# Analysis of the Response of Agricultural Export Commodities to Price and Exchange Rate Reforms in Nigeria, 1986 -2007

**BY**

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**Abstract**

*This paper investigated the extent to which price and exchange rate reforms have affected the output, prices and export supply of selected agricultural export commodities in Nigeria. The Nerlovian adaptive expectation model was adapted for analysis following the work of Njiforti (2005) and Kwanashie et al (1998a and 1998b). Cocoa, coffee, palm kernel, palm oil, cotton and rubber were selected to represent agricultural export commodities (tradables). The analytical framework constituted of three blocks (the output block, price block and export supply block). Each of the block consisted of set of regression equations for the selected tradable agricultural crops. The estimation result in block 1 indicated that, the individual crops had different patterns of responses to policy instruments. The estimated elasticity coefficients were generally low; the short-run elasticities for all the crops were lower than the long-run values. This finding was somehow expected as most cash crops production need longer gestation period to maturity. The characteristics of each crop are different, the climatic conditions and spatial distribution are also different. In block 2 (ie price block), the nominal exchange rate variable was significant at 1% probability level in all equations. This indicated that the nominal devaluation of the Naira/US$ exchange rate had positive impact on absolute domestic prices of the selected tradable commodities. Devaluation of the naira gave rise to increase in foreign demand for domestically produced goods. This subsequently gave rise to increase in their prices, given the short run inelastic supply of these commodities. Increase in their prices subsequently gave rise to increase in output as abandoned coffee and cocoa farms were revisited, and new investors came into farming to take advantage of these high prices. In block3, (export supply block), cocoa and cotton responded significantly and positively to price variable. The coefficients for Palm produce, rubber and agro-processed commodities were not significant. Estimates of the short run export elasticities were noted to be very low for the commodities investigated. In addition, they were lower than their long run counterparts. Cotton had higher elasticity values for the export crops both in the short run (1.005) and long run (1.148) respectively. The high elasticity response of cotton export was due to the short gestation period for cotton production. Based on the findings in this paper, liberalization of price and exchange rate were not able to boost the output of the selected export commodities as anticipated. The export reform structure was not adequate for Nigeria. There is the need for more problem oriented programme to boost Nigeria agricultural export commodities. To overcome the export constraint problems, Nigeria should bid for strategic advantage position in world trade to compete favourable in the international scene.*

**Key works: Agricultural output, Output Prices, Export supply, Exchange rate, tradable agricultural output**

## 1.0 Introduction

Agricultural policy in Nigeria has witnessed several changes since the colonial and post independence years (Yusuf, 2004). The policies and programmes were usually centred towards stimulating greater activities in certain specific aspects of agricultural production system. Before independence, emphasis was on the production of cash crops, such as rubber, cotton, groundnut, oil palm and cocoa, while after independence the rising food shortages shifted the focus to food crops production (Njiforti, 2008).

One of the major thrust of the economic reforms programme was the radical adjustment of agricultural pricing and exchange rate policies. The erstwhile Commodity Boards that were charged with fixing product prices and purchasing agricultural products from the farmers were dissolved and free market forces were allowed to play a prominent role in determining prices of agricultural products. This was expected to ease farmers' marketing problems and allow them to sell the outputs locally at market prices and externally at world market prices. On the other hand, devaluation of the naira exchange rate was expected to enable Nigeria's agricultural commodities to be more competitive in the world market (Ihimodu 1993).

The first major impact of the economic reforms programme was the increase in prices of agricultural products. As observed by Shonekan (1988), farmers received higher prices for the products during the reforms period than before. The prices of crops like cocoa, cotton, palm produce and coffee increased significantly. However, as noted by Ihimodu (1993), the increases in the prices of these crops were in nominal and not in real terms. In a study carried out by Phillip (1990), the price trends during the post SAP period expressed as indices of nominal prices, using 1985 as the base year, indicated that when deflated by consumer's price index, indices for all the crops reduced substantially. For example, the indices for cocoa and palm kernel were 677 and 631, respectively in 1991 and when prices were deflated by the consumer price index, the index for cocoa was 205 while that of palm kernel was 191. This is an indication that substantial part of the increase in prices of these commodities were due to the general price increase (inflation) as a result of naira devaluation.

Even though SAP reforms induced price increases, observed price increases were very unstable and not sufficient to induce output growth. As observed by Smith, (1989), prices of tradable commodities in the world market were highly unstable, as well as very unstable exchange rates of the naira. Such price/exchange rate changes, however, could lead to a major decline in future output if they are unpredictable and erratic. According to Adubi et al (1999), fluctuations - whether positive or negative - are not desirable as they increase risk and uncertainty in international transactions and thus discourage trade.

One of the most visible and pervasive policy was the naira exchange rate devaluation. The rate, which in 1981 was N6.39 and ₦9.99 in 1985 to the US dollar, in 1986, averaged 13.32. By 1992 it had depreciated to ₦19.66, ₦19.83 in 1999 and ₦130 in 2003. By 2012, the exchange rate of the naira per US dollar is about ₦150 per dollar. Economic theory suggests that exchange rate devaluation is good for exports as it makes export prices more competitive. But theory also suggests that devaluation makes import more expensive. So, for an economy like Nigeria that depends on import of inputs, devaluation could be a double-edged sword (Shapiro,1970).

The demand and supply of agricultural commodities for third world countries according to Abalu, (1975) is inelastic. As observed by Phillip (1990), tradable export supply in the short run in Nigeria is inelastic and the demand for Nigeria commodities in the world market is equally inelastic. Consequently, devaluation of the naira may not be able to boost export supply and export revenue.

Kwanashie et al. (1998a) argues that the price and exchange rate reforms which were prescription of IMF and the World Bank were a kind of political manoeuvring in the international scene. They argue that it was a strategic move by the leading commodity consumers either as a means of diverting the attention of commodity exporters and or making it infeasible for them to persist in their demand for a "New International Economic Order" to replace the one that places their economies at long and short term risks. As again noted by Kwanashie et al (1998a), expansion of commodity will lead to a fall in price and consequently farmers' income because of inelastic demand for primary commodities.

According to Olukosi and Isitor (1990), liberal price policy which gave rise to the abolition of Commodity Board in Nigeria brought about unstable farmers' income, loss of quality control and exploitation of the farmers by independent export commodity marketers.

The dissatisfaction of the performance shown by the agricultural sector, failure of some agricultural programmes and the need to provide a well articulated domestic agricultural policy to serve as a key for Nigerian agricultural development have made the government of Nigeria in 2001 to launch a

policy document as the New Agricultural Policy[2] (NAP) (FMARD, 2001). The launching of this policy was expected to be a road map in solving fundamental issues in the Nigerian Agricultural sector.

