Welfare Effects of Shifting from Tariff to Ban on Rice Import Policies in Nigeria

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Abstract: Since 1970s, Nigeria's policy on rice importation which inconsistently alternated between ban and tariff has adversely affected the growth of the domestic rice industry. In 2006, government proposed to shift from current tariff policy to total ban rice importation arguing that it offers more protection capable of stimulating growth of domestic rice industry. This study analyzes the protective and welfare effects of ban and tariff policies on rice importation in Nigeria for the periods of 1987-2005 using the partial equilibrium model. Policy shift does not really matter in terms of having substantial trickle-down effect as marketing middlemen are more likely to benefit from the imposition of trade barriers. However, tariff appeared to be more effective in raising domestic prices than discouraging importation because of the price capping effect of imported rice brands. Although, ban provided higher but insignificant amount of protection than tariff, its inefficiency costs on rice production and consumption were significantly higher. These inefficiency costs coupled with loss in revenue resulted to a higher and significant loss in social welfare.

Key words: Rice, welfare effects, partial equilibrium, ban, tariff

INTRODUCTION

Several factors have been identified to hinder the development of domestic rice industry in Nigeria. Apart from technical, agronomic, socio-economic and infrastructural constraints facing rice producers, frequent and inconsistent changes in import policy appear to be the major factor responsible for the sordid state of Nigeria's domestic rice economy (Akande, 2002; Daramola, 2005). For instance, inconsistent policy changes on import often lead to wide variations in prices in the domestic market thereby hinder the capacity of local producers from developing long-term strategic plans.

Available evidence shows that these policy changes which inconsistently alternate between tariff and ban is not as a result of carefully designed long-term importation plan, rather a product of pressure from both internal and external business groups who make concerted efforts to influence government's decision on rice importation. The fast increasing consumption of rice which has made the commodity a multi-million dollar business in Nigeria has also brought with it some politicking from various interest groups. While, the global bodies such as WTO as well as rice importers clamour for more liberal measures such as (low) tariff to avert imminent food crises in Nigeria, the domestic rice producers lobby for stricter measures such as outright ban on importation to prevent unfavourable competition with imported rice brands and encourage

domestic production. It is the consumers who cannot form any pressure group suffer most by paying higher prices whenever government imposes import restrictions.

Effective policies often depend on striking a fair balance between the interests of the consumer and those of the producer. But in Nigeria, consumers' welfare appears to be of less importance as government prefers ban to be a more effective policy tool for providing the amount of protection needed to stimulate growth of the domestic rice industry. For instance, recently Nigerian government argued at WTO and GATT fora that it is more effective to monitor and enforce ban as a protective measure than tariff as the presence of imported rice in the domestic market can be easily detected (Oyejide et al., 2005). This is a short-sighted development strategy which could be attributed to lack of adequate knowledge of the welfare implications of ban and tariff policies in the Nigeria's domestic rice economy. While, it is important that government should protect its domestic industry, it is also important to note that such protection can only stimulate industrial growth when: it is complemented with the provision of support services and it takes into account consumer's welfare.

A part from the problem of inconsistent policy changes, implementing a very strict import measure (such as ban) discourages competition necessary for improving the quality of local rice brands even after paddy production has increased thereby compelling the

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domestic consumers to continue seeking the better quality imported rice brands even at higher prices. In addition, ban and very high tariff rates trigger under-valuing of imports as well as smuggling across the Nigeria borders with Benin and Niger Republics leading to huge loss in government revenues which could have been used to develop the rice industry.

Therefore, designing an effective and social welfare maximising import policy plan should be based only on the more liberal tariff measure as such a policy plan will not only be consistent thereby affording the producers the opportunity of long-term planning and better production methods, but will adequately stimulate improved processing of local rice brands, enhance their quality and make them highly competitive in the domestic market. This will undoubtedly reduce production costs, increase the demand for local rice brands and enhance the welfare of domestic consumers. I believe policy shift from the current tariff measure to total ban may have long-term negative effect on the growth of Nigeria's rice industry.

However, my argument raises some pertinent questions concerning the protective and welfare effects of ban and tariff policies in the welfare of Nigeria.

- Does imposition of tariff or ban really protect domestic rice production?
- Under which of these two policy regimes do domestic rice producers receive higher protection?
- In which of these two policy measures do producers, consumers and government gain or lose more and by how much?
- What are the effects of these policies on rice production and consumption in Nigeria?

- Under which of these two policy measures is the national welfare higher?

These questions have been a major subject of debate among stakeholders in the Nigerian rice industry (Akande, 2002; Ezedinma, 2005; Oyejide *et al.*, 2005). In attempt to answer these questions, this study seeks to analyze the protection of domestic rice production as well as the protective and social welfare effects of rice importation in Nigeria under the ban and tariff regimes. This is with a view to providing information that will guide the government and other stakeholders in the rice industry in designing a focused and social welfare maximising importation plan. It is only on the basis of such plan that consistent policy measures capable of assisting in achieving the food security objective of the government can be implemented.

A TAXONOMIC REVIEW OF NIGERIA'S RICE IMPORT POLICIES

A taxonomic review of rice import policies in Nigeria shows that prior to 1979 government imposed high tariff rate which was subsequently reduced to 10% by 1978 (Table 1). In 1979 there was a total ban on rice importation for a period of 6 months. Between 1979 and 1984, the government introduced various quantitative restriction measures through the issuance of import license. In 1985 there was also a total ban on rice importation. Between the periods of 1986 and 1994 import license system was eliminated and there was a total ban on rice importation which was dropped in favour of high tariffs in the range of 50-120% during the years of 1996-2005. Government thinking that import tariff is no longer becoming effective

Table 1: A taxonomy of nigeria's import policies on rice (1974-2005)

