed and its major role lies in providing natural sugars needed for beer fermentation which gives beer its characteristic colour and flavour (Breau, 2012).

According to Taiwo 2017, Nigeria is Africa's largest beer consuming country as such requires the availability of BoB to satisfy domestic beer production because importation of bottled or canned beer into Nigeria is banned as such, presumably; all beer consumed in Nigeria is produced by beer companies within the Country. Consequently, BoB is imported into Nigeria and also exported, however, importation gives an indication that the amount of BoB processed in Nigeria is not sufficient to meet growing domestic beer production on one hand, on the other hand, exporting BoB indicates that BoB is sufficient to meet domestic beer production and allow for surplus to be exported and exporting BoB is also indicative of a robust domestic barley processing sector considering the large volume of beer consumption in Nigeria.

According to Udom (2006) the capacity to produce exportable quantity is often driven by policy measures put in place over a given period of time. In other words, agricultural policies put in place overtime might be responsible for import and export of BoB. Accordingly, it is important to assess the trends in import and export of BoB taking into account various policies centred on Structural Adjustment Programmes (hereafter referred to as SAP) that have come to characterize the Nigerian Agricultural sector.

In general, SAP are often divided into three distinct periods (Ibitoye, *et al.,* 2017), namely; Pre-SAP covering twenty five years from 1961-1985, SAP covering thirteen years from 1986-1998 and Post-SAP covering 1999 to the most recent data year available, this study covers sixteen years from 1999-2014. Policy measures that characterize each period are summarized in table 1.

Table 1: Summary of main features of Agricultural components of SAP

	Pre-SAP	SAP	Post-SAP
1	Imposition of Import restrictions (tariffs, ban, quota)	Import restriction was heavily relaxed (market liberalisation)	Imposition of Import restrictions (tariffs, ban, quota) were reintroduced

2	Direct Government involvement through Marketing boards for setting producer prices	Marketing boards were removed.	Marketing boards remain removed.
3	Provision of guaranteed markets for farmers. (Regulated Market)	Markets were no longer guaranteed for farmers. (Deregulated Market)	Markets were no longer guaranteed for farmers. (Deregulated Market)
4	Provision of government backed credit schemes	Government backing of credit schemes was curtailed.	Re-introduction of government backed credit schemes
5	Establishment of government backed Agricultural Development Programmes (ADP) engaged in distribution of inputs, extension services and provision of targeted rural infrastructure.	Government backing of Agricultural Development Programmes (ADP) was heavily curtailed and funding cut which slowed down the distribution of inputs, extension services and provisioning of targeted rural infrastructure.	Re-establishment of government backed Agricultural Development Programmes (ADP) engaged in distribution of inputs, extension services and provision of targeted rural infrastructure.

Culled from (Illeso, 2000)

At present, it is unclear which policy regime influenced rising export and falling import of BoB, therefore the rationale for the study is to compare growth of import and export amongst policy regimes. Studies focussing on SAP with respect to import or export growth rates are few in the literature. In particular, in assessing trends in rice production and imports in Nigeria from 1980 to 2013, Onu *et al.,* (2015) employed a log-linear model and found that growth rate in rice imports was relatively higher than growth rate in rice production due to demand-supply gap. In addition, Antia-Obong *et al.,*(2013) found that decrease in growth rate of oil palm export was accompanied with an increase in growth rate of oil palm import also as a result of demand-supply gap mainly due to policy measures that have may not have favoured levels of production to warrant export. This present study seems to be the first time a study of this nature will be carried out as such fills a gap in our understanding of trends with respect to BoB import and export in Nigeria.

Accordingly, the specific objectives of this study are as follows:

1. to measure percentage growth rates for import and export of BoB.

2. to measure percentage compound growth rates for import and export of BoB.

3. To estimate the time in years expected to double import and export of BoB.

4. To determine the pattern of growth (acceleration, deceleration, stagnation) for import and export of BoB.

2. MATERIALS AND METHODS

2.1 Data Source

Secondary data was used for this study and was obtained from FAOSTAT database available at www.fao.org/faostat/en/#data/RF. The dataset fall under the domain 'crops and livestock products' which contains annual BoB import and export data measured in tonnes from 1961-2014. FAOSTAT is the official database of the United Nations Food and Agricultural Organization (UN-FAO), which houses country and regional food and agricultural data from 1961 to the most recent year available. The dataset for this study was divided into four periods to ease comparison of policy periods and cover pre-SAP era (1961-1985), SAP era (1986-1998), post–SAP era (1999-2014) and pooled data covering the entire period (1961-2014). STATA 13.1 statistical software was used for analysis of the dataset.

2.2 Modelling Import and Export Growth Rates

Growth rate is a linear measure as such does not take into account the effect of compounding, it is calculated over an interval of years with the outcome giving an average growth rate for the interval or period. The semi-log or log-linear model is generally used for this purpose (Maikasuwa and Ala, 2013; Mech, 2017; Onu *et al.,* 2015) and takes the form.

