

WORLD COCOA OUTPUT AND PRICE VARIABILITIES: IMPLICATIONS FOR ECONOMIC DEVELOPMENT OF EXPORTING COUNTRIES

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ABSTRACT

Price index analysis was used to determine the degree of cocoa price variation at the international market. The price of cocoa between 1991 and 2002 was used for the study. Monthly and annual averages of daily price of cocoa beans were calculated using the average quotations of London cocoa terminal market and New York coffee, sugar and cocoa terminal market. The London prices were converted into United States dollars per tonne. The revelation of the study shows that between 1991 and 1995 the unit prices of cocoa at the world market changed sixty times and between 1996 and 2002, it changed 90 times, meaning that the unit prices of cocoa at the international market changed on a monthly basis. Also, the annual unit prices of cocoa increased from 56% to 95% between 1991 and 2002. It was observed that between January 1991 and December 1993 monthly unit prices of cocoa increased by 112% while between January 1991 and December 1995 it rose by 106.3%. The unit prices of cocoa beans oscillated between 10% and 16% from September 1994 to February 1995. Interestingly, between 1996 and 1998, the prices of cocoa increased at a constant rate of 2%; and June 1998 to December 2000 witnessed a drop to 2 negative digits of -32.5%. However, there was a dramatic increase from 20% in January 2002 to 82% in October 2002. From the foregoing, it can be inferred that, there exists erratic cocoa price fluctuation at the international market, which could impact negatively on exporting countries and workers in agriculture particularly. This is so because, the instability in cocoa prices results in poor budget preparation and planning, market uncertainty, irregular income, and improper fiscal policy formulation. The effect of these prolonged fluctuations can be cushioned by the formation of trade alliance by exporting countries to see how best they could stabilize the market. Also the exporting countries should develop local processing industries to process some cocoa beans into finished goods at home, as a means of reducing the quantity supplied to the international market. Formation of effective trade union(s) and cartel could be another positive option for a reduction in cocoa price uncertainty at the international market.

KEYWORDS: world cocoa output, price variabilities, and implications.

INTRODUCTION

Cocoa (*Theobroma cocoa*), an international crop of Latin American origin has tended to determine both the economic and political fate of many countries of the world of which Trinidad, Ghana, Nigeria, Cote D' Ivore, Brazil, Costa Rica and Fernando Po are prominent (Folayan, 2004). It is the most important agriculture commodity that is traded internationally (Abang, 2004). The United States of America (USA), Union of Soviet Socialist Republic (USSR) and Japan accounted for nearly 82% of the world imports of cocoa beans between 1961 and 1993 (Abang, 2004). Apart from the provisions of hard currency to exporting countries, Animpuye (2004), reported that researchers at the National Academy of Science have found that chocolate, a cocoa product contains chemicals like those in red wine and green tea that help to improve blood circulation as well as cut down blood pressure. Helmutsiets of the university of Duesseldorf and Dr Norman K. Hollenberg of Harvard medical school have both found cocoa effective in lowering the blood pressure when they studied the Kuna Indians, off the coast of Panama (Animpuye, 2004).

Cocoa prices at the international level had witnessed several changes both monthly and annually. The fundamental economic reason for these price fluctuations is explained by production pattern (supply), rate of consumption, international market policies, effect of product substitution, supply/demand elasticity of the commodity and the general activities of the market participants. The Cocoa Association of Nigeria (CAN) reported that the world annual cocoa production was put at about 3million metric tonnes at the end of the 1999/2000 cocoa season. This figure is far more than the 100,000 metric tonnes produced at the end of the 20th century, showing an

annual average increase of about 3%.

Consumption of cocoa products also increased to about 2.8 million metric tonnes at the end of the 1999/2000 trading year. The introduction of other fats beside cocoa butter up to 5% in chocolate production also affected consumption with its attendant effect on price currently (CAN, 2004).

Substantial quantity of cocoa tonnes in the world market are produced with Cote D' Ivore, producing an average of 1222.10 metric tons annually which represents 42.6% of the world total supplies (see table 1). This is followed by Indonesia and Ghana respectively.

The problem identified and to be addressed in this study is that of cocoa prices being more volatile than expected. The international price of cocoa has been very unstable. It is more than doubled between 1991 and 2002. The biological nature of cocoa product, the substantial time lags that exist between decisions to produce and realization of final output, and the nature of the demand for cocoa product are among other factors of price instability. Additionally, the price determination at the farmers level tends to be less competitive and more concentrated among the buyers than in non-farm products.