Period	Policy measures
Prior to April 1974	66.6% tariff
April 1974-April 1975	20% ,,
April 1975-April 1978	10% ,,
April 1978-June 1978	20% ,,
June 1978-October 1978	19% ,,
October 1978-April 1979	Imports in containers under 50kg were banned
April 1979	Imports under restricted license only to Govt Agencies
September 1979	6 month ban on all rice imports
January 1980	Import license issued for 200,000 tones of rice
October 1980	General import license with no quantitative restrictions
December 1980	NNSC to issue allocations to customers and traders
May 1982	PTF commenced issuing of allocations directly to traders
January 1984	Rice importation placed under gen. license restrictions
October 1985	Importation of rice (and maize) banned
July 1986	Introduction of SAP and the abolition of Commodity Boards
1995	100% tariff
1996-2000	50% "
2001	75% "
2002 - 2003	100% "
2004	110% "
2005	120% "

Source: Sutcliffe and Ayomike (1986) cited in Akande (2002: 9); Federal Government Budgets, 1995-2005

in discouraging importation, in January 2006, again declared its intention to place a total ban on rice importation. Thus, Nigeria's importation measures can be broadly grouped into ban and tariff which have been inconsistently implemented over the years.

EVOLUTIONARY TRENDS OF RICE PRODUCTION AND IMPORTATION IN NIGERIA

As we discuss the impact of policy changes on rice importation it is also important that we have an idea of the trends of the major variables of our discussion. Rice production and consumption trends in the last two decades show that domestic production which grows at an average rate of about 2% per annum has not kept pace with consumption due to annual growth rate in population which stood at about 3%. This has resulted to increasing dependence on food imports (including rice) since the last 20 years.

Although, rice output trend indicates a steady increase over the last two decades, import trend in the same period has also remain positive (Fig. 1) suggesting increasing imports despite increases in paddy production.

Rice output trend suggests that in the past 2 decades there were fluctuated increases in paddy production even though farmers had maintained consistent increases in total cultivated land area. Figure 1 shows that there has been an aggregate increase but wide fluctuations in paddy production between the period of 1987 and 2005 as indicated by the estimated parameters of the output trend line. While, farmers have maintained a relatively consistent increase in cultivated land area (as shown by a positive slope and R^2 of 0.9069 of the trend line) during this period, yields have consistently fell (negative slope and R^2 of 0.8354) which resulted to wide fluctuations in the output of paddy giving rise to low R^2 of 0.4986 even though output trend remains positive. Increased paddy production was largely due to expansion in cultivable land area. According to Ezedinma (2005), potential land area for rice production in Nigeria is between 4.6 and 4.9 million ha but only 35% (1.7 million ha) is used for rice cultivation. Despite this enormous availability of cultivable land area, Akande (2002) identified, Inadequate input supply, poor agronomic practices and land tenure problems as among the several factors which have continued to constrain rice farmers from expanding production. Rice paddy production is predominantly in the hands of smallholder farmers who on the average cultivate less than 2 ha.

The inability of domestic production to meet local demands led to importation of rice over the years even during the period of ban (Fig. 2). Although, the trends
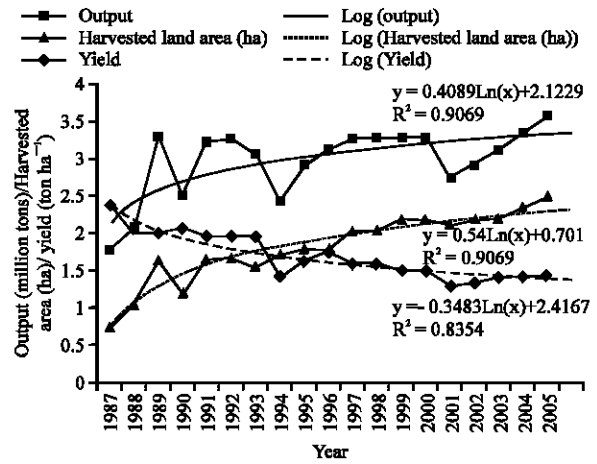

Fig. 1: Evolution of output, harvested area and yield of rice in Nigeria (1987-2005)
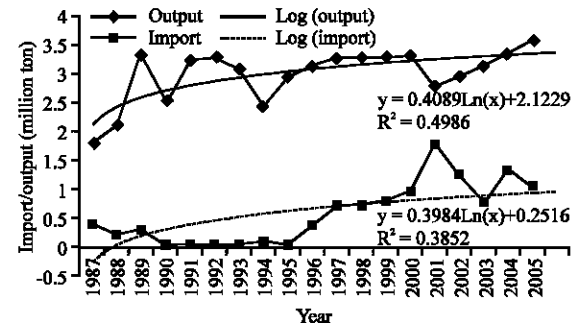

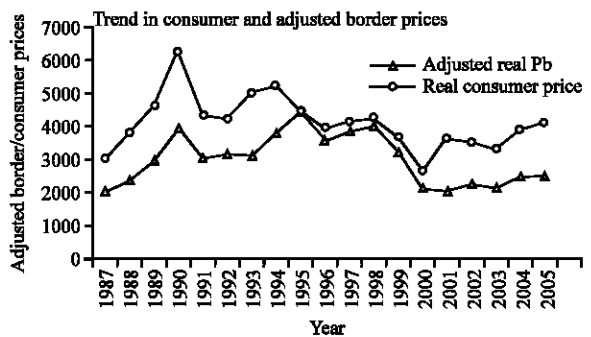Fig. 2: Evolutions of Rice Output and Import in Nigeria (1987-2005)

Fig. 3: Trends in domestic and Border Prices

indicate general increases, both domestic outputs and imports fluctuated widely in the last two decades. These fluctuations followed a systematic pattern. For instance, domestic outputs were high when Imports were low as observed especially during the ban period. While, domestic output recorded wider fluctuations in the ban period, import fluctuations were wider in the tariff period.

