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Measuring the Degree of Market Power in the Export Demand for Nigerian Cocoa: An Analysis of Dutch Market

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Abstract: The study examined the degree of market power in the export demand for Nigerian Cocoa with focus on the Dutch Market. The study covered the periods of 1961–2007 and data comprised published national aggregates on specific trade and macroeconomic variables from reputable sources. Two Stage Least Squares (2 SLS) approach was used in the estimation after instrumenting for simultaneity and establishing stationarity alongside cointegration relationship. Findings, on the demand side, showed that the demand for cocoa increases as income of Netherlands (importing country) increases. Total production of the non–participating countries traced out a positive relationship with demand for cocoa by the importing country while the coefficient of price of Coffee (substitute crop) possessed a negative sign. On the supply relation side, the demand for the export crop has a negative sign, indicating decreasing marginal output with respect to cost while the proxy for ocean freight rate with its negative sign, imply increasing export cost. The result further showed that there is relative competitiveness in the Dutch market on the strength of a market power coefficient -0.712 with a Lerner index of 0.122. Based on the findings, the study calls for government intervention in the agricultural export subsector with the aim to revitalize the country's agricultural export capacity and enhance her market power via increased market shares. These interventions could be in the form of input/production subsidies, targeted export promotion programs, farm settlement, expanded export processing zones to mention but a few.

Keywords: *Market power; export demand; cocoa; Dutch Market.*

1. Introduction and Literature Review

Agricultural export has played a prominent role in Nigeria's economic development. Drawing its strength from the largest sector (agriculture), such important roles include contribution to employment, food production, foreign exchange and industrial inputs (Omonona *et al*, 2007). Among the export crops from Nigeria, Cocoa is the most prominent in terms of production and export capacities. Since the introduction of the crop into Nigeria in about 1874 (Oyedele, 2007), it has grown to be a major export crop. Nigeria is the third largest producer of cocoa in Africa, producing about 12 percent of the total world production behind Ivory Coast which produces 35 percent and Ghana's 13 percent (Wilcox and Abbot, 2004). Currently, the production capacity of cocoa in Nigeria has reached about 385, 000 metric tonnes per annum, an increase of 215, 000 metric tonnes from year 2000 production level. This disposition places Nigeria as the fourth highest cocoa producing nation in the world after Ivory Coast, Indonesia and Ghana (Erelu, 2008). In Nigeria, Cocoa is largely produced on a small scale and the average delivery per farmer is less than 5 bags (roughly 300kg per hectare of cocoa) per season. In terms of capacity, Ondo State is rated as the largest cocoa producing state in Nigeria (Oluyole, 2005).

Prior to the oil boom era in Nigeria, cocoa, cotton, groundnut, oil palm products and rubber were the principal export crops but with export re-orientation, only cocoa remained of any importance after 1975. With assistance from the World Bank, the government restored cocoa production in the late 1970s and 1980s through replanting programs and producer price supports. Despite those efforts, downward trend in Nigeria's non-oil export to which cocoa belongs has been observed. This was touted to result from the collapse of the international primary commodity markets with the associated deterioration in the terms of trade (Nwachukwu *et al*., 2010). Nigeria seems to have an added advantage over major agricultural producers

and exporters in the Eastern and Southern Africa in terms of fertile land, proximity to traditional and terminal markets in Europe by air or by sea (Sasore, 2004). Roughly all the agricultural exports from Africa go to the European Union and America and almost in its primary form without any appreciable value addition.

As an index of degree of competitiveness of the industry, market power reflects the wedge between price and marginal cost. Its existence is tied to the demand conditions the firm faces. Market power issues in the agricultural sector have received increasing attention as firms consolidate throughout the marketing chain (Sexton and Zhang, 2001). Although consolidation itself does not automatically pre – destine a sector to imperfect competition, it is an often cited characteristic that may increase the incidence of market power. Imperfect competition is common in international agricultural commodity markets. Agricultural commodities are commonly produced in certain countries due to natural conditions and consumed all over the world. This situation enables a small number of countries or even a single country to dominate export shares in the world market, which potentially induce market power mechanism (Susanto, 2006).

