Assessment of the Determinants of Value Addition in the Nigerian Leather Industry

K. A. Akanni and H. A. Ibraheem

*Department of Agricultural Economics, Olabisi Onabanjo University, Ago-Iwoye,
Ogun State, Nigeria
E-mail: akannikunle2003@yahoo.co.uk*

ABSTRACT Modern leather industry in Nigeria evolved from the need to add value to hides and skin before export. This industry became popular up to early 1990's. Lots of the required materials for the use of tanning industries were imported to accomplish the task of adding value domestically to the raw hides and skin with huge implications on the nation's foreign exchange. Some delay (time lag) is however usually experienced between the time orders were placed for the tanning chemicals and equipment and the actual time of arrival. In this paper, the value added on the local raw hides and skin before export were estimated. This value was regressed against the lagged value of Nigeria's annual investment on imported tanning machine, spare parts, and chemicals. Other issues such as the exchange rate, interest rate and government policies on importation were also considered. Results showed that value added on the Nigeria's domestic raw hides and skin depended on the import level of machinery, tariffs and time lag (delay time).Time lag in the delivery of the imported equipment and materials however had the strongest effects on the level of value addition Huge capital investment in the local tanning industry and relaxation of the nation's policies on importation will enable private operators to procure the required tanning machines to further add values to raw leather. Elimination of trade restrictions and tariffs on imported equipment/materials will again open business space for a meaningful economic transaction in the Nigerian leather industry.

INTRODUCTION

Leather, generally, is made from hides and skin of animals. Therefore, leather industry depends on the availability and supply of hides and skin, which are obtained from livestock animals such as cattle, sheep, goats and pig. Hides are gotten from large mature animals, skin are obtained from small animals while kips are skins of immature animals (Aganga and Aganga, 1985). It was reported that in 1983 livestock population of Nigeria was about 12.5 million cattle, 25 million goats and 12 million sheep (Aganga and Aganga, 1984). These figures however, dropped to 983, 446 cattle, 1,423,089 goats and 1,028,141 sheep in 1995 (FMA, 1997). Raw hides and skin that were available to the Nigerian leather industry were said to be of the order of 1.3 million cattle hides, 11 million goats skin and 2.3 million sheep skin annually (Aganga andAganga, 1984).

Leather industry involves the process of converting raw hides and skins into leather (tanning) for the use of man. As this is done, value is continually added to the quality of the leather. Hides and skin have the ability to absorb tannic acid and other chemical substances that prevent them from decaying, make them resistant to wetting, and keep them supple and durable.

The surface of hides and skin contain hair and oil glands. Tanning agents that are commonly used in Nigeria are trivalent chromium and vegetable tannins extracted from specific tree bark, alum, syntans (man-made chemicals), formaldehyde, glutaraldehyde and heavy oils and other tanning agents. Relatively higher availability of raw materials in the northern part of the country accounts for a large number of tanneries in that region.

Finished leather materials are used worldwide as shoes, coats, belts, glove, hats, handbags, purses, clothing etc. Factory workers, soldiers, the police and other security operatives all wear heavy boots made from leathers; thus confirming the importance of leather in the Nigerian economy. Unfortunately, however, this industry has been facing a lot of crises in the recent times ranging from declining number of marketable and mature livestock animals and incidence of pest and disease attack on the skin of the livestock animals especially in the relatively hotter regions of the country. Shehu (1980) also observed that the Nigerian leather industry was facing serious problems in terms of procuring the necessary tanning materials and equipment. Perhaps the most terrible of the problems confronting the Nigerian leather industry is the reckless human

consumption of the animal skin [1] especially those of cattle, sheep and goat. In fact, raw hides and skin worth several millions of Naira are being consumed by man as "Ponmo" on annual basis (FOS, 2001). This scenario has seriously increased the competition on the use of the animal hides and skin between man and the tanneries. This situation has therefore called for better value addition to the available raw hides and skin so that they can further fetch higher income to the nation. To achieve this feat therefore, the Federal government resolved to intensively invest in the leather industry. This entails empowering the industry by importing leather tanning equipment, spare parts and tanning chemicals such as trivalent chromium, alum, formaldehyde, glutaradehyde and heavy oil from overseas.

