

Original article

Competitiveness and the Effects of Policies on Coffee Production in Nigeria

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Abstract

The study investigated the competitiveness and effects of policies on coffee production in Nigeria. Purposive sampling technique was used to select the study area and random sampling technique was used to select 72 coffee producers from the study area. Structured questionnaire was used to collect information from the respondents while the data retrieved from the questionnaire were analysed using descriptive statistics and Policy Analysis Matrix (PAM). The mean age of the farmers was 61 years, and 66.7% of the farmers were formally educated. The average age of coffee plantations in the study area was 31 years. The result of competitiveness of coffee production showed a positive private profit of ₦7,711.78 per hectare and Private Cost Ratio of 0.42. The result of Social Profitability shows a social profit of ₦43,718.50 per hectare, Domestic Resource Cost of 0.12 and Social Cost Benefit of 0.43. Furthermore, the result of the analysis showed Nominal Protection Coefficient of 0.41, Effective Protection Coefficient of 0.27 and Profitability Coefficient of 0.18, all these suggest that coffee production does not have policy protection in Nigeria.

Keywords: Competitiveness, policy, coffee, production, profitability

Introduction

Coffee as a crop is a member of the family *Rubiaceae*, a large family of over 5500 species widely distributed in the tropics. There are three species of coffee grown for commerce, these are *Coffea arabica*, which is highland coffee and it grows very well at altitude of 600m and above, it has a mild taste and is more fragile; *Coffea canephora* (popularly known as *Coffea robusta*), this is resistant and is lowland coffee thriving best at the altitude range of 0 to 750m above sea level and the third species is *Coffea liberica* which is a mild-altitude coffee thriving best at an altitude of 400m to 600m (Opeke, 2005). However, *Coffea arabica* and *Coffea robusta* are the two major species in Nigeria. *Coffea arabica* produces the best quality of coffee and still supplies the bulk of the world coffee, but it grows well only at cooler air temperature (Akinbode, 1980).

Coffee is used throughout the world and it is believed to have been brought to most of the countries during colonial period. Coffee became a cash crop and provides labor to many people in developing countries (James, 2000). Many countries are suitable for coffee production and the agricultural sector supported its planting (Cleland, 2010). According to Milford (2010), *Coffea arabica* and *Coffea robusta* are planted in almost all countries.

Despite the significance of the crop in the world market, its production encountered a downward trend in Nigeria in the last few decades. The major challenge was due to low price which is being offered by the buyer. However, low price of coffee results from the type of primary processing method being used by the farmers to process their coffee berries before selling. The impact of this was mainly felt by the producers than the consumers at the end of the marketing chain (Aderolu *et al.*, 2014). These assertions were corroborated by Alli *et al.* (2020), who reported low prices and poor farm management as major challenges of coffee farmers in Nigeria. Similarly, this trend caused immense hardship to countries where coffee is a key economic activity, as well as to the farmers who produce it. It was reported that losses resulting from coffee crisis made some producers to fall into debts while some took loans which they found difficult to pay back (CIRAD, 2009). Also, some have eventually been forced to sell their land and transfer their workforce to other farm activities. In many developing countries, low coffee production which resulted from poor pricing implies declining income for farming communities, especially for basics such as food, medicine and education of children. These affect the general welfare of the coffee farming households. Existing policies on coffee do

not appear to be yielding the desired results. Government policy is supposed to provide an avenue for monitoring and evaluating coffee production and hence put coffee production in the right position. Policy will also fashion out strategies for the regulation, pricing and exportation of coffee and its value added products. It is therefore, quite imperative that this study investigates the competitiveness and the effect of policies on coffee production in Nigeria. The outcome of the study therefore, is expected to assist relevant stakeholders in coming up with appropriate policies that will lead to the development of coffee value in Nigeria.

Materials and Methods

The study was carried out in Kogi State of Nigeria. Agriculture forms their predominant occupation of the populace alongside other vocations like trading, crafts, agro-processing among others. Substantial proportion of coffee production activities takes place in Kogi State of Nigeria. Apart from coffee, other major cash crops grown in the area include cocoa, kolanut, cashew, oil palm, orange and mango. The study employed multistage random sampling technique to select coffee farmers. The first stage involved a purposive selection of Kogi State because it is a major coffee producing State in Nigeria. The second stage involved a random selection of one Local Government Area (LGA), Ijumu LGA from the selected State. The third stage involved a random selection of 72 coffee producers from the selected LGA. Structured questionnaire was used to collect information from the selected respondents. The data retrieved from the information collected were analysed with the use of Policy Analysis Matrix (PAM). PAM is a product of two accounting identities, profitability, defined as the difference between revenue and cost while the other measure the effect of the divergences (distorting policies and market failures) as the difference between observed parameters and parameters that would exist if the divergence were removed (Monke and Pearson, 1989).