Price-making forces in cocoa marketing are not confined to national boundaries. For cocoa, a worldview is essential to understanding why prices change. An increase in the price of cocoa may be due to drought in Cote D' Ivore or Brazil. Within the confines of this problem price variation at the international level and its consequence on producing countries is what is being brought to the fore. Price is the cardinal point that most economic theories use in making guiding rules and decision in terms of production and consumption.

The objective of this paper is to seek to explain the

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persistent pattern of price behaviour over time (1991 to 2000). Such behaviour includes seasonal patterns of change and year-to-year fluctuations. The findings will aid an understanding of why temporal price changes occur, the magnitude such price changes over time as well as solution to aid in stabilizing cocoa prices at the world market.

CONCEPTUAL FRAMEWORK.

The changes in the general level of farm prices affect the ability of farmers to repay debts, the profitability of investment in land, building, equipments and the competitive position of one country relative to another in selling farm products on world markets. (Tomek G.W 1981). Changes in relative prices are of even greater importance from a social and political point of view since they affect the welfare of farm families and the level and distribution of income between the farm and non-farm sectors of the economy (Tomek G.W 1981). Prices observed through time are the results of a complex mixture of changes associated with seasonal, cyclical, trend, and regular factors. The most common regularity observed in agricultural prices is seasonal pattern of change. Economists have devoted substantial effort to an attempt to identify empirical regularities in price and quantity behaviour. Mathematical techniques are available to describe the seasonal, cyclical, trend and irregular components of an economic time series (Tomek G.W 1981). The techniques attempt to decompose the observed series into constituent parts. Mostly descriptive techniques have been developed to analyze seasonality. This helps to identify the uniformities or irregularities in the seasonal price pattern, and observation

may suggest that the seasonal pattern is changing in some systematic way. The second common technique is to construct an index of seasonal price. The base period is either a particular twelve months or an average of several twelve months period. The monthly index number varies around the base. Regression techniques also may be used to estimate the component of a time-series variable. Regression models specify the price (or other) variables as a function of the seasonal effect (Tomek G.W 1981). Models of agricultural product price behaviour often assume purely or perfectly competitive market structure. An equilibrium price thus represents a norm towards which transaction price tends to converge under competitive condition. The demand/ supply function must be appreciably determined. The supply position for cocoa at the world level is represented in table 1 below while the world market monthly prices are shown in tables 3&6 respectively.

Folayan J.A. (2004), warehousing of cocoa beans essential tool for developing sustainable database for Nigeria's cocoa economy. National cocoa statistics conference August 2004. Oshogbo, Osun State.

Cocoa production, marketing and exportation are of crucial importance to the economy of exporting countries. Cocoa production contributes substantially to the total Gross Domestic Product (GDP) and total export earnings of these exporting countries. For instance, between 1960 and 1970, cocoa export formed about 15% to 20% of the total export earnings for Nigeria. Table 2 below shows the percentage contribution of cocoa export to the total export earnings of Nigeria's Gross Domestic products (GDP).

TABLE 1: AVERAGE PRODUCTION OF RAW COCOA BEANS IN MAJOR COUNTRIES OF THE WORLD 1992/93-2002/2003 (METRIC TONNES).

Countries	Cote D'lvore	Ghana	Indonesia	Brazil	Nigeria	Cameroon	Malaysia	Ecuador	Other countries	World total
Year	1	2	3	4	5	6	7	8	9	10
1992/93	697	312	234	304	130	99	219	70	295	2360
1993/94	883	255	251	276	142	97	204	79	282	235
1994/95	862	310	238	215	144	107	120	83	271	2352
1995/96	1265	404	284	222	163	117	116	103	265	2939
1996/97	1130	323	327	193	157	121	102	101	265	2709
1997/98	1113	409	331	173	165	114	57	30	263	2655
1998/99	1197	398	393	138	198	121	79	75	230	2829
1999/2000	1412	435	412	124	168	112	338	95	305	3027
2000/01	1175	396	408	152	186	125	35	84.6	263.6	2825.2
2001/02	1264.7	340.6	455	123.6	185	131	25.0	80.7	255.6	2861.2
2002/03	1320	497	425	162.6	165	145	40.0	88.7	270.7	3114
Average	1222.10	399.27	400	189	160.4	129.5	57.6	83.2	265.8	2865.3
%	42.6	13.8	14	6.5	5.6	4.5	2.0	3.0	8.0	100

SOURCE: DERIVED FROM COCOA PRODUCERS ALLIANCE EXTRAORDINARY GENERAL ASSEMBLY REPORTS, 2002 OF QUARTERLY BULLETIN STATISTICS VOL. XXX NUMBER 1, COCOA YEAR 2003/2004.