Over time, there seemed to be a downward trend in Nigeria's non-oil export resulting from the collapse of the international primary commodity markets with the associated deterioration in the terms of trade. However, for the agricultural export subsector in Nigeria, because the export commodities are in their primary forms, international prices have generally been on the decline and unattractive. This is in addition to Nigeria's often volatile foreign exchange regimes which have rendered farmer's incomes (producer prices) from export static at best, if not dropping; hence it becomes fairly difficult to sustain production. This is particularly true in Nigeria where production costs are generally high and immobile (Daramola *et al.,* 2007). It has also been observed that those unfavorable domestic terms of trade for agricultural exports, loss of market power and declining output are the principal contributors to the dismal performance of traditional exports, and those factors reflect in the interaction of inappropriate domestic pricing policies and external shocks. It is hoped that the outcome of this study will form a formidable basis for formulating appropriate sub – sectoral policies and dependable platform for taking informed decisions cum act as a reference to further studies. As such, wider interest will be stimulated in this study area and attention drawn to the need for redefining, revitalizing and re-diversifying Nigeria's economic prosperity. In the light of the foregoing, the study aimed to estimate the degree of market power of Nigerian Cocoa in the Dutch Market.

2. Methodology

Sources of Data: The data employed were national aggregates that were obtained from secondary sources. The data covered the periods 1961 – 2007. The major sources include several issues of the Production Yearbook published by the Food and Agriculture Organization (FAO), FAOSTAT website, the National Bureau of Statistics (NBS) Annual Abstract of Statistics and several issues of the Central Bank of Nigeria's (CBN) Annual Reports and Statement of Accounts, United Nations and World Bank databases.

Theoretical Framework: The theoretical framework adopted for this study is the New Empirical Industrial Organization (NEIO) in the form of oligopoly model. It emerged due to the dissatisfaction with the Structure – Conduct – Performance (SCP) framework which dominated empirical work in 1960s and 1970s (Sexton, 2000). This is because it provides a general model of industry pricing within which it is possible to model competition, monopoly and all degrees of oligopoly. Suppose that an industry consisting of n-firms produces a homogenous output with identical costs. The market demand function can be written as:

$$Q_t = Q(P_t, Z_t) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where P_t is the single price in the market and Q_t is the total quantity consumed at time t (industry output). Z_t is a vector of exogenous variables that shift the demand for Q_t. Since price and output are simultaneously determined, the demand function can equally be written as:

$$P_t = P(Q_t, Z_t) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Equations (1) and (2) are assumed to be well behaved such that they obey the following conditions: (a) P(0) is greater than zero, which ensures that there are positive prices, (b) The demand is downward sloping, that is if $Q > 0$ and $P(Q) > 0$, then $P'(Q) < 0$, and (c) The demand curve cuts both axes such that if $Q > 0$, then $QP(Q)$

$\leq$ M where M is a finite number. Condition (c) imposes a bound on total revenue and eliminates any chance for firms to have infinite profits.
In a standard economic form, total revenue (R) equals the product of price and quantity demanded:

$$R_t = P_tQ_t \qquad \text{...(3)}$$

Hence perceived marginal revenue, $MR_t(\lambda)$, is given by

$$MR_t(\lambda) = P(Q_t, Z_t) + \lambda Q_t \left[\frac{\partial P_t(Q_t, Z_t)}{\partial Q_t} \right] \qquad \text{...(4)}$$

Where λ in (4) is a new parameter to be estimated that can be interpreted as an index of the degree of competitiveness of the industry, reflecting the wedge between price and marginal cost. As will be shown subsequently, λ also nests an index of the beliefs that other firms react to their output choices, i.e. a "conjectural variations" parameter. The numerical value of λ is a constant between zero and one. If the firms in the industry act like price takers, then λ= 0 and perceived marginal revenue equals price (the profit maximization solution for perfect competition). That is, these firms act as though they face a horizontal demand curve at an exogenously determined price. When λ=1, the industry behaves as a monopolist or perfect cartel, which gives the solution of perceived marginal revenue equals marginal costs. An intermediate λ's correspond to oligopoly or monopolistic competitive concepts. Under Cournot model, for instance, $\lambda = 1/n$ since each firm in the industry produces the same amount at equilibrium conditions.
Providing that the aggregate cost function is given by:

$$C_t = C(Q_t, W_t) \qquad \text{...(5)}$$

Where C_t is total cost of producing Q_t and W_t *is* a vector of exogenous cost-shifters, the equilibrium condition for the industry is achieved when perceived marginal revenue equals marginal cost. This relationship can be written as

$$P(Q_t, Z_t) + \lambda Q_t \left[\frac{\partial P_t(Q_t, Z_t)}{\partial Q_t} \right] = \frac{\partial C(Q_t, Z_t)}{\partial Q_t} \qquad \text{...(6)}$$