Export promotion of agricultural and agro-industrial products as one of the policy options of the NAP recognised the comparative advantage Nigeria has in the production of a number of exportable agricultural commodities, such as cocoa, palm produce, rubber, ginger, spices, fruits and vegetables, flowers, shrimps and ornamental fish, cassava products, hides and skin, cashew, gum arabic, groundnuts and cotton (products). In order to diversity the base of the Nigerian economy and widen the market for agricultural commodities to absorb the expected increase in production, there is need to promote the export of these agricultural and agro-industrial products. To facilitate the acceptance of Nigerian agricultural commodities in the international market, including taking full advantage of the US African Growth and Opportunity Act (AGOA), there will be need to develop appropriate capacities and institutional framework within the agricultural sector as well as in other relevant sectors to meet the Sanitary and Phytosanitary Standards (SPS) and comply with the Technical Barriers to Trade (TBT) agreements of the World Trade Organisation (WTO).

Therefore, this paper analyses the response of agricultural outputs to price and exchange rate reforms in Nigeria covering the period of 1986 to 2010.

## 2.0 Conceptual and theoretical literature

### 2.1 Concept of Exchange rate

An exchange rate is the price of one currency in terms of another (Adubi et al 1999). Given two currencies, the naira and the US dollar, for example, the exchange rate between the naira and the dollar is equal to the units of naira needed to purchase one unit of the US dollar. The value of naira in terms of dollars in this case, is the reciprocal for the N/$ exchange rate. However, in the current situation in which the currencies of the major trading nations are floating, the movement of the exchange rate so defined may not give an accurate idea of the real changes in the international purchasing power of any given currency (Adubi et al 1999). Thus, for this purpose the concept of effective exchange rate has been developed as the standard technique for dealing with a group of floating currencies. There are both the "nominal" and "real" versions of effective exchange rates. The former refers to the index of the weighted average of the exchange rates of the country's trading partners, relative to its own exchange rate. The latter refers to the nominal effective exchange rate deflated by (or adjusted for) indices of relative prices.

### 2.2 The Theoretical Foundation of Exchange Rate Policy

The theoretical foundations of exchange rate policy are important in discussing importance in exchange rate. All the models of exchange rate determination are basically hinged on the familiar national income identity and quantity theory of money and its reformulations. The classical, Keynesian, neo-Keynesian and Monetarists arguments, including the structuralists counter arguments, are central to the view expressed by the proponents of the subsisting models of exchange rate determinations (Ogiogio, 1993).

Models of exchange rate determination are simply the different frameworks built on competing school of thought under which the exchange rate of a currency can be determined. The models are based on a body of economic theories on the relationship between the exchange rate of a domestic currency vis-à-vis that of trading partners and the factors responsible for variations in their equilibrium values. The main models of exchange rate determination are the traditional flow model, the Portfolio balance model and monetary model. The discourse here is based on the monetary approach to exchange rate determination because it is considered as most elegant (Njiforti, 2005).

### 2.3 Monetary model of exchange rate.

[2] The previous agricultural policy document was finalized in 1988 and was supposed to remain operative until the year 2000. Hence, in year 2001, a new policy document was launched. The new policy document bears most of the features of the old one, but with more focused direction and better articulation.

The monetary approach to exchange rate determination is the most elegant and perhaps the most complete of all the models of exchange rate compared to traditional flow model[3] and Portfolio balance model[4] (Oyejide, 1986).

The monetary approach is complete because it does not only emphasize the primary role of money but recognised the role of the real sector as a contributory factor in exchange rate determination. The monetary model is based on three legs or a tripod. In the first instance, it asserts that the equilibrium exchange rate depends on the stock equilibrium conditions in each country's money market. The monetary equilibrium condition states that the price level adjusts instantaneously to equate the value of the nominal money stock to the desired or real demand for money. The demand for money itself is a function of real income and nominal interest rates. The movement in the monetary equilibrium is comparatively analyzed with that of a trading partner. An increase in the money stock would induce the depreciation of the domestic exchange rate vis-à-vis trading partner's currencies while a decrease will lead to the opposite response, all things being equal. The rate of growth of domestic income is also adduced as a factor influencing the exchange rate. An increase in the growth rate of domestic income in comparison with those of trading partners would cause the exchange rate to appreciate. This is because the resulting excess demand for money would lead to a fall in the domestic price level. The third leg on which the monetary model stands is the covered interest parity which holds that interest rates are equalized on a global basis. If interest rate in the domestic economy rises, the demand for money would fall, prices would rise and the exchange rate would depreciate. Thus, the exchange rate of a domestic currency is influenced by relative shifts in money stocks, real incomes and interest rates or inflation rates (Oyejide, 1986).

A simple expression for the exchange rate can be derived from the quantity theory of money when there are two countries and an exchange rate that follows its Purchasing Power Parity (PPP) (value Edwards, 1988).

Let the foreign country be denoted by an asterisk (*), so that it has an equation linking money, prices, income, and velocity:

$$M^*V^* = P^*Y^*. \quad . \quad . \quad (1)$$

Using values for home money supply, prices, velocity, and income, we have;

$$MV = PY. \quad . \quad . \quad (2)$$

All we need to add is the relationship implied by PPP. That is prices will be the same in both economies when converted at the current exchange rate:

$$PE = P^*, \quad . \quad . \quad . \quad (3)$$

Where P is the home country price level, $P^*$ is the foreign country price level, and $E$ is the exchange rate (number of units of foreign currency per unit of home currency). Now all we do is rearrange (1) and (2) as expressions for $P$ and $P^*$, then substitute into (3) and arrange as an expression for $E$. This gives

[3] The traditional flow model relies on equilibrium in the foreign exchange market as the determining factor of the appropriate exchange rate. The intersection between the demand for and supply of foreign exchange or the market clearing equilibrium rate is regarded as the pure or market exchange rate. The point of intersection is derived from the so called "Marshallian Scissors" which are the demand and supply schedules. The traditional flow model does not relegate the importance of money but it concentrates on forces behind the demand and supply schedules of foreign exchange. It posited that the exchange rate or the strength of a nation's currency is influenced by relative prices, interest rates and real income.