Private Profitability (PP) as well as Private Cost Ratio (PCR) were used to measure competitiveness of coffee production in the study area while Social Profitability (SP), Domestic Resource Cost (DRC) and Social Cost Benefit ratio (SCB) were used to measure comparative advantage.

Private Profitability (PP) – This demonstrates the competitiveness of the marketing system given current technologies, prices of input and output and policy.

$$\Pi = P_o Q_o - P_i Q_i \quad \text{Where:}$$

Π = Private Profit;

$P_o Q_o$ = Value of output produced at private prices;

$P_i Q_i$ = Value of inputs used at private prices.

Private Profit < 0 shows that the product is not competitive given current technologies, prices of inputs and outputs; Private profit = 0, operators are earning normal profit while private profit > 0 implies that the product is competitive given current technologies, prices of inputs and outputs, and policy.

Private Cost Ratio (PCR) - This shows the private efficiency of the marketing channels and is an indication of how much one can afford to pay domestic factors (including a normal return to capital) and still remain competitive.

$$PCR = \frac{\sum a_{ij} P_k^p}{Y_i^p P_i^p - \sum a_{ij} P_j^p} \quad \text{Where:}$$

$\sum a_{ij} P_k^p$ = Cost of domestic factors at private prices; $Y_i^p P_i^p$ = Revenue at private prices;

$\sum a_{ij} P_j^p$ = Cost of tradable inputs at private prices.

PCR < 1 indicates that the product is highly competitive;

the PCR > 1 implies entrepreneurs are making losses;

PCR = 1 indicates the breakeven point.

Social Profitability (SP) – The social profit reflects social opportunity costs and it measures efficiency and comparative advantage.

$$SP = \sum Y_i^s P_i^s - (\sum a_{ij} P_j^s + \sum a_{ij} P_k^s) \quad \text{Where:}$$

SP = Social profit;

$\sum a_{ij} P_j^s$ = Cost of tradable inputs at social price;

$\sum Y_i^s P_i^s$ = Revenue at social price;

$\sum a_{ij} P_k^s$ = Cost of domestic factors at social price.

A positive social profit indicates that the system uses scarce resources efficiently and contributes to national income (Nelson and Panggabean, 1991; Keyser, 2006), hence, the commodity has a comparative advantage. A negative social profit indicates social inefficiencies and suggests that production at social costs exceeds the costs of import, thus indicating that the sector cannot sustain its current output without government intervention at the margin.

Domestic Resource Cost (DRC) – The DRC indicates how much domestic resources are needed to generate an additional value of export revenue. It is a measure of relative efficiency of domestic production by comparing the opportunity of domestic production to the value generated by the product (Tsakok, 1990).

$$DRC = \frac{\sum a_{ij} P_k^s}{\sum Y_i^s P_i^s - \sum a_{ij} P_j^s} \quad \text{Where:}$$

$\sum a_{ij} P_k^s$ = Cost of domestic factors at social prices;

$\sum Y_i^s P_i^s$ = Revenue at social prices;

$\sum a_{ij} P_j^s$ = Cost of tradable inputs at social prices.

DRC of less than unity indicates efficiency of producing the goods domestically; DRC of more than unity indicates inefficiency in domestic production while a DRC of unity indicates a balance, in which case the country neither gain nor lose foreign exchange through domestic production.

Social Cost Benefit (SCB) - The SCB indicates how much greater the value of output created in relative to the associated cost of production estimated in social prices.

$$SCB = \frac{\sum a_{ij} P_j^s + \sum a_{ij} P_k^s}{\sum Y_i^s P_i^s} \quad \text{Where:}$$

$\sum Y_i^s P_i^s$ = Revenue at social price;

$\sum a_{ij} P_k^s$ = Cost of domestic factors at social price.

A ratio less than one indicates that an activity is profitable and a ratio that is greater than one shows that the activity is not profitable (Monke and Pearson, 1989).

The effects of government policies on coffee production in the study area were measured with protection coefficients. The protection coefficients used are Nominal Protection Coefficient (NPC), Effective Protection Coefficient (EPC) and Profitability Coefficient (PC).

Nominal Protection Coefficient (NPC) - The NPC is a measure of the extent to which domestic price policy protects the domestic marketers from the direct input of foreign market (Tsakok, 1990). It is the ratio of domestic price to a comparable world (social) price.

$$NPC_o = \frac{P_o^p}{P_o^s} \quad \text{Where:}$$

P_o^p = Private (domestic) price on output;

P_o^s = Social (world/border) price on output.