Table 2: NIGERIA: SHARE OF COCOA IN THE EXPORT EARNINGS, 1980-2003.

YEAR	TOTAL EXPORT EARNING OF NIGERIA (N MILLION)	EARNING FROM COCOA EXPORTS (N MILLION/ TONNE)	% CONTRIBUTION OF COCOA EXPORT TO THE TOTAL EXPORT EARNINGS OF NIGERIA
1980	14,077.0	337.2	2.4
1981	11,023.3	105.3	1.0
1982	8,722.5	116.0	1.3
1983	7,505.5	260.0	3.5
1984	9008.8	214.9	2.4
1985	12214.8	290.3	2.4
1986	8920.5	424.9	4.8
1987	30360.6	1559.3	5.1
1988	31192.8	2232.1	7.2
1989	57971.2	1581.7	2.7
1990	109886.1	1498.9	1.4
1991	121533.9	2100.9	1.7
1992	205611.7	1649.1	0.8
1993	218801.1	1925.8	0.9
1994	206059.2	2019.6	1.0
1995	950661.4	6912.3	0.7
1996	1309584.0	8589.1	0.7
1997	1241662.7	9215.0	0.7
1998	751856.7	8051.3	1.1
1999	1188969.84	10836	0.91
2000/01	1945723.31	13446	0.69
2001/02	2,001,230.79	17524	0.93
2002/03	1874874.21	N.A	N.A

Source: International cocoa organization, London Computed from 1999 data obtained from annual Digest of statistics FOS, Lagos and CBN, annual report and statements of accounts (various issues); Quarterly bulletin of cocoa statistics vol.6 Number 1, cocoa year 2003/04; Folayan J. A. (2004). National cocoa statistics conference organized by Cocoa Association of Nigeria 19/20 August 2004.

METHODOLGY

Monthly and annual averages of daily prices of cocoa beans from 1991-2002 were used for this study. The daily prices for cocoa beans were calculated using the average of the quotation of the nearest three active future trading months of the London cocoa terminal market and the New York coffee, sugar and cocoa exchange market. The London prices are converted into United States Dollars per tonnes by using the current six months forward rate of exchange in London at the closing time (CAN 2004). The United States Dollars

Table 3 CATEGORY A: WORLD MARKET MONTHLY PRICES OF COCOA BEANS (1991 - 1995)

	1991	1992	1993	1994	1995
Jan	8735.57	909.96	752.03	920.06	1001.95
Feb	843.28	857.80	726.65	885.47	1021.73
Mar.	875.36	826.20	706.46	932.44	967.01
April	847.83	761.39	716.39	884.83	931.98
May	790.64	717.22	704.54	973.96	927.97
June	788.91	681.72	700.44	1022.21	919.1
July	779.73	763.53	762.78	1065.36	875.66
August	852.69	808.71	782.63	1066.57	935.64
Sept	941.27	771.52	894.39	105.37	941.45
Oct	954.45	746.27	918.33	979.96	930.8
Nov	950.07	775.74	956.89	976.37	961.10
Dec	970.55	745.81	978.97	963.77	928.39

SOURCE: COCOA ASSOCIATION OF NIGERIA (CAN) NEWS-LETTER VOLUME 6 NO 1

denominated converted into SDR equivalent at the appropriate daily official United States Dollars/ SDR exchange rate published by the international monetary fund adopted from (CAN 2004)
The price index analysis was employed as the analytical tool for this study.

The price index analysis formula is given by

$$P = \frac{P_t}{P_0} \times 100$$

Where P = price index
Pt = current price of cocoa per given month/year and
Po = price of base month/ year.