Figure 3 shows that consumer and border prices fluctuated even though consumer prices were always higher except in 1995 when the 2 prices were almost equal and could be due to the shift in policy from total ban to tariff which took place in 1995 which is largely responsible for the rise in importation in that year. A rise in import tariff rate from 75-100% in 2001 (Table 1) led to the huge fall in importation witnessed in 2001 (Fig. 2) thus resulting to the wide differences between consumer and border prices observed since 2001 (Fig. 3).

GROWTH IN PER CAPITA RICE CONSUMPTION IN NIGERIA

Before 1970, the average per capita consumption was about 3 kg which was regarded as the lowest per capita annual consumption in West Africa. But with increasing population growth, increasing income levels, rapid urbanization and change consumer taste and preferences in the last 2 decades, consumption has increased tremendously (Akande, 2002; WARDA, 2003). Figure 4 shows that per capita rice consumption has consistently increased since 1987. Akande (2002) noted that the annual increase of about 10% in per capita rice consumption observed in Nigeria since mid-1970s there has been adjudged the highest in West Africa.

Several studies have pointed out that there has been appreciable growth in rice consumption in Nigeria. According to Nkang *et al.* (2006), with per capita consumption of between 3.5 kg and more than 14 kg per year per household, there has been accelerated growth in consumption from an average per capita consumption of 18 kg during the 1980 decade to an estimated average of 22 kg between 1995 and 1999. This finding is confirmed by Akpokodje *et al.* (2001) who noted that the share of rice in cereals consumed increased from 15% in the 1970s to 26% in the early 1990s. Also, Kebbeh *et al.* (2003) stated that FAO projections indicate rice consumption growth rates of 4.5% per annum through the 2000s representing a 70% increase in total rice consumption by the end of the decade.

Increasing demands in recent years reflect more of increases in the demands for imported rice brands partly to meet the shortfall on domestic supply and partly to meet consumer demands in urban areas. Oryza (2005) noted that urban consumers prefer and can afford to pay for the high quality imported rice. Local rice brands are of poor quality because they contain dirt, stones, chaff and large quantity of broken or irregular grains and so lack competitive advantage against the imported brands (WARDA, 2003).
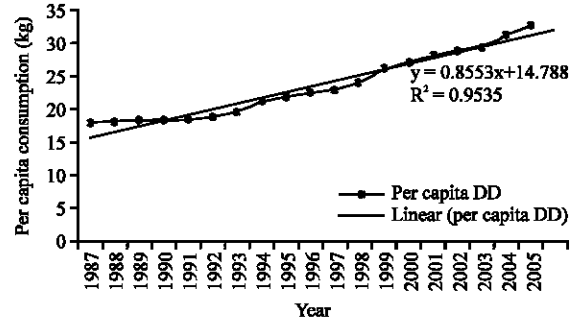

Fig. 4: Trend in per capita rice consumption in Nigeria (1987-2005)

According to Ezedimma (2005), although improving the standards of local rice is feasible but it may not be competitive. Further processing of domestic rice to meet the quality and standards of imported rice will attract extra costs of 25% and make the local rice brands more expensive than the imported rice due to irregular sized grains of diverse colours from paddy farmers. This feature will continue to make imported rice preferable to consumers than domestic rice even after polishing, de-stoning and clean up.

A study conducted by Lancon *et al.* (2003) on the criteria to justify consumers´ preference for imported rice showed that, among 954 respondents, seventy-one percent of the customers named cleanliness as one of the three criteria and for 38% of customers interviewed it was the first criteria. Swelling capacity takes a clear second position-being reported by nearly half the respondents as one of the criteria to justify their preference for imported rice.

THEORETICAL FRAMEWORK

Neoclassical trade theories posit that under free trade condition the domestic market of the importing country will be in competitive equilibrium and resources will be optimally allocated among producers and consumers leading to increased social welfare. But imposition of trade restrictions (such as ban and tariff) which often influence the relationship between world price and the price domestic producers in the importing country receive distort this equilibrium leading to a decline in social welfare (Akhtar, 1999).

Method of partial equilibrium analysis: According to Ronnie and Alan (2002), in partial equilibrium analysis, a model is built which concentrates on a particular subsection of the economy, with all other variables being
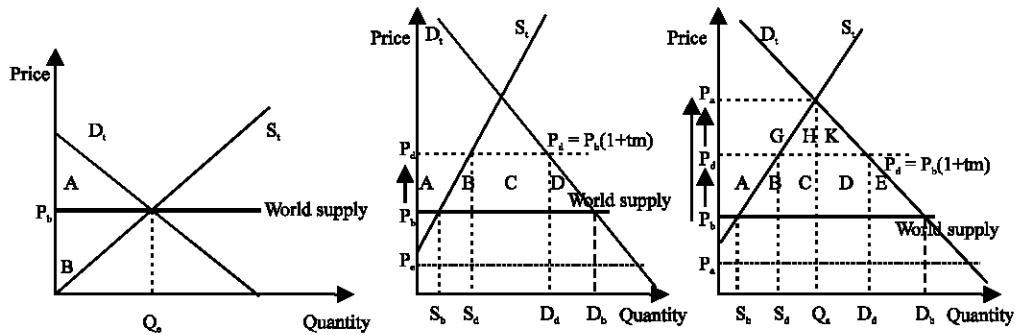
Fig. 5: Welfare Effects of free trade, import tariff and total ban: The case of small importing country

treated as exogenous to the model. It describes only part of the economic system, capturing only the direct impact of (say) a policy shock on the relevant market, ignoring the impact on other areas of the economy as well as feedback effects from these to the original market.

Perali (2003) simply defines Partial Equilibrium (PE) as the analysis of a market in equilibrium considered in isolation from other product or input markets. A study which seeks to analyze the efficiency/welfare effects of policy changes within a particular market or sector of a domestic economic applies the methodology of PE. He noted that the major advantage of the PE approach lies on its empirical simplicity. However, he agreed that PE analysis is partial in the sense that only the price effect is considered.