[4] The portfolio balance model relies heavily on the asset or portfolio market. It holds that the portfolio equilibrium position of wealth holders in each country simultaneously determines the exchange and interest rates. The shift in the allocation of wealth between the domestic money base, domestic public bonds and net foreign bonds denominated in foreign currency influences the equilibrium exchange rate. Movement in domestic interest rates and fiscal operations of government to the extent that they induce movements in net foreign assets holding, influence movement in the equilibrium exchange rate. Accurate forecasts based on this model are therefore difficult because domestic and foreign assets are not perfect substitutes as their rates of returns differ significantly. Furthermore, while some countries are net foreign debtors, others are net foreign creditors. The most disturbing omission of this model is the treatment of wealth holders in isolation of the environment in which they operate. The environment influences the decision of wealth holders. The wealth that is being distributed between the various assets would have been earned as a result of certain investment decisions and prevailing economic conditions.

$$E = \frac{M^*}{M} \cdot \frac{Y}{Y^*} \cdot \frac{V^*}{V} \cdot \quad . \quad . \quad .(4)$$

This is an important equation which gives us some new insights into the exchange rate. The first term is the ratio of the home and foreign money supplies. *E* falls in proportion to the home money supply and rises in proportion to the foreign money supply. This means that, when the home money supply rises, the exchange rate depreciates in the same proportion. The logic of this has two steps. First, a rise in home money supply leads to a proportional increase in the home price level (for given levels of *Y* and *V*). Secondly, a rise in the home price level leads to a proportional depreciation of the home currency to preserve PPP.

The second term in (4) has a very important implication. Domestic real national income is positively related to *E.* This means that, other things being equal, a rise in domestic national income leads to an appreciation of the home currency. The reason for this is that an increase in *Y* leads to an increased transactions demand for the home currency. Anything that increases demand for the home currency will tend to appreciate its exchange rate.

This simple model of exchange rates gives important insights, but it is only a beginning. Many more complicated factors affecting interest rates and expectations can easily be incorporated by a more detailed specification of the determinants of *V*. However, the main elements of (4) are recognizable in many of the empirical exchange rate models of the last two decades.

**2.4 Price and exchange rate changes and agricultural exports in Nigeria**

In the early 1960s in Nigeria, there was little concern for exchange rate policy, as it had almost no significance in economic management. Between 1960 and 1967, the Nigerian currency was adjusted in relation to the British pound with a one-to-one relationship between them. Between 1967 and 1974, another fixed parity was maintained with the American dollar. This system was abandoned between 1974 and late 1976, when an independent exchange rate management policy was ushered in that pegged the naira to either the U.S. dollar or the British pound sterling, whichever currency was stronger in the foreign exchange market. The main objective of the exchange rate policy in this phase was to operate an independently manage exchanged rate system that would influence real economic variables in the economy and bring down the rate of inflation. Consequently, a policy of progressive appreciation of the naira was pursued over the period and was aided by the oil boom that occurred at the same time. Because of the huge earnings from crude petroleum exports over the period, Nigeria persistently ran appreciable external surpluses in the balance of payments, which supported the appreciation of the naira. This practice led to considerable stability in the naira exchange rate (MUSA, 2011).

Throughout this period the pricing of agricultural exports was done by the established government marketing boards. Specifically, these marketing boards were responsible for fixing prices and ensuring quality of crop exports. Though low, agricultural export prices were stable during this period and not subject to changes in the exchange rate (which was more or less fixed) apart from fluctuations in the international prices of primary products.

Late in 1976, as a result of the changing fortunes of Nigeria's economic circumstance, a policy reversal was affected in the management of the naira exchange rate. There was a deliberate policy to depreciate the naira, though this was not systematic. In the effort to realign the naira exchange rate, the monetarists were convinced that a more appropriate way to ensure stability and viability of the naira was to peg it to a basket of currencies. Hence, a basket of seven (7) currencies of Nigeria's major trading partner countries was adopted. Towards the end of 1985, as the economic crisis deepened, the government allowed the exchange rate to be determined by market forces. This led to many rates that diverged widely from one another. The evidence between 1985 and 1993 showed elements of distortions in the exchange rate that made it difficult to predict the path towards stability of the rate (Ogiogio, 1993).

In the quest for the stability of the exchange rate, the Nigerian monetary authorities tried several biding systems including the Dutch Auction System (DAS) and the Marginal Rate System. An attempt to ensure viability in the market let to many amendments of the rules, intervention by the Central Bank of Nigeria, and opening of different foreign exchange windows for operations during this period. Despite

this, the fluctuating rates of the exchange rate continued to be an issue of concern to the authorities. For example, the naira exchange rate, which stood at N6.7178 = $1 during the months of January 1989 depreciated to N7.5871 by March 1989. The rate strengthened progressively from N 7.5808 = $1 to N 7. 1388 = $1 in July 1989 after a series of tight monetary policy actions had been taken. The rate averaged N7.2593 = $1 in August, compared with N7.0389 = $1 in January 1989. As at December 1991, the naira was exchanging for the dollar at the rate of N9.9331: $1.00. By June 1993, the naira had depreciated to N17.3760: $1.00.

Prior to the policy reforms in 1986, and especially during the 1960s, Nigeria was known mainly as an exporter of primary agricultural commodities and, to a relatively small extent, as an exporter of one or two solid minerals. From 1960, when Nigeria became an independent sovereign state, until 1970, its economy was largely sustained, at least from the point of view of off-shore commodities, by the export earnings from these basic agricultural and mineral commodities. The export list of the country within this period comprised ground-nut, cocoa-beans, palm oil and palm kernel, cotton, rubber, ginger, hides, and skins, timber, copper, zinc, columbite, tin, and lead.

The commencement of large-scale exploitation and exportation of crude petroleum began in the early 1970s. The huge inflow of foreign exchange revenues that accompanied the oil boom diverted the attention of the government and a considerable number of the producers of the traditional commodities into activities aimed at exploiting the economic opportunities created by the huge oil revenues. This development heralded the decline of agricultural production and the resultant drop in both volume and value of traditional export commodities (Manyong, 2005) .

Between 1981 and 1990, the average growth rate was negative, at -2.86%; the period 1981-1985 recorded -4.54% and 1985-1990 had a growth rate of 27.06%. During 1960 – 1981, the average rate of growth was an impressive 22.1% while the period 1981-1994 recorded 11.6%. The impressive performance of merchandise exports before 1981 was largely due to the advent of petroleum in the export list. In 1960, non-oil exports, comprising mainly agricultural commodities, accounted for 97.3% of total exports. This percentage, however, declined continuously (export for three years) to 1.8% in 1981. The percentage then fluctuated until 1991, when it started a consistent decline to 2.6% in 1994. In 1992, non-oil exports, which stood at 144227.8 million, were at their lowest level since 1960. At the same time, crude petroleum exports, which were valued at N8.8 million or 2.7% of total exports in 1960, increased to a record level of N201,383.9 million or 97.9% of total exports that same year. Since the introduction of SAP in 1986 and a policy shift towards support for growth of traditional non-oil exports, there had been an appreciable increase in exports. Thus, growth of non-oil exports has been positive except in 1992. The devaluation of the currency, with the attendant increase in domestic prices of exports, was one of the major factors responsible for the increase. In the 1990s, however, the share of non-oil exports has been consistently less than 5% of total merchandise exports. With regard to imports, exchange rate over-valuation in the 1960s and 1970s helped to cheapen imports of competing food items, as well as agro-based and industrial raw materials. For example, it was cheaper to import maize for domestic use than to grow it locally, while imported talcum was found to be relatively cheaper than the palm kernel oil used by domestic soap manufacturers. The situation was exacerbated by the liberal food imports policy, especially during 1970 -1977 when there was little or no trade tariff on imported food items. This fostered rapid expansion in the importation of these goods to the detriment of local production of similar goods.