For instance, Ihuoma, (1984) reported that Nigeria spent about N7 million on the importation of tanning materials / equipment between 1979 and 1983. But it is often realized that there is a time – lag between the time orders are placed for the importation of the these items and the actual time they arrive for the use of the tanneries (Ihuoma,1984).The delay time probably became protracted with the enforcement, by the Nigerian government ,of customs duties and physical control measures. The Custom duties are a form of tax paid on imported goods as they arrive in a port or approved station (Olukosi and Isitor, 1990).This duties were imposed to raise revenue for the government. Under the Structural Adjustment Programme (SAP) in Nigeria, custom duties were used to discourage the importation of foreign goods such as machineries, base metals, other equipment /materials and thus promote economic self-reliance .This is reflected in the upward adjustment of the tariffs on the affected goods from time to time. The physical control involves placing an outright ban or embargo on the importation of these foreign goods. The enforcement of 100 percent physical inspection programme by the Nigerian Customs Services (NCS) was aimed at reducing smuggling and under-valuation of imports. Importers however complained the policies probably exacerbated trading problems. They (importers) now face long clearance procedures, high berthing and unloading costs, erratic application of customs regulations and corruption. With these policies it became rather difficult for both private and public entrepreneurs to import tanning equipment and materials from overseas.

Thus importers were forced on holidays as their factories ran short of raw materials.Import license /documents again became very difficult to obtain particularly for the private operators. All these caused unimaginable level of delay in receiving ordered goods from overseas.

Delay [2] is noticed to have a negative implication on the quality of value addition to hides and skin and the general output level of the Nigeria leather industry and invariably the expected revenue from the sub-sector. In this paper therefore, the researchers investigated the extent of value addition on the local raw hides and skin and the effect of the delay in the arrival of the imported processing items/materials on the quantum of values being added to them.

Basically, a distributed lag model which has lagged values of variables as part of its set of explanatory variables, McDowell (2004) is found relevant here. The lagged values may be those of the endogenous variable and/or the exogenous variable(s).Lagged variables are normally incorporated into econometric models so as to bring models of economic behaviour nearer to the realities of real life situation that is dynamic, rather than a static model. Specifically, a polynomial lag scheme is used so as to construct composite variables, which are linear combinations of exogenous lagged variables in the original model specification. However, the weights used in constructing the composite variables follow a polynomial of a given degree.

MATERIALS AND METHODS

Secondary data were used for this study. The data[3] contained information on the value addition on the Nigerian hides and skin from 1970 to 2004. The level of Nigeria's annual investment in the industry, particularly costs incurred on items/ materials such as imported tanning machines; spare parts and chemicals were quantified and obtained. Informaion were also gathered on the exchange rate, interest rate and import policies on the Nigerian leather materials/equipment. Required data were obtained from the records of the Federal Office of Statistics, Leather Research Institute of Nigeria, Annual report of the Central Bank of Nigeria, Journals and other relevant publications.

Polynomial lag model was used in the analysis of data. Obtained data were analyzed by regressing the value added on the raw materials

for each year against the lagged values of Nigerian's annual investment on those imported tanning material/items.

The model used for the analysis written explicitly, is as stated below:

$$Y_t = \beta o x_t + \beta_1 x_{t-1} + \beta_2 x_{t-2} + \ldots + \beta_{34} x_{t-34} + \varepsilon_t \ldots \ldots \ldots \ldots \ldots (1)$$

Where,

Y_t = value added on raw leather materials

X_t = value of investment in year t (t = 1, 2…..34 years i.e investment in 1970 – 2004).

$x_{t-1}, x_{t-2} \ldots x_{t-34}$ = Lagged values of investment i.e value of investment in 1969 – 2003

βo = Constant term

$\beta o, \beta_2 \ldots \beta_5$ = Investment coefficients

ε_t = Error term.

Ordinary Least Square (OLS) regression model was used to capture the relationship between the annual value addition on the raw hides and skin and the composite investment in the previous years on tanning machines, chemicals and spare parts. Interest rate, exchange rate and import policies tariff by the Nigerian government were also important independent variables that were incorporated into the regression model.