This can also equivalently be written as

$$P(Q_t, Z_t) = \frac{\partial C(Q_t, Z_t)}{\partial Q_t} - \lambda Q_t \left[\frac{\partial P_t(Q_t, Z_t)}{\partial Q_t} \right] \qquad \text{...(7)}$$

Equation (7) is usually called the general supply relation because it allows for non-price taking conduct and is central to the inferences drawn about market power in any particular study. By estimating equation (2), one can obtain an estimate of the slope of the demand curve, $\partial P_t(Q_t, Z_t)/\partial Q_t$. Furthermore, based on that estimate and an estimate of the optimality equation (6) or (7), one can obtain an estimate of λ and MC, where marginal cost (MC) is assumed to be constant with respect to output. That is, estimating equation (7) will give an estimate of the product λ and the demand slope of equation (2). The index of market power λ can be obtained through dividing this composite parameter by the slope of the inverse demand obtained from estimating (2).
At this point, it is worth noting that the parameter of market power λ has many interpretations. There are two possible interpretations of λ. First, λ is a measure of the equilibrium wedge between price and marginal cost. This interpretation, which Perloff (1992) called the general interpretation of λ can be demonstrated by equation (9) where

$$P_t(.) - \partial C(.)/\partial Q_t = -\lambda Q_t (\partial P_t(.)/\partial Q_t \qquad \text{... (8)}$$

In several empirical studies, an index is employed to measure market power generally called the Lerner Index. Using Lerner index of monopoly power, one can demonstrate the following results

$$L = \frac{P - MC}{} = \frac{-\lambda Q_t (\partial P_t(.)/\partial Q_t)}{} = \frac{\lambda}{}$$

P P ε …… (9)

Where ε is the market demand elasticity. Therefore, λ can be interpreted as an index of market power or structure

Method of Data Analysis and Model Specification: The method used is two stage least squares approach. This is based on the fact that there is simultaneous relationship between the variables. In order to evaluate the degree of market power in Netherlands, equations 1 and 7 were invoked and implicitly stated thus:

$Q_i = \alpha_0 + \alpha_1 P_{it} + \alpha_2 P_{st} + \alpha_3 I_t + \alpha_4 PI_{it} + \alpha_5 W_{it} + \varepsilon_{it}$ ……(10)

Where Q_i = the quantity of export crop to destination country i

P_{it} = Real export price of the crop

P_{st} = Real export price of coffee (substitute crop) in the destination country

I_t = Income proxied by the GDP of Netherlands (destination country)

PI_{it} =The interaction term, which is the product of P_{st} and I_{it}.

W_{it} = Total production of the export crop excluding participating

countries in the destination market

$\alpha_{;s}$ = Parameters to be estimated

ε_{it} = Error term

Following Bresnahan (1989); Buschena and Perloff (1991) and Susanto (2006), suppose that the aggregate marginal cost of production takes the following functional form:

$MCt = \emptyset_t V_t + \emptyset_t C_t + \varepsilon_{it}$ ……(11)

Where:

MC_t = Marginal cost
V_t = Variable cost of producing the export crop proxied by a ratio of the producer price (in local currency) to a measure of the domestic price. This models the cost of production
C_t = Ocean freight rate proxied by the ratio of the export price to the producer price was used. The price paid to producers represents a cost to exporters

Applying the condition for equilibrium in an imperfectly competitive industry where perceived industry marginal revenue is equal to the marginal cost, we have the optimality equation (supply relation) and specified thus:

$$P_{it} = \emptyset_0 + \emptyset_a Q_{it} + \emptyset_b V_t + \emptyset_c C_t + \lambda \left[\frac{Q_{it}}{\alpha_1 + \alpha_4 I_t} \right] + \eta_{it} \quad \text{.....(12)}$$

All variables are as previously defined and λ is an index of market power.

Rearranging equation (12),

$P_{it} = \alpha_0 + \alpha_1 Q_i + \alpha_2 P_{st} + \alpha_3 I_t + \alpha_4 PI_{it} + \alpha_5 W_{it} + \varepsilon_{it}$ ……(13)

On the basis of theory, Q_i is observed to be endogenous and has to be instrumented if statistical test indicates potential simultaneity between Q_t and P_t.
Since the own quantity Q_t in equations (10) and (11) is potentially endogenous because of the simultaneous relationship with own price, P_t, Hausman specification test was implemented following the reduced form equation employed to obtain an instrumental variable.

$$Q_t = \beta_n IV_n + \varepsilon_{it} \quad \ldots\ldots(14)$$

Where:

IV denotes instrumental variables – a vector of exogenous or predetermined variables which are strongly correlated with Q_t but not correlated with the error term.
β_n = Vector of coefficients to be estimated

ε_{it} = Error term

The IV includes all the exogenous variables in the demand and optimality equations.