In PE analysis involves the estimation of Consumer Surplus (CS) and Producer Surplus (PS). In a competitive market the total welfare (CS+PS) is maximized if the free market equilibrium prevails. However, the estimates of consumer and producer surpluses critically depend on the quality of the estimated demand and supply slopes (Perali, 2003). It is expected that the higher the demand and supply elasticities, the higher the CS and PS values.

Partial equilibrium theory: Theory of PE models analyze welfare effects of import policies by comparing the world market (or border) price and the prices prevailing in the domestic market in the policy period as described in Fig. 5a-c.

Under the free trade condition, the domestic market of the importing country will be in competitive equilibrium (Fig. 5a) as domestic market price will be equal to the border price, P_b and the social welfare will be at maximum. However, while this equilibrium domestic market price may be fairly constant as it depends on world market demand and supply it is always higher than the equilibrium price in the exporting country (P_{ex}). If the domestic market demand and supply at border price are D_b and S_b respectively, then the welfare impacts of trade barriers

such as import tariff and total ban on imports can be explained as shown in Fig 5b and c. In these figures D_t and S_t represent the time series (annuals) market demanded and supplied schedules respectively of the domestic importing country.

Import tariff scenario: Assuming government decides to impose an import tariff; the domestic market price will rise from P_b (world market price and also the free trade price) to P_d as shown in Fig. 5 b where P_d represents the consumer price in the domestic market of the importing country. In this case, P_d is equal to $P_b(1+tm)$ where tm is the tariff rate. The demand falls from D_b (in the free trade condition) to D_d while supply increases from S_b (in the free trade condition) to S_d. This gives excess demand of D_d-S_d.

With this price increase and fall in excess demand, the loss in Consumer Surplus (CS) will be the trapezium 'ABCD', the gain in Producer Surplus (PS) will be the trapezium 'A', while the gain in government revenue (tariff revenue) will be the rectangle 'C'. The loss in Production Efficiency (PE) which is the cost of sub-optimal allocation of resources caused by increased production due to rise in price is represented by the triangle 'B'. The loss in Consumption Efficiency (CE) -inefficiency arising from fall in consumption due to rise in price- is represented by the triangle 'D'. Since the area 'ABCD' (loss in CS) is larger than the sum of the areas 'A' and 'B' (gain in PS + tariff revenue), then the net welfare will be negative and is represented by sum of the two triangles 'B' and 'D' (i.e. -B - D). This is the deadweight loss which represents the total cost to the society for distorting the free trade equilibrium condition of the domestic market through the imposition of import tariff.

Total ban scenario: Assuming the government imposes a total ban on rice importation, the domestic market price moves up from P_b (domestic price at free trade condition) to P_a (Fig. 5c). P_a is the autarky price --- the equilibrium

price in a closed market. It represents the consumer price in the domestic market of the importing country when there is no trade. Since, the market is at equilibrium, the total market demand and supply are equal. The loss in CS is represented by the trapezium 'GHKABCD', the gain in PS is shown by the trapezium 'GA'. There is no government revenue generated, therefore the loss in production efficiency (PE) is represented by the triangle 'HCB' while loss in Consumption Efficiency (CE) is represented by the triangle 'KDE'. Since the area 'GHKABCD' (representing loss in CS) is larger than the area 'GA' then the net social welfare is negative and is represented by the area 'HKBCDE'. This net social welfare loss which is the sum of the areas 'HCB' and 'KDE' represents the total cost to the society for distorting the free trade equilibrium condition of the domestic market by imposing outright ban on importation.

In practice, the tariff and ban scenarios show that ban raises the domestic producer prices above the level that can be raised by tariff. Thus the loss in CS, gain in PS, loss in PE and loss in CE due to total ban on importation are all higher those obtained from imposing import tariff. However, the sizes of loss in CS, gain in PS and losses in PE and CE in the two scenarios largely depend on the differences between the domestic prices (P_a, P_d and P_b).

From the above theoretical framework, the estimation and analysis of the welfare effects of ban and import tariff policies using yearly time-series data basically depends on the annual relationship or ratios of the prices --- P_a, P_d and P_b (Bakhshoodeh and Akbari, 2002). It is important to note that the values of P_a, P_b and P_d used to estimate the domestic market demand and supply functions are time-series data which vary annually thereby making the use of their ratios for computing the annual loss in CS, gain in PS and loss in production and consumption efficiencies very reasonable.

ANALYTICAL FRAMEWORK AND METHODS OF DATA ANALYSES

Types and sources of data: Secondary data were used for this study and covered the period of 1987 and 2005. Ideally data should be from a single source to maintain consistency. There was no single source that provided all the relevant data for all the variables envisaged in this study. However, efforts were made to obtain data from a single source as majority of the data used for this study were obtained from the FAO database at http://faostat.fao.org/site/336/default.aspx. Data that were not available in this database were obtained from other sources. Data gathered from the FAO database included data on the annual domestic output of rice; average annual producer prices; annual producer prices of cassava; farming population; harvested land area of rice paddy; official exchange rate; implicit price deflator (1990 = 100); national population and GDP at current market prices. Data on per capita rice consumption came from the database of United States Department of Agriculture (USDA) at www.usda.gov. Data on world market prices (f.o.b. Bangkok) were collected from the International Rice Research Institute (IRRI) database at http://www.irri.org/science/ricestat/index.asp. Our reference border price is based on the world market price of milled Thai rice, 5% broken ------ the commonest type imported into Nigeria. The Project Coordination Unit (PCU) of the Federal Ministry of Agriculture and Rural Development (FMARD), Abuja, Nigeria provided data on yearly national average consumer prices.