When it became obvious that aggregate import demand had outstripped total foreign exchange available for imports, trade restriction through import licensing schemes was introduced. Unfortunately, the implementation of the schemes was grossly abused; it favoured mainly urban political patrons and multinational corporations. With the adoption of SAP, foreign exchange allocation and import licensing procedures were abolished and transactions in foreign exchange were subjected to market forces under an auction system. The new foreign exchange policy helped to remove the over-valuation problem to the extent that it is now generally felt that the naira is undervalued.

In principle, the sharp depreciation in the naira exchange rate should be expected to boost export earnings and producers' prices of export crops. Available data (CBN,1994) showed that despite the

declining trends in the U.S. dollar, prices of Nigeria's agricultural export commodities in the world market, the exchange rate depreciation has resulted in substantial increases in the naira equivalent of the world prices and consequently in local producer prices. Indeed, since the introduction of SAP, producer prices of all export commodities have risen far above what the commodity boards used to pay farmers. This has gone a long way to boost domestic production through improved husbandry of existing farms and the cultivation of increased hectares.

On the imports side, exchange rate devaluation has resulted in dramatic increase in the naira price of imports and this is expected to discourage importation of foreign food items, by raising the level of effective protection for domestic production. On the other hand, the naira costs of imported items have also risen astronomically, taking most of these goods almost out of the reach of many consumers. The sharp rise in the costs of imported inputs could discourage new investments in commercial ventures while the maintenance and rehabilitation of existing equipments would also pose a serious financial strain on modern entrepreneurship.

## 3.0 Methodology

The analytical framework consists of the domestic price model, the relative price model, the adaptive expectation model, Njiforti (2005). The empirical framework consists of three blocks. These include the production output block, the price block and the export supply block (Kwanashie et al, 1998a; Kwanashie et al, 1998b; Nerlove, 1958b; Phillip, 1990 and Nerlove, 1986; and Njiforti, 2005).Consequently sections 3.1, 3.2 and 3.3 present the derivation of the domestic price estimate, relative price estimate and price expectation model respectively.

### 3.1 Domestic Price Estimate

$P_i = P_i^*E(1-T)$ . . . . . (9)

$P_i^*$ = world price of product i

$E_t$ = nominal exchange rate

T = export tax rate

Equation 10 determines the supply prices ($P_i$) of the commodities in the domestic economy as a direct function of world market price ($P_i^*$) times the exchange rate ($E_t$) and tax (1-T). With the reforms of export trade, export tax is zero that is T = 0, therefore equation (9) is transformed into equation (10);

$P_i = P_i^*E_t$ . . . . . (10)

Taking the total derivative of equation (10)

$$dp_i = dp_i^* * (\frac{dp_i}{dp_i^*}) \times E + dE(\frac{dp_i}{dE}) \times P_i^*$$

This implies $P_i = a_1E + a_2P_i^* + e_t$ . . (11)

where;

$$a_1 = dp_i^* * (\frac{dp_i}{dp_i^*})$$

$$a_2 = dE(\frac{dp_i}{dE})$$

Equation (11) above has been converted into a stochastic process by adding the stochastic term ($e_t$). Equation 11 implies that changes in domestic prices of exports depend on changes in world price of exports, changes in the nominal exchange rate, relative sensitivity of domestic price to world price and exchange rate and random shocks. It is expected that, domestic prices of exports will response positively to changes in world prices and nominal exchange rate (defined as the ratio of Naira to foreign currency).

### 3.2 Relative Price Estimate

Equation (12) represents the relative price index which is used as a proxy for domestic price level.

$RP_i = P_i/CPI*100$ . . . . . (12)
Where, $RP_i$ is the relative price of product i
Pi = price of product i
CPI = domestic price index.

### 3.3. Price expectation model

The Nerlovian framework has been adapted for the price expectation model. In actual estimations, the original Nerlovian model has been modified in many diverse ways. Most studies of agricultural supply response include some form of price expectation; constant and partial output adjustments (See Phillip, 1990, Njiforti, 2005). The formation of the price expectation is often taken to conform to the adaptive expectations hypothesis, hence, the formation of the price expectation hypothesis would start with a simple adjustment model (partial and constant) as specified below;

$Q_t = f(Q^*_t)$ . . . . . .(13)
Where Qt = actual output
Q*t = desired output
Note: $Qt = f(P^e_t)$. . . . . .(14)
$P^e_t$= expected price at current time period
$Q^*t = f(P_{t-1})$
$P_{t-1}$= actual price at previous time period
Hence equations 13 and 14 in stochastic forms are written as;

$Qt = \alpha_o + \alpha_1 p_t^e + u_{1t}$ . . . . (15)

$Q^*t = \alpha_o + \alpha_1 p_{t-1} + u_{2t}$ . . . . . (16)

The problem of supply model in this case lies on adjustment principle (i.e. Partial adjustment; $(Q^*_t - Q_{t-1})$ or constant elasticity adjustment $(\frac{Q^*_t}{Q_{t-1}})$

#### 3.3.1 Partial Adjustment

$Q_t = Q_{t-1} + \beta(Q^*_t - Q_{t-1})$ . . (15)

$\beta$ = partial adjustment coefficient.

$0 \leq \beta \leq 1$

When $\beta$ =0

$Qt = Q_{t-1}$, no adjustment

When $\beta$ = 1

$Q_t = Q^*_t$, no adjustment.

So, if there should be adjustment, $\beta$ must not be 0 nor 1 but in between.