Nominal Protection Coefficient on output (NPCo) measures the effect of policy intervention on output prices. NPCo less than one indicates that domestic farm gate price is less than the international price for output and that policies were decreasing the market price. Hence, there is negative protection on output and this confirms the presence of taxes or any other policy that is detrimental to the realization of the maximum output while NPC greater than one indicates the presence of subsidies. It shows that the private price of the goods has been kept higher than the border price. This means that government policies provide incentives to the local producers of the goods thus enabling the producers to realize the maximum output.

Effective Protection Coefficient (EPC) - EPC is the ratio of the difference between the revenue in private price and cost of tradable inputs in private price to the difference between the revenue in social price and the cost of tradable inputs in social price. Hence:

$$EPC = \frac{Y_i^p P_j^p - \sum a_{ij} P_j^p}{Y_i^s P_i^s - \sum a_{ij} P_j^s} \quad \text{Where:}$$

$Y_i^p P_i^p$ = Revenue in private price;

$\sum a_{ij} P_j^p$ = Cost of tradable inputs in private price;

$Y_i^s P_i^s$ = Revenue in social price;

$\sum a_{ij} P_j^s$ = Cost of tradable inputs in social price;

An EPC greater than one suggests that government policies provide positive incentives to producers and hence the production of such goods are encouraged through introduction of subsidies and reduction or an outright withdrawal of tax while EPC that is less than one implies producers are not protected through policy intervention, hence producers face high taxation.

Profitability Coefficient (PC) - The PC shows the impact of all transfers on the profitability. It is an extension of the EPC to include factor transfers. It measures the incentive effects of all policies and thus serves as a proxy for the net policy transfer.

$$PC = \frac{Y_i^p P_i^p - (\sum a_{ij} P_i^p + \sum a_{ij} P_k^p)}{Y_i^s P_i^s - (\sum a_{ij} P_i^s + \sum a_{ij} P_k^s)}$$

Where:

$Y_i^p P_i^p$ = Revenue in private price;

$\sum a_{ij} P_j^s$ = Cost of tradable inputs in social price;

$Y_i^s P_i^s$ = Revenue in social price;

$\sum a_{ij} P_k^p$ = Cost of domestic factors in private prices;

$\sum a_{ij} P_j^p$ = Cost of tradable inputs in private price;

$\sum a_{ij} P_k^s$ = Cost of domestic factors in social price.

$PC > 1$ = Policy transfer income into the production system;

$PC < 1$ = Policy transfer income away from the production system.

Results and Discussion

Table 1 shows the socio-economic characteristics of coffee farmers. The table shows that the mean age of the farmers is 61 years. This shows that most farmers are aged. This is a negative implication to coffee production as some of the farmers will not have the needed strength to do farm work. There is a need to encourage youth into coffee production in the study area. The table also shows that none of the farmers has more than two hectares of farm, even about 55.6% of them do not have up to one hectare. All these indicates that the farmers are small scale farmers. The average age of coffee farms in the study area is 30 years. This indicates that most farms are old and are due for rehabilitation. Also, 66.7% of the farmers are formally educated. This is a good indicator towards an increased productivity as farmers will be able to read and interpret the result of any innovation given to them. The result of private profitability of coffee production among coffee producers is shown in Table 2. The result showed that coffee farmers had positive private profit of ₦7,711.78 per hectare. The result showed that the private profit for the farmers is positive. This implies that coffee production in the study area is competitive given current technologies, prices of inputs and outputs and the prevailing policies. Also, the coffee farmers are earning financial gains and can produce coffee without any assistance from the government. The result of Private Cost Ratio (PCR) indicated that coffee production by coffee farmers had a PCR of 0.42. The result showed that coffee production among the coffee farmers had PCR less than one. This shows that coffee production among coffee farmers is competitive given current technologies and the prevailing policies. Hence, the farmers are earning profit and can be able to pay for the domestic factors and the productive activities would still be competitive. The coffee producers were able to achieve this because their private factor costs were less than the value added in private price. This finding is in line with Adeoye and Oni (2014) who found out that plantain production in Nigeria was competitive. The result of the analysis of social profitability is shown in Table 3. The result showed that coffee producers had social profit of ₦43,718.50 per hectare. The result showed that coffee producers had positive social profit. This shows that coffee production in the study area is socially profitable. Hence, the coffee producers in the study area are utilizing scarce resources (such as labour and capital) efficiently in the production of coffee. This also means that coffee production by coffee farmers can survive without government interventions. The result of the analysis of Domestic Resource Cost showed that coffee producers had DRC of 0.12. From the result, it was discovered that the DRC for coffee production was less than one. This indicates that there is efficiency in the production of coffee domestically.