Estimating the amount of protection: Several methods of estimating the amount of protection provided to domestic producers exist in literature (Chand, 1999; OECD, 2007). However the simplest and commonly used method of estimation is the Nominal Protection Coefficient (NPC). This method measures the ratio of the average domestic market price (at farm gate) received by producers in the importing country to the border price (measured at farm gate level). The NPC values were estimated using domestic prices as shown in Eq. 1.

$$NPC = Pd/Pb = Pb(1+tm)/Pb = 1+t \qquad (1)$$

Where,
Pd = Domestic price of rice.
Pb = Border price of rice adjusted for CIF and importers margin.
t = Tariff rate.

Based on Eq. 1, we conclude that producers are protected only when mean NPC is greater than unity (NPC>1) and the higher the mean NPC value, the more the domestic rice producers are protected against importation, otherwise (mean NPC < 1) producers are not protected.

Measuring welfare effects of import policies: To measure the welfare effects of import policies, we adopted two major steps. First we estimated a set of aggregate demand and supply functions using the Ordinary Least Squares regression (OLS) technique. Based on previous studies (Nguyen, 1963; Rafeek and Samaratunga, 2000; Peralis, 2003; Alam, 2005) the demand and supply functions for rice often take either linear or Cobb-Douglas form. A

step-wise regression technique was adopted in estimating these functions. Secondly, we estimated the welfare parameters based on domestic market demand and supply elasticities using Eq. 2-6.

$$LossCS_t = \int_{P_b}^{P_d} \alpha P_d^{-n} dP = \frac{D_b}{1-n}\left[\left(\frac{P_d}{P_b}\right)^n * (P_b) - P_d\right] \quad (2)$$

$$GAINPS_t = \int_{P_b}^{P_d} \beta P_{d(t-1)}^{\varepsilon} dP = \frac{S_d}{1+\varepsilon}\left[P_d - \left(\frac{P_b}{P_d}\right)^{\varepsilon} * (P_b)\right] \quad (3)$$

$$Loss\ PE_t = S_d * (P_d - P_b) - GAINPS_t \quad (4)$$

$$Loss\ CE_t = LossCS_t - D_d * (P_d - P_b) \quad (5)$$

$$Tr_t = (D_d - S_d) * (P_d - P_b) \quad (6)$$

Where,

LossCS$_t$ = Estimated loss in consumer surplus in year t (N).

GAINPS$_t$ = Estimated gain in producer surplus in year t (N).

LossPE$_t$ = Estimated loss in production efficiency in year t (N).

LossCE$_t$ = Estimated loss in consumption efficiency in year t (N).

Tr$_t$ = Tariff Revenue in year t (N).

Pd = Annual consumer price prevailing in domestic market (N/ton).

Pb = Annual border price = annual world market price (at f.o.b.) adjusted for insurance, freight and importer's margin (N/ton).

Db = Estimated annual total domestic market demand at adjusted border price (ton).

Dd = Total annual demand at consumer price in year (ton).

Sd = Total annual domestic production at consumer price in year (ton).

η = Estimated coefficient of price in the demand function (This is also the elasticity of demand since the demand function is Cobb-Douglas).

ε = Estimated coefficient of price in the supply function (This is also the elasticity of supply).

In this study, the effect of inflation was removed by deflating all prices and monetary (nominal) values to their real values using a common implicit price deflator (1990 = 100) to obtain their real values as shown in Eq. 7.

Table 2: Periods of ban and tariff measures on rice importation in Nigeria

Years	Period	Policy measure
1987-1994	Ban	Total ban on rice importation
1995-2005	Tariff	Oscillating tariffs

$$Real\ price = \frac{[Nominal\ price]}{Implicit\ price\ deflator} \times 100 \quad (7)$$

However, because of the strong trend observed in the demand and supply quantities, these annual aggregate real values were divided with annual their corresponding annual total consumption to obtain their annual per ton values. The reason for adjusting these welfare parameters to their per ton values using the total consumption values is also to provide the same reference quantity for easy aggregation and better comparison.

Comparing protection and welfare indicators: To compare protection and welfare indicators, the dataset was divided into two periods: ban and tariff. As shown in Table 2. The period of ban was between 1987 and 1994 while the tariff period was between 1995 and 2005.

The annual values of the NPCs as well as all the welfare indicators computed from equations 2-6 were grouped into these two periods. For each period, the mean amount of protection to domestic production (mean NPC) as well as the mean net social welfare (mean NSW) were estimated and compared by adopting the methodology used by Hughes *et al.* (2006) by assuming that the samples from each period are independent. If T_{cal} is greater than critical value (T_{tab}) at alpha level of 10%, the null hypothesis of no significant difference in the level of protection provided to domestic production in any two periods is rejected.

RESULTS AND DISCUSSION

Estimated results of demand and supply functions: Estimated demand and supply functions for rice in Nigeria are shown in Eq. 8 and 9:

$$Ln\ PCD_t = 3.1101 - 0.2687 LnP_t + \\ (6.0369)*(-4.1619*) \\ 0.1146 LnPCGDP_t + 0.1564 LnPCass_t \quad (8) \\ (8.5282*) \qquad (4.0041*)$$

Multiple $R^2 = 0.9594$; F-value = 118.2*; df = 15

$$Ln\ PCHLA_t = -4.6458 + 0.1615 LnP_{t-1} + \\ (-7.7313*)\ (2.0865**) \\ 0.0211 Time + 0.1910\ D \quad (9) \\ (2.1191**) \qquad (1.6947)$$

Multiple $R^2 = 0.8537$; F-value = 27.22 *; df = 14

Values in parenthesis are t-values; * Significant at 1% level; **Significant at 5% level.

Where,

P_t	=	Real consumer price (in N/ton) in year t.
P_{t-1}	=	One year lagged real producer price (in N/ton) in year t.
PCD_t	=	Per capita consumption (in kg) in year t.
$PCHLA_t$	=	Per Capita Harvested Land Area of Rice (in ha) in year t.
$PCGDP_t$	=	Per Capita GDP (in N) in year t.
$PCass_t$	=	Real price of cassava in year t.
D	=	Policy dummy (1 for tariff policy and zero otherwise).
Time	=	Time trend (whole number digits starting from 1 for 1987 and 19 for 2005).
η, λ, γ, α, β, ϵ, k and q	=	The parameters to be estimated.
Ln	=	Natural log.