By simplifying equation 15

$Qt = Q_{t-1} + \beta Q^*_t - \beta Q_{t-1}$ . . . (16)

$Qt = (1-\beta)Q_{t-1} + \beta Q^*_t$ . . . . (17)

$Qt = (1-\beta)Q_{t-1} + \beta(\alpha_o + \alpha_1 P_{t-1}) + U_t$ . . . (18)

$Qt = Q_{t-1} - \beta Q_{t-1} + \alpha_o\beta + \alpha_1\beta P_{t-1} + \beta U_t$ . . (19)

$Q_t = a_o + a_1 Q_{t-1} + a_2 P_{t-1} + v_t$ . . . . .(20)

$a_o = \beta\alpha_o$, $a_1 = 1-\beta$, $a_2 = \alpha_1\beta$

$V_t$ = random error term

**Constant Elasticity Adjustment Model**

The constant elasticity is based on the following equations

$$\frac{Q_t}{Q_{t-1}} = \left(\frac{Q^*_t}{Q_{t-1}}\right)^{\lambda} e^{ut} \quad . \quad . \quad . \quad . \quad (21)$$

Where $\frac{Q^*_t}{Q_{t-1}}$ = constant elasticity adjustment,

$Q^*_t = \alpha P_t^{\beta}$ . . . . . (22)

$\lambda$ = adjustment coefficient and $\lambda \neq 1$ for any adjustment

Simplifying equation (21)

$$Q_t = \alpha^{\lambda} Q_{t-1} Q_{t-1}^{-\lambda} P_t^{\lambda\beta} e^{ut} \quad . \quad . \quad (23)$$

$$\log Q_t = \lambda \log \alpha + \log Q_{t-1} - \lambda \log Q_{t-1} + \lambda\beta \log P_t + u_t \quad (24)$$

$$\log Q_t = \lambda \log \alpha + (1-\lambda) \log Q_{t-1} + \lambda\beta \log P_t + u_t \quad . \quad (25)$$

$$Q_t = a_a + a_1 Q_{t-1} + a_2 P_t + u_t \quad . \quad . \quad . \quad . \quad (26)$$

$a_o = \lambda \log \alpha$

$a_1 = 1 - \lambda$

$a_2 = \lambda\beta$ = Measures price elasticity

The constant elasticity would be measured using the following processes.

Price Elasticity (P.E) = $\frac{\delta Q_t}{\delta P_t} \times \frac{P_t}{Q_t}$ . (27)

Differentiating equation (26) with respect to $p_t$

$$\frac{\delta Q_t}{\delta P_t} = \frac{1}{Q_t} = \frac{\lambda\beta}{P_t} = \frac{\lambda\beta Q_t}{P_t} \quad . \quad . \quad (28)$$

$$P.E. = \frac{\delta Q_t}{\delta p_t} \times \frac{P_t}{Q_t}$$

P.E= $\frac{\lambda\beta Q_t}{P_t} \times \frac{P_t}{Q_t}$ . . . (29)

P.E = $\lambda\beta$ . . . . (30)

Hence equation 30 measures the short-run elasticity of response.

From equation 26 the long-run elasticity would be measured as follow;

Long-run Elasticity = $\frac{\lambda\beta}{1-(1-\lambda)} = \beta$ . . (31)

For the purpose of empirical investigation between agricultural production volume, commodity export supply volume, foreign exchange rate and prices of selected agricultural tradable commodities, the following model would be adopted based on constant elasticity adjustment hypothesis;

$$Q_{it} = f(P_i^*, P_t, D_1, D_2, Q_{it-1}) \quad . \quad . \quad (32)$$

Where

$Q_{it}$ = output of tradable crops

$D_1$ =Dummy for weather (that assumes the value of unity for the drought year and zero for other years)

$D_2$= Dummy for various policy variables which are incorporated through price expectation ($P^e_t$)

$P_{it}$ = absolute price of crop i.

Hence the formation of the price expectation is taken to conform with the adaptive expectations hypothesis as follows;

$$Pe_t - Pe_{t-1} = \alpha(P_{t-1} - Pe_{t-1}) \quad . \quad . \quad (33)$$

$\alpha$ = adjustment coefficient; ($0 < \alpha < 1$)

$Pe_t$ = current period expected price

$Pe_{t-1}$ = previous period expected price

$P_{t-1}$ = previous period actual price

Equation 33 would be used to estimate the response of agricultural production and export supply to adjustment policies. The coefficient of elasticities would be estimated based on the estimation processes indicated in elasticity equations stated above.

**3.4 Empirical Models**

The empirical models have been presented in three blocks following the work of Njiforti (2005). These blocks include the production, price and export blocks respectively. The choice of these blocks have been informed by the focus of the paper and the work of Njiforti (2005) and Kwanashie et al, (1998a) and Kwanashie et al, (1998b)

**Block 1: Production supply**

$\ln(Qc_t) = a_o + a_1 \ln Pc_{t-3} + a_2 \ln(Qc_{t-1}) + a_3 \ln(CEA_{t-3}) + a_4 D_{1t} + e_t$ . (34)

$\ln(Qcof_t) = b_o + b_1 \ln PCof_{t-3}) + b_2 \ln(CEA_{t-3}) + b_3 \ln(Qcof_{t-1}) + b_4 D_{1t} + e_t$ (35)

$\ln(Qco_t) = co + c_1 \ln(Pco_{t-3}) + c_2 \ln(CEA_{t-3}) + c_3 \ln(Qco_{t-1}) + c_4 D_{1t} + e_t$ (36)

$\ln(QPo_t) = d_o + d_1 \ln(QPo_{t-3}) + d_2 \ln(CEA_{t-3}) + d_3 D_{1t} + d_4 \ln(Qpo_{t-1}) + e_t$ .(37)

$\ln(QR_t) = e_o + e_1 \ln(PR_{t-3}) + e_2 \ln(CEA_{t-3}) + e_3 D_{1t} + e_4 \ln(QR_{t-1}) + e_t$. .(38)

$\ln QPk_t = fo + f_1 \ln(PPk_{t-3}) + f_2 \ln(CEA_{t-3}) + f_3 D_{1t} + f_4 \ln(QPk_{t-1}) + e_t$ .(39)

Block 1 shall determine the responsiveness of selected tradable output to policy reforms.

**Block 2: Price**

$PCo_t = g_o + g_1 INDEXWPco_t + g_2 E_t + g_3 D_{2t} + e_t$. . (40)

$Pcof_t = h_o + h_1 INDEXWPcof_t + h_2 E_t + h_3 D_{2t} + e_t$.. . (41)

$ot_t = i_o + i_1 INDEXWPCot_t + i_2 E_t + i_3 D_{2t} + e_t$. . (42)

$Ppk_t = j_o + j_1 INDEXWPPpk_t + j_3 E_t + j_4 D_{2t} + e_t$ . (43)

$Ppo_t = k_o + k_1 INDEXWPPo_t + k_2 E_t + k_3 D_{2t} + e_t$. . (44)

$PR_t = l_o + l_1 INDEXWPR_t + l_2 E_t + l_3 D_{2t} + e_t$ . . (45)

Block 2 shall determine the responsiveness of selected tradable commodity prices to policy reforms.