The instrumented demand and optimality equations are thus:

$$Q_i = \alpha_0 + \alpha_1 P_{it} + \widehat{\alpha_2 P_{st}} + \alpha_3 I_t + \alpha_4 PI_{it} + \alpha_5 W_{it} + \varepsilon_{it} \quad \ldots\ldots(15)$$

$$\widehat{P_{it}} = \emptyset_0 + \emptyset_a Q_{it} + \emptyset_b V_t + \emptyset_c C_t + \lambda \left[\frac{Q_{it}}{\alpha_1 + \alpha_4 I_t} \right] + \eta_{it} \quad \ldots\ldots(16)$$

From the simultaneous equations above, the endogenous variables are:

Q_{it} = the quantity of export crop to destination country i
$\widehat{P_{it}}$ = Real Export Price of the crop (instrumented)

The pre – determined variables are:
P_{st} = Real export price of substitute crop in the destination country
I_t = Income proxied by the GDP of the destination country
PI_{it} = The interaction term, which is the product of P_{st} and I_{it}.
W_{it} = Total production of the export crop excluding participating countries in the destination market.
V_t = Variable cost of producing the export crop proxied by the ratio of producer price to the domestic price
C_t = Ocean freight rates proxied by the ratio of export price to the producer price, reflecting cost of export
λ = Market power index
The model is overidentified and thus was estimated with two – stage least squares (2SLS) given its simultaneous equation posture. The approach (order condition) for solving the identification problem followed Thomas (2007) who averred that if the equality sign is satisfied, that is if (K – M) = (G – 1), the equation is exactly identified. If the inequality sign holds, that is, if (K – M) > (G – 1), the equation is over identified. Where:
G = total number of equations (= total number of endogenous variables).
K = number of total variables in the model (endogenous and predetermined)
M = number of variables, endogenous and exogenous, included in a particular equation.
The lerner index is stated thus:

$$L = \frac{P - MC}{P} = \frac{-\lambda Q_t (\partial P_t(.)/\partial Q_t)}{P} = \frac{\lambda}{\varepsilon} \quad \ldots\ldots(17)$$

3. Results and Discussion

Summary Statistics of the Data: The summary statistics for all the variables employed in the study within the period of the study, 1961-2007 are presented in Table 1. All the price variables were deflated using consumer price index (CPI) in conformity with Susanto (2006). Based on trade statistics of FAO (2009), Netherlands was selected on the strength of her consistency over the years as Nigeria's trading partners in Cocoa. The major participating countries in the Dutch market employed by the study are Cameroun, Cote d'Ivore, Ghana, Indonesia and Malaysia and they were chosen based on the fact that they supply at least 1000 tonnes per annum to the market.

During the study period, the minimum and maximum total export quantity of cocoa was 9,289.00 tonnes and 305,550 tonnes with a mean of 180,331.83 tonnes. The corresponding standard deviation of the quantity exported was 46,386.38, implying variability in the data over the period. The gap between the minimum and maximum values of both crops was quite large, which implied that there had been tremendous increase in their export volumes during the period of study. Similar increases were also recorded in the quantity of cocoa exported to Netherlands during the period. The export price of the commodity showed similar upward trend during the sample period. The difference between the minimum and maximum prices for cocoa was $2,426.91 per tonne representing 179.10 percent increase. Probably, increase in price may have contributed to increase in the quantity exported in line with theory. More so, the price of substitutes (coffee) rose tremendously. The gross domestic product (GDP) showed an upward trend as revealed by the difference between the minimum and maximum values. This reflected enhanced prosperity of the importing country.