Following the law of demand, consumer price of rice, consumer's income and price of cassava (close substitute) were included in the demand function as independent variables and their estimated coefficients give the expected sizes and signs. Coefficients of -0.2687, 0.1146 and 0.1564 implies that the demand for rice in Nigeria is price, income and cross inelastic thereby indicating rice t be a very important staple food in Nigerian. These estimated price coefficients are consistent and within the range of elasticities found in other countries (Alam, 2005). This finding supports Akpokedje *et al.* (2001) who noted that with the low price elasticity of demand in the Nigeria urban market fiscal instrument like tariff can be increased without a corresponding decline in demand because rice is still considered a fast food in many urban centers. In recent years rice has been a common daily meal served in households as well as in social occasions in Nigeria. This also agrees with Akande (2002), who noted that rice is no longer a luxury food in Nigeria but a major source of calorie for both the rich and poor alike. Therefore, consumers are likely to maintain a fairly constant demand as their income rises. This result is also consistent with the findings of Erenstein *et al.* (2004) who observed that even though rice competes with other food stuff in the market especially cassava, yam and maize, the persistent increase in rice consumption even at higher prices has over the years made the commodity a very important part of Nigerian diet thereby suggesting such competition to be only limited.

On the supply side, the coefficients show marked similarity in terms of size and signs as well as conformity to the law of supply and *a priori* expectations. All the exogenous variables show positive sign. A coefficient of 0.1615 indicates that the domestic supply of rice is fairly
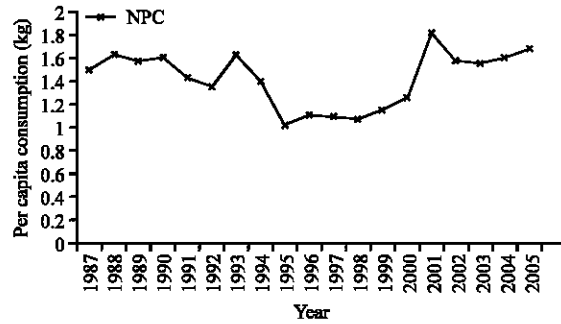

Fig. 6: Trend in NPC values

Table 3: Real amount, gain and effect of protection to Nigeria's domestic rice market under ban and tariff regimes

Period	Mean NPC	Gain in producer surplus (N/ton)	Protective effect (N/ton)
Ban (1987 -1994)	1.5046	1357.11	42.92
Tariff (1995-2005)	1.3463	555.59	16.43
t-value	1.4622	4.4944	3.2232

Source: Author's calculation

inelastic with respect to its own price. Several factors could be responsible for this inelastic situation. The first and most important factor is farm size. More than 70% of food crops in Nigeria are produced by smallholder farmers who own and cultivate less than two hectares of farmland. This is a serious production constraint which limits the farmer's ability to increase production by expanding cultivable land area in response to price increase. Also, farmers may not likely expand output appreciably due to rise in previous year's price as it has been observed that government import policies have significant positive effect on the consumer prices. It may be mostly the middlemen who benefits from the protection of domestic production more than the domestic millers and farmers. As most rice farmers depend on the local rice millers for market, there is high tendency that miller's demand for rice paddy will change substantially if there is a change in previous year's consumer price. Therefore millers and middlemen (wholesalers and retailers) may likely respond more to changes in previous year's price than the local farmers.

The insignificance of the dummy variable suggests that local farmers may not be highly responsive to change in import tariff and ban policies due to some factors explained earlier. The reason appears to be that there are no formal or institutional arrangements to ensure that price increases arising from implementations of these protectionist policies are specifically directed to benefiting the local farmers who are the core source of rice paddies in Nigeria.

Protection of domestic rice production in Nigeria: In determining the amount of protection provided to the domestic rice producers during the period under review, we estimated the Nominal Protection Coefficient (NPC) which is the ratio of domestic price to the border rice (in naira terms). Table 3 shows that the mean NPC fell from 1.5046 in the ban period (1987-1994) to 1.3463 in the tariff period (1995-2005). Thus, the shift in government's import policy benefited both the producer and the consumer but was geared more towards satisfying the needs of the consumer with the removal of protection from the producer and a widening in the availability of imported rice brands.

This finding suggests that these two import policy measures offer protection to domestic rice producers by raising the domestic market price. Although, the mean NPC in the ban period is greater than the mean NPC in the tariff period, the t-value of 1.4622 indicates that this difference is not significant at 10%. Therefore there is no significant difference in the mean NPCs in the two periods.

The increase in tariff rate of up to 100% in 2000/2001 (Table 1) led to a sharp rise in domestic prices and a widening gap between domestic and border prices (Fig. 3) which gave rise to high NPC values observed in the tariff period (Fig. 6). Therefore, we can conclude that tariff could be an effective instrument for raising the domestic prices. This conclusion is true as it agrees with the findings of Erenstein *et al.* (2003) who noted that prices of imported rice brands put a cap on the prices of locally produced rice. However, the capping effect is not 100% as price differential still exists between local and imported brands (even after import restrictions have been imposed) due to quality differentials. Also, the high NPC values in later part of the tariff period could be attributed not only to the high tariff imposed on imported rice brands but also due to the improved quality of local rice brands which made it easier for the price capping effect to substantially reflect on the prices of local brands.

It is also reasonable to conclude that high prices observed in the domestic market may not really be due to scarcity of the commodity in the market arising from fall in imports, but due to high production and processing costs and/or high border prices which puts a cap on locally produced rice brands.