**Block 3: Export supply**

$\ln(xco_t) = m_o + m_1 \ln(xco_{t-1}) + m_2 \ln(PCo_t) + e_t$ . (46)

$\ln(xCot_t) = n_o + n_1 \ln(xcot_{t-1}) + n_2 \ln(PCot_t) + e_t$ . . (47)

$\ln(xpal_t) = O_o + o_1 \ln(xpal_{t-1}) + o_2 \ln(PK_t) + o_3 \ln(Ppo_t) + e_t$. (48)

$\ln(xR_t) = p_o + p_1 \ln(xR_{t-1}) + p_2 \ln(PR_t) + e_t$. . . (49)

$\ln(xaP_t) = q_o + q_1 \ln(xaP_{t-1}) + q_2 \ln(PaP_t) + e_t$ . . (50)

Block 3 estimate the impact of price and exchange rate liberalization policies on the export supply of each of the selected export commodities.

**3.6 Definition of Acronyms**

| | | |
|---|---|---|
| $Qco_t$ | = | quantity of Cocoa |
| Qcot | = | quantity of Cotton |
| $Qcof_t$ | = | quantity of coffee |
| $QR_t$ | = | quantity of Rubber |
| $QPo_t$ | = | quantity of palm oil |
| $Qpk_t$ | = | quantity of palm kernel |
| $PCo_t$ | = | domestic Price of cocoa |
| $Pcof_t$ | = | domestic price of coffee |
| $PCot_t$ | = | domestic price of Cotton |
| $Ppk_t$ | = | domestic price of palm kernel |
| $Ppo_t$ | = | domestic price of palm oil |
| $PR_t$ | = | domestic price of rubber |
| $xco_t$ | = | export of cocoa |
| $xCot_t$ | = | export of cotton |
| $xpal_t$ | = | export of palm produce |
| $xR_t$ | = | export of rubber |
| xaPt | = | export of agric-processed goods. |
| $INDEXWPco_t$ | = | Index of world market price of cocoa |
| $INDEXWPcof_t$ | = | Index of world market price of coffee |
| $INDEXWPCot_t$ | = | Index of world market price of cotton |
| $INDEXWPPpk_t$ | = | Index of world market price of palm kernel |
| $INDEXWPPo_t$ | = | Index of world market price of palm oil |
| $INDEXWPR_t$ | = | Index of world market price of rubber |
| E | = | Exchange rate |
| *T* | = | Time trend |
| $D_1$ | = | Weather Dummy |
| $D_2$ | = | Dummy for non price export promotion |
| $e_t$ | = | error term |
| ln | = | natural logarithm |
| CEA | = | Capital expenditure on agriculture. |

**Data Source and estimation techniques**

Data from 1986 to 2010 were used for the analysis. Data on agricultural price indices, exports, imports and exchange rates were obtained from the Central Bank of Nigeria (CBN) Statistical bulletin, Economic and Financial Review, and Annual Reports and Statements of Accounts, as well as Trade Summary of the Federal Office of Statistics and Abstracts of Statistics of FOS. The CBN data were chosen for three reasons as advanced by kwanashie et al (1998a):

1. It is the most comprehensive of economic data on Nigeria.
2. CBN data is usually based on the surveys by the FOS of Nigeria, its own surveys and other Nigerian data sources. International organisations based their data on CBN data. As a result, CBN is to be preferred for a Nigerian study for the reason that in spite of its weaknesses, it is arguably the most credible.
3. Policy in Nigeria is formulated using CBN data.

The estimation techniques used are the ADF unit root test, the Ordinary Least Square (OLS), the Generalised Method of Moment etc. These various techniques were used to ensure robustness of the results and also avoid spuriousness.

## 4.0 Results and Discussions

### Block 1 :Production supply function Estimations

Equations 51 to 56 are the estimates for the production supply functions of the selected export commodities. The values in parenthesis are the t-ratios.

$\ln(Qct) = 4.18 **+ 0.53\ln(Qc_{t-1}))** + 0.132\ln(Pc_{t-3}) - 0.203\ln(CEA_{t-3}) - 0.0225D_{1t}$
(2.207) (2.213) (1.551) (-1.667) (-0.131). . (51)
$R^{-2}$= 0.465, DW = 2.75

$\ln(Qcof_t) = 1.668 - 0.00668\ln PCof_{t-3}) - 0.0333\ln(CEA_{t-3}) + 0.8007\ln(Qcof_{t-1})* + 0.0122D_{1t}$
(0.724) (-0.0245) (-0.123) (5.235) (.003) (52)
$R^{-2}$= 0.756, DW = 2.10

$\ln(Qco_t) = 3.775** + 0.348\ln(Pco_{t-3})* -0.2519\ln(CEA_{t-3}) + 0.4274\ln(Qco_{t-1})***+ 0.241D_{1t}$
(2.457) (2.221) (-1.632) (2.017) (.212) (53)
$R^{-2}$= 0.569, DW = 2.012

$\ln(QPo_t) = 3.040*** + 0.013\ln(PPo_{t-3}) + 0.008\ln(CEA_{t-3}) + 0.095D_{1t} + 0.490\ln(Qpo_{t-1})***$
(1.661) (-0.132) (-0.258) (1.321) (2.494) . (54)
$R^{-2}$= 0.424, DW = 2.14

$\ln(QR_t) = 3.423* + 0.151\ln(PR_{t-3}) - 0.069\ln(CEA_{t-3}) + 0.695D*_1 + 0.179\ln(QR_{t-1})$
(2.702) 1.677) -0.669) (2.951) (0.840) (55)
$R^{-2}$= 0.679, DW = 2.04

$Ln(QPk_t) = 3.23** - 0.012\ln(PPk_{t-3}) - 0.03\ln(CEA_{t-3}) + 0.31D_{1t} + 0.54\ln(QPk_{t-1})$ (56)
(3.23) (-0.0116) (-0.029) (0.31) 0.538)
$R^{-2}$= 0.675, DW = 2.65

* = Significant at 1 per cent.
** = Significant at 5 per cent.
*** = significant at 10 per cent.

The values in parenthesis are the t-values. The coefficients of the estimates in the equations in Block 1 are elasticities because they are estimated in log-linear forms. This makes it easy to directly obtain short-run output elasticities and also to compute long-run elasticities as specified. All the estimates are good fit of the data used as indicated by the $R^2$and $R^{-2}$. The estimates explain between 47%(cocoa), 76%(coffee), 57%(cotton), 42%(palm oil), 68%(rubber) and 67%(palm kernel) of the variations in crop output over the period under review.

As would be expected, the individual crops had different patterns of responses to price policy instruments. Some crops were more responsive to prices than others while some show little relationship to the variables in the equations, suggesting that they may be influenced more by variables not included in their specification. In such a case, this study simply demonstrates that the policy instrument and transmission mechanisms of the reform policy may be inadequate in addressing the supply response of such a crop.