Table 1: **Summary Statistics of the Data**

Variable	Mean	Minimum	Maximum	Std. Dev
Export quantity (tonnes)	180331.83	9289.00	305550.00	46386.38
Export Value ($000)	226878.49	28695.00	638328.00	120537.75
Export quantity to Netherlands (t)	30556.93	7183.00	147595.00	38153.38
Export price ($/000)	1355.09	391.00	3782.00	716.55
Export price of substitute ($)	1740.11	639.00	4487.00	974.09
Producer price (N)	96035.62	10158.00	267435.00	47716.17
World prod. less Participating Countries (t)	1119198.21	412784.00	11162885.00	1560316.05
GDP of importing Country ($b)	240.04	15.29	776.12	198.91
Value of Agric. Export	12938340.15	471901.00	6605000.00	13295894.01
Value of World Agric. Export	3.20	0.14	14.00	3.31
Real Exchange rate	74.50	0.02	201.00	72.26
Annual average rainfall (mm)	1295.8	897.00	1597.00	172.05

Preliminary Tests (Stationarity and Cointegration tests): The variables for both the demand function and supply relation of cocoa exports was subjected to stationarity and cointegration tests in line with time series econometrics and their results presented in Tables 2. It could be observed in Table 2 that all the variables that were subjected to the ADF unit root test were not stationary in their level form for cocoa at all levels of significance. On application of the ADF test on their first difference terms after logging, they became stationary as shown by the values of the ADF test, which are larger (in absolute terms) than the standard critical values.

To also confirm stationarity, the variables were also subjected to PP test which was believed to give robust estimates. All the variables became stationary in their first difference terms. Hence, they are integrated of order one, 1(1).

Table 2: Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) Tests for Integration Order for Cocoa

Variable	ADF		PP	
	1(0)	1(1)	1(0	1(1)
Q_t :	-3.09	-4.471	-3.173	-4.191

P_t :	-2.997	-4.990	-3.101	-4.201
P_{st}:	-2.241	-4.325	-3.112	-4.182
I_t :	-3.024	-7.290	-2.379	-5.463
PI_t:	-3.039	-4.764	-3.115	-4.634
W_t:	-2.690	-4.863	-3.038	-4.032
C_t :	-3.018	-4.895	-2.618	-6.697
V_t :	-3.117	-4.982	-2.817	-4.877

NB: Critical values of ADF at 1%(***), 5%(**) and 10%(*) are -4.196, -3.520 and -3.192 respectively. The PP test critical values at 1%(***), 5%(**) and 10%(*) are -4.187, -3.516 and -3.190 respectively.

The co integration test was preceded by the performance of ordinary least squares (OLS) estimation on the variables in levels to estimate the long run relationship. The residuals generated from the OLS estimation were subjected to the cointegration test. The results of the cointegration test for demand function and supply relation for the export commodity are presented in Table 3. The result of the residual based cointegration test showed that the regression residual of both the demand function and supply relation for cocoa were stationary. Both the ADF and PP tests were applied but the critical values of the latter were relied upon. Dittmann (2002) argued that Phillips-Perron test when applied to residual based cointegration determination is more powerful than the ADF test. Based on the critical values, it could be inferred that there exists a cointegration relationship in both demand function and supply relation equations for cocoa.

Table 3: Results of Residual Based Cointegration Test for Nigerian Cocoa

Model	**ADF**	**PP**
Demand Function	-2.750***	-2.751***
Supply Relation	-3.562***	-3.562***

NB: Critical values of ADF at 1%(***), 5%(**) and 10%(*) are -2.641, -1.950 and -1.607 respectively.

Prior to estimation and given that own quantity was potentially endogenous because of the presence of simultaneous relationship with own price, Hausman specification test was performed and the result shown in Table 4. It could be observed that there is simultaneity since the results are significant and the null hypothesis of no simultaneity between P_{it} and Q_{it} rejected at 5% level of probability for Cocoa.

Table 4: Results of Simultaneity Test

Export Crop	**Destination Country**	**Test Statistics**	**Simultaneity**
Cocoa	Netherlands	2.307**	Yes

Market Power Estimation by Two Stage Least Squares (2SLS): Having found that the model is overidentifed after the simultaneity test, the two stage least squares (2SLS) method was applied in order to realize unbiased and consistent estimates and the results presented in Table 5. In the demand function for cocoa export, the coefficients of the income of Netherlands (importing country) and total production of non – participating countries have positive coefficients and are statistically significant at 1% probability level. Real export price of substitute crop (Coffee) possessed a negative coefficient and significant at 5 % level of probability. The positive sign implies that the quantity demanded by the importing country increases as their income and world production excluding participating countries increase. The direct relationship between income and quantity demanded is in tandem with the theory of demand as reported by Adegeye and Dittoh (1985). However, the sign identity of the total production of non – participating countries contradicts a priori expectation based on the understanding that non – participants' production increases as demand for the commodity from Nigeria increases. This can only hold true if the cocoa beans from Nigeria have much higher quality than those from most other countries.