High tariffs imposed by government over the years has not been effective in discouraging importation the way it raises prices of imported rice brands. This finding supports Nwoko (1986), who found that although tariff generates some revenues, it may not be an effective means of reducing imports. The continued soaring of imports over the years despite very high and rising tariff

rates could be attributed to the poor quality of locally produced rice brands. The price differential between imported and local rice brands has not been high enough to discourage consumer's preference for the high quality but more expensive imported brands. The amount of tariff imposed on imports does not significantly deter importers from importation since imported rice brands could still be sold in the Nigerian domestic market at higher prices given growing consumers preference for high quality imported brands against the local brands.

It is expected that ban would have provided a significant level of protection vis-à-vis tariff. But the low mean NPC value for the ban period could be attributed to smuggling. If ban on importation was effectively enforced, there would have been scarcity of the commodity in the domestic market and therefore a substantial rise in domestic prices far above the world market prices. Thus NPC values in the ban period would have been significantly higher than that of tariff period. But because ban triggers smuggling of rice across the Nigeria borders, imported rice brands find their way into the Nigeria market at duty free rate which keeps the price of imported rice brands relatively low and by extension, the domestic price (Erenstein *et al.*, 2003).

The low NPC in the ban period also shows how porous the Nigeria borders are and how far the men of Nigeria Custom Services (NCS) can be compromised. An importer would prefer to circumvent the law by paying bribes to custom officials (knowing fully well that he would recoup his money quickly due to high demand for imported rice), than obeying the law and lost out of business. Apart from bribery of NCS officials, Oyejide *et al.* (2005) observed that illegal levies charged by the Nigeria Ports Authority (NPA) substantially increase the costs of imports and this could be a driving force that triggers smuggling.

Imposition of ban has not been effectively enforced since some quantities of rice were officially imported during the period (Fig. 2). This demonstrates either lack of political will on the part of the government or waiver being given to some businessmen who are highly connected to government.

The summary implication of these findings is that imposing outright ban for the sole purpose of protecting the domestic rice industry does not provide the level of protection which is significantly different from the level of protection which would have been provided if tariffs were imposed.

Welfare effects of rice import policies: With respect to producer surplus, at 10% level, the mean gain in producer surplus in the ban period (N1357.11 per ton) was

Table 4: Mean Real Prices of Rice during the Ban and Tariff periods (N/ton)

Period	Real Producer Price (RPP)	Real Consumer Price (RCP)	Real Border Price (RBP)	RCP-RBP	RCP-RPP
Ban (1987-1994)	3666.41	4559.18	3037.042	1522.13	892.76
Tariff (1995-2005)	2739.93	3779.16	2953.163	826.00	1039.22
t-values	1.70	2.23	0.2281	2.73	0.30

Source: Author's calculations

Table 5: Welfare Effects of Rice Import Policies in Nigeria (in N/ton)

Period	Loss in CS	Gain in PS	Tariff revnue	Loss in productn efficiency	Loss in consuptn efficiency	Net social welfare loss (Deadweight loss)
Ban (1987-1994)	-1796.41	1357.11	0.00	- 42.92	-274.27	-439.30
Tariff (1995-2005)	-975.75	555.59	253.96	- 16.43	-149.75	-166.18
t-value	-2.5558	4.4944		3.2232	1.8284	-2.3452

significantly higher than the mean gain in producer surplus in tariff period (N555.59 per ton) as indicated by the t-value of 4.4944. This confirms that imposition of ban generally favours the domestic producers more than tariff. Thus, the shift in policy from ban to tariff, even though remains protective, slightly disfavoured producers.

The lower producer prices observed in the tariff period (Table 4) could be attributed to improved production and processing technologies (and thus lower production and processing costs) which lowered the producer prices of the local rice brands relative to imported brands. This could be because rice producers in Nigeria began to adopt improved production and processing technologies recently (in the tariff period). Thus, the negative impact of high production and processing costs on producer prices is greater than the positive impact of import restriction policies on consumer prices. In terms of protection, import tariff policies may be indirectly favouring domestic producers more than total ban on importation. Therefore, it is logical to conclude that it is more imperative to direct efforts towards technologies that will increase production and processing efficiencies and reduce production and processing costs instead of at import restriction policies that will increase consumer prices which may: Benefit the middlemen more than the domestic farmers and millers and indirectly lower producers profit margin by discouraging improvements in production and processing technologies.

If we consider the protective effects (costs of protection) of these two policies on production as shown in Table 5, it is clear that the protective effect of ban is significantly higher than the protective effect of tariff. This implies that the imposition of outright ban and tariff resulted to loss in production efficiency to the tune of N42.92 per ton and N16.43 per ton, respectively (Table 5). These losses in production efficiency (which shows the inefficiency arising from increased domestic production and sub-optimal allocation of resources due to rise in prices caused by import restrictions) were found to be

significant at 10% thereby suggesting outright ban to be a policy measure that encourages huge wastage of production resources. Therefore, we conclude that rice producers in Nigeria were more efficient under the tariff regime and this could be attributed to their efforts to remain in the market by improving the competitiveness of their products against the imported rice brands.

The mean annual loss in consumption efficiency (which represents the inefficiency arising from low consumption due to higher prices caused by import restriction) in the ban period (N274.27 per ton) was higher than that of the tariff period (N149.75 per ton) as shown by the t-value of 1.8284. The reason is that domestic consumers paid higher prices for the commodity during the ban period and given the inelastic demand for rice in Nigeria, consumption remained fairly constant even at such higher prices.

Therefore, we can conclude that although both ban and tariff lead to distortions in the rice economy and encourages production and consumption inefficiencies within the sector, the inefficiencies caused by the imposition ban is more severe than those of tariff. However, given that revenue is generated by imposing tariff, there is tendency that such revenue if properly utilized can improve production and consumption efficiencies thereby making tariff a more welfare-maximizing policy than ban.