Table 1: Socio-economic variables of the respondents.

Variables	Frequency	Percentage
Age of respondents (Years)		
≤ 40	8	11.11
41-50	16	22.22
51-60	8	11.11
> 60	40	55.56
Total	72	100
Mean	61	
Marital Status		
Single	0	0
Married	64	88.89
Widow/widower	8	11.11
Total	72	100
Educational Status		
Non-formal education	24	33.33
Primary education	16	22.22
Secondary education	8	11.11
Tertiary education	24	33.33
Total	72	100
Association membership		
Member	48	66.67
Non-member	24	33.33
Total	72	100
Cropping System		
Sole Coffee cropping	16	22.22
Coffee/arable cropping	40	55.56
Coffee/tree cropping	16	22.22
Total	72	100
Farm size (Ha)		
< 1	40	55.56
1-2	32	44.44
Total	72	100
Age of Coffee farm (Years)		
≤ 10	8	11.11
11-20	24	33.33
21-40	24	33.33
> 40	16	22.23
Total	72	100
Mean	30	

Table 2. Competitiveness of coffee production among coffee farmers

Indicators	Value
Private Profitability (PP)	₦7,711.78
Private Cost Ratio (PCR)	0.42

It shows that the value of domestic resources utilized in coffee production is lower than the value added and therefore there

is an efficient use of domestic resources in coffee production. Coffee production is therefore said to be economically profitable and is having a comparative advantage. The result of the analysis of SCB showed that coffee production had SCB of 0.43. The result shows that the SCB of coffee production for coffee producers was less than one indicating that the sum of both the tradable inputs and domestic factor costs are less than the gross revenue under the prevailing production conditions. Coffee production among coffee producers is therefore profitable. However, the lower the SCB, the higher the degree of efficiency of the system.

Table 3. Comparative Advantage of Coffee Production Among Coffee Producers

Indicators	Value
Social Profitability (SP)	₦43,718.50
Domestic Resource Cost (DRC)	0.12
Social Cost Benefit (SCB)	0.43

The result of the analysis of Nominal Protection Coefficient on Table 4 showed that the NPC for coffee producers was 0.41. It could be observed from the result that the producers had NPC of less than one. This indicates that the domestic price of coffee is less than the border price. Therefore, there is negative protection on the domestic price of coffee beans and there is disincentive on output prices as it relates to producers. This confirms the presence of taxes or any other policies that are detrimental to the realization of maximum revenue from coffee production. The table further showed that the Effective Protection Coefficient (EPC) for coffee production was 0.27. The result showed that the EPC for coffee production was less than one. This shows that the value added at the market price was lower than the value added at the international price. Hence, the coffee producers are not protected through policy intervention. The result of the analysis of Profitability Coefficient (PC) showed that the PC for coffee producers was 0.18. The PC for the coffee producers was less than one. This indicates that the private profit was less than the profits evaluated at the world reference price. Hence, there is lack of incentive in the marketing system. The result corroborates the findings of Oluyole et al. (2016) who discovered in their studies that cocoa farmers' output prices in Southern Nigeria were not protected.

Table 4. Protection Coefficients on Coffee Production among Coffee Producers

Indicators	Value
Nominal Protection Coefficient (NPC)	0.41
Effective Protection Coefficient (EPC)	0.27
Profitability Coefficient (PC)	0.18

Conclusion and recommendation

Coffee production was privately profitable. This was indicated by the findings from the analysis of Private Profitability and Private Cost Ratio. There was comparative advantage in producing coffee in Nigeria as revealed by the result of the analysis of Social Profitability, Domestic Resource Cost and Social Cost Benefit. However, the existing

government policies on agriculture did not protect coffee production as indicated by the result of the analysis of Nominal Protection Coefficient, Effective Protection Coefficient and Profitability Coefficient. Hence, resources were diverted away from the system and the system could have been taxed.

The study recommends that farmers should increase their farm sizes and prepare for replacement stock as the farms are already old. These will have positive impact on the output and profitability of the coffee plantations. Also, efforts should be made on the part of government and other stakeholders in the agricultural and coffee subsector to strengthen subsidizing agricultural inputs to coffee farmers. This is quite imperative because findings from NPC, EPC and PC have shown that farmers were not deriving incentives (such as subsidized inputs) from government policies.

Conflict of Interest: We declare that there is no conflict of interest in this research article.

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