$InImp_t = b_0+b_1T+e$ ----------(1)

Where $InImp_t$ = Natural logarithm of BoB import quantity measured in tonnes at period t.

$InExp_t = b_0+b_1T+e$ ----------(2)

Where $InExp_t$ = Natural logarithm of BoB export quantity measured in tonnes at period t.

b_0 = estimated constant regression line

b_1 = estimated growth coefficient

T = linear time trends for each period

e = error term

percentage growth rate is obtained as follows:

Growth rate = $b_1 * 100$ ----------(3)

Equation 3, gives the average percentage growth rate over a specified period.

2.3 Compound Growth rate

Compound growth rate is a non-linear measure, the effect of compounding takes into account variability or volatility that have occurred overtime. Compound growth rate is expressed as follows:

CGR = (antilog b_1 -1) * 100 ----------(4)

Otherwise expressed as:

CGR = ($□^{b}{}_1$ – 1) * 100 ----------(5) (Mech, 2017) (Ibitoye *et al.*, 2017)

Where;

CGR = Compound Growth rate

□ = Euler's exponential constant, given a value of 2.71828.

2.4 Doubling Time

The time in years expected to double import and export of BoB is given as:

TDG = 69/r ----------(6) (Maikasuwa and Ala, 2013).

Where;

TDG = Time to double growth

r = Compound growth rate as in equation (5)

2.5 Estimating patterns of growth

Three patterns of growth, namely; accelaration, deceleration and stagnation, are explored (Oyenweaku, 2004). A log-quadratic model is fitted for this purpose as follows:

For Import of BoB in tonnes:

$InImp_t = b_0+b_1T+ b_2T^2+e$ ----------(7)

For Export of BoB in tonnes:

$InExp_t = b_0+b_1T+ b_2T^2+e$ ----------(8)

For equation (7) and (8), the quadratic time variable T^2 enables measurement of acceleration, deceleration and stagnation, hence, the coeficient of interest for the quadratic model is b_2.

Accordingly,

a. Acceleration is observed, when b_2 is positive and statistically significant.
b. Deceleration is observed, when b_2 is negative and statistically significant.
c. Stagnation is observed, when b_2 is either negative or positive but not statistically significant.

3. RESULTS AND DISCUSSION

3.1 Growth Rate Analysis

Table 2 show findings on average growth rates and compound growth rates for export and import of BoB taking into account the three specific policy regimes as well as the pooled data.

Table 2: Percentage growth rates and compound growth rates

Periods	**Export Growth rate (%)**	**Export Compound growth rate (%)**	**Import Growth rate (%)**	**Import Compound growth rate (%)**
Pre-SAP 1961-1985 (n=25)	1.97^{NS} (0.012)	1.99	0.13 ^{NS} (0.041)	0.13
SAP 1986-1998 (n=13)	7.86* (0.034)	8.18	0.44 ^{NS} (0.052)	0.44
Post-SAP 1999-2014 (n=16)	**12.47** ** **(0.018)**	**13.29**	**-25.52** ** **(0.040)**	**-22.52**
Pooled 1961-2014 (n=54)	20.34** (0.011)	22.56	-4.03** (0.012)	-3.95

*** represent P<0.01,* represent P<0.05,^{NS} represent Not Significant,*
Figures in Parentheses are standard errors

All four export growth rates were positive, however the pre-SAP period was not statistically significant. The post-SAP period witnessed highest export growth rate of 12.47% at $p<0.01$ level of significance. This means that over the 16 years that make up the post-SAP period, export of BoB grew an average of 12.47% per year, the compounded growth rate for the same period was slightly higher at 13.29% , indicating that any possible variability or volatility in export quantities had a somewhat upward trend.

For the same Post-SAP period, growth rate for import of BoB was -25.22% at $p<0.01$ level of significance, implying that import of BoB fell an average of -25.22% per year. The compounded growth rate of -22.52% is lower than the average growth rate and further indicates that variability in import quantities experienced a downward trend. The Post-SAP period is therefore associated with statistically significant rising export and falling import which suggests that Post-SAP policies may have favoured increasing export and an accompanying reduction in import.

The pooled period also show that export was positive and statistically significant ($p<0.01$) with growth rate of 20.34% and compound growth rate of 22.56%, while import was negative and statistically significant ($p<0.01$) with growth rate of -4.03% and compound growth rate of -3.95% for the same period. The findings reveal that for the entire period under review export experienced an upward trajectory while import was declining.

Table 3: Export and Import doubling time of BoB

	Export	**Import**
Pooled 1961-2014	69/22.56 = 3 years	69/3.95 = 18 years

Accordingly, table 3 show that the rate of increase in export would double in 3 years, in other words, based on export trends for the entire period, it would require 3 years for export of BoB to double current export levels. This finding further buttresses the pooled data results for export outlined in table 2.