The coefficient for domestic prices are not significant in equations 51 (cocoa), 52 (coffee), 54 (palm oil), 55 (rubber) and 56 (palm kernel). However, the coefficients for coffee (equation 52) and palm kernel are having negative signs. The domestic price variable is only significant for cotton at 10 per cent probability level, (equation 53). This result points out that, even though prices of commodities increased as a result of price reform, prices were not high enough to induce output growth. These results go to confirm the fact that most producers price increases were in nominal and not in real terms. Hence,

producers' prices were not high enough to induce production. Rather, the increases in nominal prices were inflationary due to the devaluation of the naira exchange rate.

The adjustment coefficient in equations 51 to 56 are positive and significant, except for equations 55 (rubber) and 56 (palm kernel) that are not significant. This indicates that all the commodities demonstrated that previous level of production or output had positive impact on their current level of output. This result is contrary to the result of a similar study by Kwanashie et al (1998a) who concluded that current period level of output can instead reduce if previous period level of output was high. This is because they assumed that demand for these commodities are less elastic and increase in supply can lead to a fall in price and consequently a fall in the subsequent level of production.

The coefficients for capital expenditure on agriculture were not significant in all the equations and negative signed except in equation 54 that it showed positive sign. This result is not doubtful as one of the reform agenda was for the government to relinquish productive sector of the economy to the private sector and only play a monitoring and supportive role. Hence, within the reforms period, budgetary allocation to agriculture was actually minimized. The federal government as a result abandoned direct involvement in agricultural production. Most of the Federal Government agricultural projects were commercialised or privatised. For example, subsidy on fertilizer was removed.

The dummy variable $D_1$ was used to capture the effect of weather and other agro climatic factors. "1" was assigned to those years that experienced poor weather and "0" was assigned for those years with favourable weather conditions. This variable was not significant in all the output equations except equation 55 (rubber). The sign of this variable was positive in all the equations except equation 51 (cocoa). Most explanations Kwanashie et al. (1998a) for poor performance of the agricultural sector give weather conditions significant weights. The use of rainfall dummy ($D_1$) in these estimations has not captured this phenomenon, as the variable was not significant in the equations except in equation 55. This suggests that weather may not be as crucial as is often assumed. However, the insignificance of rainfall may simply be an indication of methodological problems.

**Table 1: Short-run and long-run price elasticities and adjustment coefficients for individual crops**

| Crop | Short-run elasticities | Longrun elasticities | Adjustment coefficient |
|---|---|---|---|
| COCOA | 0.132974 | 0.285642 | 0.534474 |
| COFFEE | -0.00669 | -0.03357 | 0.800718 |
| COTTON | 0.348672 | 0.608934 | 0.427406 |
| KERNEL | -0.0116 | -0.02513 | 0.53838 |
| PRUBBER | 0.151455 | 0.184566 | 0.179401 |
| POIL | 0.013563 | 0.026642 | 0.490919 |

Short – run elasticity $= \lambda\beta$

Long-run elasticity $= \dfrac{\lambda\beta}{1-(1-\lambda)} = \beta$

Table 1 shows the short-run and long-run price elasticity and adjustment coefficients for the individual tradable crops. Though the elasticity values are generally low, as expected, the short-run elasticities are generally smaller than the long-run elasticities. This is true for all the selected crops.

The short-run elasticities for all the crops were low. These findings are somehow expected as most cash crop production need longer gestation period to maturity. The characteristics of each crop are different, the climatic conditions and spatial distribution are also different. These factors influence responses of individual crops to various price and non-price incentives. It is not accidental that cotton, for example, has a higher short-run responsiveness (0.346) than the rest of the crops. The lag structure of cotton is much smaller than for palm kernel, cocoa, coffee, rubber and palm oil because cotton requires a relatively shorter time between planting and harvesting (gestation period).

**Block 2: Price function estimations**

Equations 57 to 62 are the estimated equations for the price functions. The values in parenthesis are the t-ratios.

$PC_t = 777.08 - 0.103INDEXWPc_t + 859.13E^*_t + 975.09D_{2t}$ .(57)
(0.232) (-0.327) (17.577) (0.230),
$R^{-2} = 0.97$, DW = 1.395

$Pcof_t = 458.50 + 1.77INDEXWPcof_t + 886.72E^*_t - 6566.37D_{2t}$. . (58)
(0.037) (2.211) (4.853) (-0.419),
$R^{-2} = 0.80$ , DW = 1.906

$PCot_t = 383.95 + 0.281INDEXWPCot_t + 316.22E^*_t - 801.27D_{2t}$ . (59)
(0.112) (1.340) (6.58) (-1.513),
$R^{-2} = 0.84$, DW = 1.822

$Ppk_t = 78.64 + 1.17INDEXWPPpk^*_t + 148.87E^*_t - 124.71D_{2t}$ . (60)
(1.531) (6.696) (45.155) (-1.513),
$R^{-2} = 0.99$, DW = 2.01

$Ppo_t = 41.62 - 0.35INDEXWPPO_t + 705.42E^*_t + 1376.25D2t$ (61)
(0.0052) (-0.950) (6.165) (0.135) ,
$R^{-2} = 0.76$, DW = 1.85

$PR_t = 264.15 + 0.91INDEXWPR^*_t + 485.103E^*_t - 1939.62D_{2t}$* . (62)
(0.550) (3.668) (29.196) (-2.883),
$R^{-2} = 0.99$, DW = 1.307

* = Significant at 1 per cent.
** = Significant at 5 per cent.
*** = significant at 10 per cent.

Block 2 shows the results for the price functions. The $R^{-2}$ indicates that the functions specified are good fits of the data used. For example 97%, 80%, 84%, 99%, 76% and 99% movements in the prices of cocoa, coffee, cotton, palm kernel, palm oil and rubber are explained by the linear influences of the explanatory variables.

The coefficients for nominal exchange rate are significant at 1 per cent probability level, and positive in all the equations (57 to 62). This suggests that the nominal devaluation of the Naira/US$ exchange rate had positive impact on absolute domestic prices of all tradable commodities. Devaluation of the naira led to increases in foreign demand of Nigerian tradable as they were cheaper in terms of foreign currency. The increase in demand of these commodities by foreign consumers boosted domestic prices due to short run inelastic supply for these commodities.

The coefficients for world market price are significant only in three of the price equations (equations 58, 60, and 62) and are all positive signed in these three equations. It was not significant in three of the equations with one of them denoting a negative sign (equation 57). These results indicate that world market prices had a mild impact on domestic prices. In certain circumstances, increase in world market prices had direct and positive influence on domestic prices of the commodities concerned like the case of coffee, palm kernel and rubber. In another situation, it influenced domestic prices negatively like the case of cocoa.