Generally, the objective of using a polynomial lag model is, as in other lag schemes, to construct composite variables, which are linear combination of exogenous lagged variables in the original model specification (McDowell, 2004). This model is regarded as a fairly sophisticated model, which has been widely used in the estimation of polynomial lag relationships. Here, the simplified versions of the Almon scheme which is regarded as the best known version of the polynomial lag scheme was used in the empirical analysis of the collected data. In their study on polynomial lag formulation of price response in Nigerian food crop production, Oludimu and Akanni (2004) also used the model. The model is generally expressed as follows:

$$Y_t = \beta o x_t + \beta_1 x_{t-1} + \beta_2 x_{t-2} + \ldots + \beta_{34} x_{t-34} + \varepsilon_t \ldots \ldots \ldots \ldots \ldots (2)$$

Where,

Y_t = value added on raw materials

K = Number of lags (which is equal to 34 years in this case) or more concisely

$$Y_t = \sum_{i=0}^{k} \beta_i x_{t-1} + \varepsilon_t \ldots \ldots \ldots \ldots \ldots \ldots \ldots (3)$$

Assume that; $\beta_i = a_0 + a_1 i + a_2 i^2 + \ldots + a_r i^r \ldots \ldots \ldots \ldots \ldots (4)$

Then, by substitution, the distributed lagged equation in (3) above becomes

$$Y_t = \sum (a_o + a_1 i + a_2 i^2 + \ldots + a_r i^r) x_{t-1} + \varepsilon_t \ldots \ldots \ldots \ldots \ldots (5)$$

But when i = 0, 1, 2 …k.

b_i is assumed to be constant when i = k + 1

Therefore, $a_0 + a_1 (k + 1) + a_2(k + 1)^2 + \ldots a_r(k + 1)^r = 0$ or

$$a_0 = a_1(k+1) - a_2(k + 1)^2 - \ldots - a_r(k + 1)^r \ldots \ldots \ldots \ldots \ldots (6)$$

Substituting for a_0 in (4) above; we have

$$\beta_i = -a_1(k+1) - a_2(k + 1)^2 - \ldots - a_r(k + 1)^r + a_1 i + a_2 i^2 + \ldots + a_r i^r \ldots \ldots \ldots \ldots \ldots (7)$$

Therefore, equation (3) above becomes

$$Y_t = \sum_{i=0}^{k} \left[a_1(k+1) - a_2(k + 1)^2 - \ldots - a_r(k + 1)^r + a_1 i + a_2 i^2 + \ldots + a_r i^r \right] x_{t-1} + \varepsilon_t \ldots \ldots (8)$$

But if the relevant explanatory variables (lagged and unlagged) are combined linearly into r composite variables, then

$$Z_1 = \sum_{i=0}^{k} i - (k + 1) x_{t-1} \ldots \ldots \ldots \ldots \ldots \ldots (9)$$

or written generally,

$$Z_r = \sum_{i=0}^{k} i^r - (k + 1)^r x_{t-1} \ldots \ldots \ldots \ldots \ldots \ldots (10)$$

But i < (k + 1),

Then the linearised variable becomes

$$Z_j = \sum_{i=0}^{k} (k+1)^j - i^j x_{t-1} \ldots \ldots \ldots \ldots \ldots (11)$$

The transformed polynomial – lagged equation then becomes

$$Y_t = a_0 + a_1 z_1 + a_2 z_2 + \ldots + a_r z_r + \varepsilon_t \ldots \ldots \ldots (12)$$

$a_0, a_2, \ldots a_r$ were then estimated by OLS method and $\beta_0, \beta_1, \beta_2, \ldots \beta_k$ were obtained by disaggregating a_i's.

$a_0, a_2, \ldots a_r$ were then estimated by OLS method and $\beta_0, \beta_1, \beta_2, \ldots \beta_k$ were obtained by disaggregating a_i's.

β_i are the coefficients of the investment parameters by government on the factors that determine value addition in the leather industry. In Nigeria these factors are the level of governments' investment in procuring tanning chemicals, tariffs and time lag between the period of placing order for those machines /spare parts and tanning chemicals and the actual time of arrival at the Nigerian ports.

RESULTS AND DISCUSSION

The result of the composite analysis of the collected data is given in Table 1. The adjusted R^2 – value is 0.6827, which indicated that only about 68 percent variations in the value addition to the Nigeria leather was explained by the identified variables: tanning machines, spare parts, chemicals, tariffs and time lag and others. The balance was however accounted for by variables not captured in the model. These might include factors such as inflationary rate and government policies on controlling international trade and so on. This finding corroborates earlier position by Ihuoma (1984) that government policies on importation of goods inhibit the inflow of foreign goods into Nigeria.