Table 4: Patterns of Growth

Periods	**Export**	**Import**
Pre-SAP	0.0004 ^{NS}	-0.004 ^{NS}
1961-1985	(0.002)	(0.007)
(n=25)	(Stagnation)	(Stagnation)
SAP	-0.0123 ^{NS}	0.041 **
1986-1998	(0.009)	(0.010)
(n=13)	(Stagnation)	(Acceleration)
Post-SAP	**-0.0076 ^{NS}**	**0.009 ^{NS}**
1999-2014	**(0.004)**	**(0.009)**
(n=16)	**(Stagnation)**	**(Stagnation)**

Pooled	0.0007 ^{NS}	-0.000 ^{NS}
1961-2014	(0.001)	(0.001)
(n=54)	(Stagnation)	(Stagnation)

*** represent P<0.01*
^{NS} represent Not Significant
Figures in Parentheses are standard errors

Table 4, show that post-SAP period experienced stagnated growth, thus revealing an unusual but not uncommon finding because positive and statistically significant post-SAP growth rate tend to suggest an accelerated growth pattern. However, in this case, the post-SAP period although having positive growth, was occurring at negligible pace (stagnation). Patterns of growth essentially identify pace of growth which can be either of acceleration (fast pace of growth), deceleration (slow pace of growth) and stagnation (pace of growth is negligible as such is neither fast nor slow). This finding illustrates the importance of identifying growth patterns when measuring growth rates, because a positive growth rate could be misleading to policy makers without consideration to growth patterns. The pattern of growth often reflects on weakness or otherwise in institutions that support an enabling business environment for actors to participate in a given market or sector (Antia-Obong, 2018). In addition, the general stagnation in the pattern of export growth despite positive and statistically significant growth rates is a likely reason why imports still persist howbeit on a downward path.

4. CONCLUSION AND RECOMMENDATIONS

This study was aimed at measuring growth rates, patterns of growth and doubling time for export and import of BoB by comparing three policy regimes with the sole purpose of identifying the policy period that enhanced export more than imports. The study found the post-SAP period to be associated with increased export and falling import as such satisfy expected policy outcomes for the period. Accordingly, institutions that ease doing post-SAP

policy measures the likes of import restriction and prohibition of bottled or canned beer, market deregulation, credit guarantee schemes and input distribution should be sustained and strengthened in order to accelerate pace of growth.

REFERENCES

Antia-Obong, E. A. (2018). Influence of Transaction Costs on Market Participation by Smallholder Poultry Farmers in Nigeria: A Mixed Methods study. *Unpublished Ph.D Thesis Newcastle University, United Kingdom*.

Antia-Obong, E.A.; Ibok, O.W.; Udoh, E.S.; Daniel, E.E.;. (2013). Insights on Oil Palm Production Variation and Trade Growth rates in Nigeria. *Greener Journal of Agricultural Sciences, 3*(7), 536-541.

Breau, A. (2012, August 21). *Making Beer.* Retrieved November 12, 2018, from How is Barley Turned Into Beer?: https://indianapublicmedia.org/amomentofscience/barley-turned-beer

Ibitoye, S.J.; Shaibu, U.M.; Omole, B O;. (2017). Assessment of the Growth Rate of Cotton (Gossypium Spp) Production in West Africa: Evidence from Nigeria's Pre-SAP, SAP amd Post-SAP periods. *Saudi Journal of Humanities and Social Sciences, 2*(2), 111-116.

Illeso, B. (2000). Structural Adjustment Program and Agricultural Production in Nigeria (1970-1996). *Unpublished Master of development Economics Dissertation, Dalhousie University, Halifax Nova Scotia* .

Maikasuwa, M.A.; Ala, A.L.;. (2013). Trend Analysis of Area and Productivity of Sorghum in Sokoto State, Nigeria, 1993-2012. *European Scientific Journal, 9*(16), 69-75.

Mech, A. (2017). An Analysis of growth trend, instability and determinants of rice production in Assam. *Indian Journal of Agricultural Research, 51*(4), 355-359.

Onu, D O; Obike, K. C.; Ebe, F. E.; Okpara, B. O.;. (2015). Empirical Assessment of the trend in Rice Production and Imports in Nigeria (1980-2013). *International Research Journal of Agricultural Science and Soil Science, 6*, 150-158.

Oyenweaku, C. (2004). Stagnation, Acceleration and Deceleration in Agricultural Production in Nigeria, 1970-2000. *Journal of Agriculture and Food Science, 2*(2), 131-140.

Taiwo, S. (2017, May 12). *Nigeria is the Highest Alcohol-Drinking Country in Africa.* Retrieved December 3, 2018, from Beer Consumption: https://www.pulse.ng/bi/lifestyle/beer-consumption-nigeria-is-the-highest-alcohol-drinking-country-in-africa-id6667060.html

214 Udom, D. (2006). Analysis of Nigerian Meat production Trends: 1961-2004. *Nigeria*
215 *Agricultural Journal, 37*(1), 18-23.

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