If government goes ahead to implement outright ban on rice importation, there is high tendency that domestic producers will make less effort to improve on their production and processing techniques. Instead they may devote more attention in lobbying the government to keep the ban measure in place and even assist the government in protecting the borders instead of channels such resources towards increasing their production and processing efficiencies. The resultant effect will be increased prices and poor quality of local rice brands, scarcity of high quality imported brands and drastic fall in consumer welfare.

Table 5 shows there was loss in consumer surplus throughout the period under review. The fall in the mean real consumer price of rice in the Nigeria domestic market from N4559.18 per ton during the ban period to N3779.16 per ton during the tariff period lowered the mean loss in consumer surplus from N1794.41 per ton during the ban period to N975.75 per ton estimated in the tariff period. The results also reveal that this difference in consumer surplus is significant at 5% as indicated by the t-value of -2.5558.

Apart from protection of domestic production, government imposes import restrictions partly to generate revenue especially when import taxes, tariff or custom duties are imposed. Tariff on imported items has been found to be the second-largest source of revenue in Nigeria after crude oil exportation. Table 5 shows that for each ton of rice imported into Nigeria, about N253.96 on the average was generated as tariff revenue by the Nigeria Custom Service. This tariff revenue is considered low and could be attributed to smuggling and under-aluing of imports by NCS as importers likely provide low value figures for their wares as observed by Oyejide *et al.* (2005).

Even though the mean gain in producer surplus in the ban period (N1357.11 per ton) is significantly higher than that of tariff period (N975.75 per ton), net social welfare loss in the ban period (N439.30 per ton) is higher than the net social welfare loss in the tariff period (N166.18 per ton) and could be attributed to the revenue generated in the tariff period. The net social welfare loss in the two periods significantly differs at 1% as indicated by the t-value of -2.3452. Hence, we conclude that there was no significant difference in net social welfare arising from these two policies. Therefore, there is no doubt that imposing ban on rice importation in Nigeria provides a higher and significant loss in social welfare than imposing import tariff.

The sum of estimated annual losses in production and consumption efficiencies of N317.19 and N166.18 per ton in the ban and tariff periods, respectively which shows the annual net social welfare loss (otherwise know as the deadweight loss) represents the total cost to the Nigerian society for imposing ban and tariff on rice importation in Nigeria. Thus, given the revenue generated in the tariff, the cost to the Nigerian society of imposing ban is almost twice the cost of imposing import tariff.

In a nutshell we can conclude from the above analyses that, although the local rice producers (farmers and millers) will gain from the implementations of import restriction measures (such as ban and tariff), the local consumers lose more than the producers gain. The imposition of ban does not significantly protect domestic production more than tariff but at the same time it brings about significant loss in social welfare due to huge loss in government revenues that would have been ploughed into economic activities that generate increased social welfare.

Therefore, while it is important to protect the domestic rice industry against unfavourable competition, it is also important that any protection measure should take into consideration consumer's welfare. For this reason the use of the more liberal tariff measure as an instrument of protection of domestic rice industry in Nigeria will not only improve the growth of the domestic rice sector but will also be more acceptable from the social welfare point of view.

POLICY IMPLICATIONS AND RECOMMENDATIONS

The above findings and conclusions from this study have led to the following policy implications which will ensure the designing of consistent and welfare-maximizing import plan capable of stimulating the growth of domestic rice industry. It is expected that the following steps should be taken.

There is need for the government to renew interest in the use of tariff as instrument of protection and such interest should be sustained. The current high tariff rate of about 120% should be sustained for at least 3 years and the tariff revenue generated should be used to establish a Rice Development Fund (RDF). The management of this fund should comprise all the stakeholders in the rice industry. However, the main objective is to use the fund to boost investments in research and infrastructure within the rice sector. The major areas of focus should be: proper funding of the current research on development of NERICA varieties, the provision of loans to rice millers for the purchase of de-stoning and polishing machines and Improving the source of energy supply to various rice mills in the country.

To ensure that protection policies have trickling down effect, it is imperative that the supply chain for rice be shortened. Thus, there is need to encourage farmers to form millers cooperatives. As rice paddy production in Nigeria is geography-specific, rice farmers within a particular locality can form cooperative and can be offered loans to install milling, de-stoning and polishing

machines. Agricultural extension officers have a lot to do in this regard and therefore need to be encouraged and motivated to ensure the sustainability of the millers' cooperative project.

Government through the ministry of agriculture at all levels and the ADPs should monitor the movement of rice paddy to ensure that all paddies taken to a particular mill are of the same variety to avoid uneven grains after processing.

Efforts should be made towards adequate equipment and motivation of the men of Nigeria Customs Services (NCS) in patrolling the borders to ensure effective combating of smuggling. However, there is need to design strategies for effective monitoring of activities of NCS to ensure that: They do not compromise, imports are not under-valued and tariff waivers are not granted to some importers under any guise.

It is expected that if the RDF is judiciously used to implement the necessary developmental objectives in the rice sector within the first three to four years, the quality of the locally produced rice brands must have increased tremendously. The next step will be to embark on vigorous enlightment campaigns to promote the improved quality of local rice and encourage the consumption of local rice brands. Government may also encourage consumption of local rice for a short period of time by offering some incentives to consumers in the form of consumption subsidies.

With the quality of local rice improved and consumption to a large extent shifted towards local rice within the first 4-6 years, then the high tariffs can be gradually reduced to usher in full free trade in the rice sector. However, it is expected that by this time, the domestic rice industry must have improved; stabilized and local rice brands must have been competitive with the imported brands. Thus, the imported brands would no longer be a threat to the growth of the domestic rice industry as local consumers may not easily differentiate between imported and local rice brands in terms of quality differentials.

With the above policy recommendations followed and implemented by all the stakeholders involved, there is no doubt that government will remain focused and consistent in implementing a long-term import policies capable of stimulating improvements in the quality of local rice brands. This will not only benefit the producers who will enjoy increased patronage and economies of scale through increased production and processing efficiency, but also consumers who will pay lower prices for higher quality local rice brands.

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