The non-price incentive was captured by dummy variable ($D_2$). Some of these non-price incentives included monetary and fiscal policies of federal government, interest rate mechanism and sectoral allocation of credits. This variable was not significant in all the equations except one, (equation

62 for rubber) with a negative sign. The other equations equally had negative signs except equation 57 and 61 that showed positive signs. This implies that policies such as the removal of export licenses and the dissolution of Commodity Boards which were expected to have positive impact on prices of the selected tradables was not realized. This can be explained by the slow pace of the transmission mechanism for the adjustment policy to be translated into domestic prices. This result is contradictory to a similar study carried out by Kwanashie et al. (1998a), who concluded that non price incentive had a positive impact on the prices of tradable commodities.

The results led to a general conclusion that liberal exchange rate and trade policies made only a mild impacts on the domestic prices of some tradable commodities, and like in the case of cocoa and palm oil, the impact was not significant at all and negative. This could be due to the intervention of commodity organisations like the International Cocoa Organisation (ICCO).

**Block 3: Export Supply function Estimations**

Equation 63 to 67 are the estimated equations for the export supply functions. The values in parenthesis are the t-ratios.

$\ln(xcc_t) = 5.83^{**} + 0.44\ln(xcc_{t-1})^{**} + 0.24\ln(PCo_t)^{***}$ . (63)
(2.71) (2.39) (2.10)
$R^{-2}=0.705$ DW = 1.519

$\ln(xCot_t) = 2.25 + 0.12\ln(xcot_{t-1})) + 1.005\ln(PCot_t)^{*}$ . (64)
(1.45) (0.64) (3.61)
$R^{-2}=0.85$ , DW = 1.314

$\ln(xpal_t) = 5.02^{*} + 0.44\ln(xpal_{t-1}) - 0.011\ln(PK_t) + 0.188021\ln(Ppo_t)$. (65)
(2.31) (0.02) -0.015) (0.402)
$R^{-2}=0.492$ , DW = 1.697

$\ln(xR_t) = 4.85^{*} + 0.515\ln(xR_{t-1}) + 0.204\ln(PR_t)$ . . (66)
(2.53) (1.76) (0.69)

$\ln(xap_t) = 2.03^{*} + 0.112\ln(xap_{t-1}) + 0.612\ln(Pap_t)$ (67)
(1.99) (0.312) (1.91)

$R^{-2}=0.711$ DW = 1.733
* = Significant at 1 per cent.
** = Significant at 5 per cent.
*** = significant at 10 per cent.

Block 3 is the export supply block. The values in parentheses in equations 63 to 66 indicate the t-statistics. The two variables considered for the export supply models are the lagged dependent variable and the domestic price variable. The explanatory variables specified in equations 63 to 67 accounted for 70.5, 85, 49.2 and 71.1 per cent of the variability in the observed exports of cocoa, cotton, palm produce and rubber respectively.

The coefficients for the lagged dependent variable are positive in all the equations, but only significant in equation 63 (export supply of cocoa). Though the previous level of export supply were positively related to the current level of export supply, they were not actually significant except in the case of cocoa. This implies that an increase in previous period export supply of cocoa as induced by increase in world market price or devaluation of the naira and consequently increase in domestic prices would give rise to increase in current period level of export supply for these commodities as farmers may increase production to benefit from the high prices.

The coefficients for the domestic price variable are positive in all the equations, except in equation 65 where the domestic price for palm kernel is negative. The domestic price variable is only

significant in equations 63 (cocoa) and 64 (cotton). The positive signed of the domestic prices for these commodities indicated that exporters could increase their export supply in response to increase in domestic prices due to increase in world market prices or devaluation of the naira. But these prices were not significant in the export supply models because the price reform did not cause price to be high enough to induce output growth. Most of the price increases were inflationary and this subsequently gave rise to increase in the cost of imported inputs and consequently increase in costs of domestic production.

**Table 2: Short and Long-run Elasticity of Selected Agricultural Export Commodities**

| CASH CROPS | short run elasticities | long run elasticities | adjustment coefficients |
|---|---|---|---|
| PCOCOA | 0.249 | 0.449 | 0.445 |
| COTTON | 1.005 | 1.148 | 0.124 |
| PALM PRODUCE | 0.188 | 0.341 | 0.446 |
| PRUBBER | 0.204 | 0.421 | 0.515 |
| AGRIPROCESSED | 0.612 | 0.689 | 0.112 |

Table 2 shows the estimates of the export elasticities for five commodities. The short run elasticity estimates is obviously implied by the coefficient on the domestic price variable as indicated in equations 63 to 67. Estimates of the short run export elasticities are noted to be very low for the commodities investigated. In addition, but not unexpectedly, they are lower than their long run counterparts. For instance, the short run elasticities for cocoa, cotton, palm produce, rubber and agric-processed goods are 0.249, 1.005, 0.188, 0.204 and 612 respectively while the long run elasticities for the same set of commodities are 0.449, 1.148, 0.341, 0.421 and 689 respectively. These elasticity estimates are easily interpreted. Taking the cocoa estimates for example, a 10 per cent change in the domestic price will result in a short run 2.49 per cent change and long run 4.49 change in the level of cocoa export. Other estimates can similarly be interpreted. From the elasticities estimate, cotton has high elasticity values both in the short run (1.005) and long run (1.148) respectively. The high elasticity response of cotton export can be due to the short gestation period for cotton production. This result is in agreement with the earlier result observed in cotton production output response to price and other macroeconomic variables. It is equally in agreement with the results of a similar study carried out by Phillip (1990) and Kwanashie et al (1998b).

## 5.0 Conclusion

The findings in this paper raised fundamental concerns about the role of liberal price and exchange rate policies in boosting the output of agricultural export commodities in Nigeria. The results suggest that Nigeria is unlikely to benefit from a dependence on primary commodities. However, the alternative route to boosting output of agricultural export commodities is for Nigeria to improve its internal and external strategic advantage.

The Bretton Woods School appear to have succeeded in diverting attention of Nigeria and similar economies away from a global approach to the development problems of commodity exporters, it should be obvious that such diversions do not and cannot resolve the international commodity problem nor its consequences in countries such as Nigeria. This is because all aspects of development are linked to patterns of output and trade. In fact, as Killick (1991) pointed out, development of industrial countries was induced by transitions in output-mix and trade mix first, from high primary concentration to high secondary concentration and then to high concentration in services. Consequently, reappraisal of Nigerian development path is necessary. It is therefore to identify and evaluate feasible alternative policies for Nigeria on the basis on how each policy would improve Nigeria's strategic position rather than the myth of the trade gains of exploiting the so call "comparative advantages". The global economy bestows trade gains in favour of nations that possess strategic advantages in world trade while penalizing those that maximize comparative advantages in primary products, Kwanashie et al, (1998a). Therefore

the real challenge for raising non-oil exports revenue and for stimulating Nigeria's development through agricultural export commodities lies in the improvement of Nigeria's strategic position in the global economy.

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