The negative sign possessed by the coefficient of price of the substitute crop is not in line with a priori expectation and established demand theory. Although the outcome is surprising, one possible reason is that import decisions are often motivated by political rather than economic rationale. Over the years, Netherlands has remained one of Nigeria's trading partners which show that their bilateral relations have been cordial.

More so, Coffee the substitute crop may not have enjoyed consistent patronage over the years in the Netherlands market.

In the supply relation, the quantity of cocoa exported had a negative sign which indicates decreasing marginal output with respect to cost. This is plausible since Nigeria falls within the rank of developing nations and has been operating below optimal capacity. Nkang *et al* (2006) averred that negative elasticity could probably be attributable to failure of farmers to replace their old and low – yielding cocoa trees with high yielding ones. Beyond this, rising production costs especially labour costs are known to partially offset output price increases. The ocean freight rate which was proxied by rate of export price to producer price had a negative coefficient. This result is consistent with Deodhar and Sheldon (1997) who had a similar sign for ocean freight rate in their study on market power in the world market for soy meal exports.

The coefficient of market power was quite high in magnitude (-0.714) and significant at 1% probably level. Applying the Lerner index, it was realized that the Cocoa had a Lerner index of 0.122. Given its magnitude, the Dutch market for cocoa is competitive. This probably accounts for continued patronage of cocoa beans from Nigeria despite increased production by non – participating countries. With respect to the negative sign of the index, Sperling (2002) reported that the negative coefficient of the market power parameter implied an oligopoly mark up, indicating that exporters are better off under monopoly rather than a mark down. According to De Wulf (2004), a good is competitive if it can coexist with imports where domestic production is not sufficient to satisfy the domestic market, and can be exported when it is in surplus supply. In case it is not competitive, the commodity needs to be protected against imports to let production take place at all in the country, and the commodity cannot be exported. Given that market power is interpreted as an index of degree of competitiveness of the industry, it could be inferred that Nigeria has competitive advantage in the export of Cocoa to the Dutch market.

In terms of the diagnostic statistics, the demand function and supply relation of export crop have appreciable R^2 estimates and F – ratios, implying reasonable explanation of variations in the quantity demanded and overall significance of the model respectively. The DW estimates showed absence of autocorrelation in the model given that it fell within 1.5 – 2.5 range.

Table 5: Estimation of Market Power of Cocoa Export in the Dutch Market using 2SLS

Variable	Cocoa
Export Demand	
Intercept	11.531***
	(2.930)
Real export price	0.951
	(0.244)
Real export price of substitute	-0.802**
	(-2.038)
GDP of destination market	7.284
	(2.840)
Interaction term	-0.553
	(-0.155)
World prod. less market participants	0.497***
	(2.818)
R^2	0.529
F – Ratio	7.639
Supply Relation	
Export quantity	-0.877***
	(-2.812)
Variable cost of production	-0.091
	(-0.794)
Ocean Freight Rate proxied by	

Cost of export	-0.992***
	(-3.849)
λ	-0.714
	(-3.074)
R^2	0.622
F – Ratio	13.982
	(3.015)
DW	1.59

NB: Figures in parentheses are t-test Values
***, ** and * represent significance at 1%, 5% and 10% probability levels respectively.

4. Conclusion

The aim of the study was to measure the degree of market power in the export demand for Cocoa with focus on the Dutch market. With the use of two stage least squares technique after testing for stationarity, cointegration and instrumenting for simultaneity, the data covering 1961 – 2007 periods were employed in the model estimation.

The first result is that the demand for cocoa increases as the income of the importing country (Netherlands) increases. This is a robust finding and consolidates a priori expectation. Second, total production of the non – participating countries traces out a positive relationship with demand for cocoa by the importing country, contrary to theoretical underpinnings. Third, the coefficient of the price of the substitute crop has a negative sign, suggesting an inverse relationship with export demand for cocoa. On the supply relation front, the demand for the export crop has a negative sign, indicating decreasing marginal output with respect to cost while the proxy for ocean freight rate with its negative sign, imply increasing export cost. The coefficient of market power is -0.712 with a Lerner index of 0.122, indicating existence of relative competitiveness in the Dutch market. Finally, government intervention in the agricultural export subsector is necessary to revitalize the country's agricultural export capacity and enhance her market power via increased market shares. Output needs to grow first before exports can take place. These interventions could be in the form of input/production subsidies, targeted export promotion programs, farm settlement, expanded export processing zones to mention but a few. Further research efforts are anticipated in the area of our export and import markets.

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