The estimated t-values showed that only tanning machines tariffs and time lag had significant relationship, at 5 percent level, with the value addition on raw leather materials. With a tariff cut on imported tanning machines many operators of tanneries will be able to afford the equipment being purchased from overseas. A review of the physical control measures such as 100 percent inspection of imported items could minimize delay in taking delivery of these items from overseas. The Nigerian Customs Services (NCS) could be more empowered in terms of provision of quality personnel so as to ensure an efficient service delivery that importers will appreciate.

Table 1: Result of the regression analysis

	b_i	T-value	Significant level
Constant	38.858 (6.059)	6.578	0.003
Machine (x_1)	0.338 (0.129)	2.606*	0.060
Spare parts (x_2)	-5.43E – 02 (0.121)	0.449	0.677
Chemicals (x_3)	2.293 E-01 (0.085)	0.27	0.800
Tariff (x_4)	-1.131 (0.373)	-3.031*	0.004
Time lag(x_5)	-3.642 (1.324)	-2.751*	0.121
Internal rate (x_6)	1.7563 (1.3561)	1.295	0.265
Exchange rate (x_7)	1.6588 (1.120)	1.4811	0.3542

R^2 value = 0.739.Adjusted R^2 value = 0.6827
*Significant at 5% level
Figures in parentheses are standard errors.
Source: Computed from survey data.

CONCLUSION

In this study the researchers investigated the determinants of value addition on the local raw hides and skin. The implications of the delay in the arrival of the imported equipment /materials on the level of added value of raw leather were also studied. Tanning machies, tariffs and time lag significantly affected the total value addition on the Nigerian raw leather materials. To increase the value addition in the Nigerian leather industry therefore, efforts should be made in procuring these materials to the advantage of Nigerian investors. All the identified bottlenecks that cause delay in the timely delivery of ordered items/materials from overseas should be reviewed .Too stiff policies on importation of goods must be relaxed so as to further widen the Nigerian business horizon. If this is done, the tannery industry in this nation will flourish once again and all the stakeholders can benefit from it.

NOTES

1   Several thousands of tonnes of animal skin are consumed daily as delicacies in Nigeria. Despite calls from various quarters for a ban on this activity a perceived high incidence of poverty has constrained the government in placing a ban on the consumption of the commodity as thousands of Nigerians see cooked skin as a cheaper protein source.
2   Sometimes, time lag between period of importation and the actual time of arrival of imported tanning equipment/materials may exceed 15 months. This long delay is a major constraint to the activities of tanning industries in Nigeria.
3   Data on the spare parts, tanning chemicals, machines/equipment, interest and exchange rates, tariffs paid on imported goods and estimated time lag between period of placing order and taking delivery were collected .The period covered is 1969 to 2004 and the data were obtained from the FOS, CBN and Federal Ministry of Agriculture.

REFERENCES

Aganga, A.O. and A.A. Aganga. 1984. "Parasitic and Nutritional Diseases of cattle and their effects on Hide Quality." *Journal of Leather Research,* 2(4): 81-84.
Federal Office of Statistics FOS. 2001. *Annual Abstract of Statistics, Lagos.* Federal Office of Statistics
Federal Ministry of Agriculture, FMA. 1997. *Annual Reports.* Lagos: Federal Ministry of Agriculture
Ihuoma, A.A. 1984. "Growth performance and import constraints of the Nigeria leather industry." *Journal of Leather Research,* 2(4): 71-79.
McDowell, A. 2004. Polynomial distributed lag models. *The Stata Journal*, 4(2): 180-189.

Oludimu ,O.L. and K. A. Akanni. 2004. "A polynomial lag formulation of price response in Nigerian foodcrop production." *Journal of Agricultural Management and Rural Development (JAMRD),* 1: 193-200.

Olukosi, J.O. and S.U. Isitior. 1990. *Introduction to Agricultural Marketing and Prices; Principles and Applications.* Abuja: Living Books Services, GU Publications, FCT Pp.105-112.

Shehu, B. 1980. *Proceedings of the National Seminar on the current problems facing the leather industry in Nigeria.* Zaria: Leather Research Institute, Pp.24-29.