The index for the base period is, of course, 100, and the monthly index numbers vary around the base. An index of ninety (90) for June, for example, indicates that June prices for the period described were 10 percent below the twelve-month average. The monthly index numbers can be constructed for a period of years, and this can then be used to see if any systematic changes have occurred in the pattern (Tomek G.W 1981).

In the annual price variation, descriptive statistics were employed using average prices for the study. In agriculture a principal factor in yearly price variability is changes in supply. The demand and supply functions may be

TABLE 4 WORLD MARKET MONTHLY PRICE INDEX FOR COCOA BEANS (1991 - 1995)

YEAR	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUST	SEPT	OCT	NOV	DEC
1991	100	96.5	100.2	97.1	90.5	90.3	83.6	97.6	107.7	109.3	108.8	111.1
1992	104.2	98.2	94.6	87.2	82.1	78.0	87.4	92.6	88.3	85.4	88.8	85.4
1993	96.08	83.2	80.9	82.0	80.7	80.2	67.3	89.6	102.4	105.1	109.5	112.0
1994	105.3	101.4	106.7	102.3	111.5	117.0	121.9	112	116.2	112.1	111.8	110.3
1995	114.7	116.9	107.3	106.7	106.2	105.2	100.2	107.1	107.8	106.1	110	106.3

SOURCE: COMPUTED FROM THE TABLE 3

Table 5: PERCENTAGE RATE OF CHANGE OF MONTHLY PRICES OF COCOA BEANS AT THE WORLD MARKET

YEAR	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUST	SEPT	OCT	NOV	DEC
1991	0	-3.5	-0.2	-2.9	-9.5	-9.7	-10.7	-2.4	7.7	9.8	8.8	11.1
1992	4.2	-1.8	-5.4	-12.8	-17.9	-22	-12.6	-7.4	11.7	-14.6	11.12	14.6
1993	-13.92	-16.8	-19.1	-18	-19.3	-19.8	-12.7	-10.4	2.4	5.1	9.5	12.0
1994	5.3	1.4	6.7	2.3	11.5	17	21.9	22	16.2	12.1	11.8	10.3
1995	14.7	16.9	7.3	6.7	6.2	5.2	0.2	7.1	7.8	6.6	10	6.3

SOURCE: COMPUTED FROM TABLE 4

TABLE 6: WORLD MARKET MONTHLY PRICES OF COCOA BEANS (1996 - 2002)

	1996	1997	1998	1999	2000	2001	2002
Jan	919.43	1008.77	1214.82	1036.15	669.6	742.57	1105.14
Feb	934.46	991.56	1215.46	1020.15	638.78	894.58	1197.54
Mar.	915.72	1105.76	1278.99	963.77	694.69	878.39	1273.32
April	1003.98	1145.40	1285.55	875.49	680.43	853.22	125.85
May	1054.25	1132.49	1335.33	787.04	693.42	855.18	125.85
June	1065.62	1214.30	1291.22	867.04	707.62	777.54	1274.95
July	1031.71	1217.76	1286.62	831.21	707.44	772.89	1404.51
August	1028.54	1220.05	1269.07	774.38	670.97	811.03	1484.18
Sept	1019.44	1301.49	1236.99	771.12	682.62	792.77	1637.41
Oct	1025.91	1271.03	1170.57	735.18	682.52	848.13	1676.48
Nov	1011.02	1233.23	1145.41	670.16	624.24	878.59	1362.80
Dec	1025.08	1282.90	1080.46	669.81	620.77	1057.05	1510.09

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Table 7: WORLD MARKET MONTHLY PRICE INDEX FOR COCOA BEANS (1996 - 2002)

YEAR	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUST	SEPT	OCT	NOV	DEC
1996	100	102	99.6	109.2	114.6	116	112	111.8	110.8	111.5	109.8	111.5
1997	109.7	108	120	125	123	132	132	133	141	138	134	139
1998	135	132	139	139	145	140	139	138	135	127	125	118
1999	112.7	110.9	104.8	95.2	85.7	94.3	90.4	84.2	83.9	79.7	72.9	72.8
2000	728	684	75.6	74.0	75.4	76.9	76.9	72.9	74.3	74.2	67.9	67.5
2001	80.8	97.3	95.5	92.8	93.0	84.6	84.6	88.2	86.2	92.3	95.6	115
2002	120	130	138	138	138	153	138.6	161	178	182	148	164

SOURCE: COMPUTED FROM TABLE 6

viewed as representing annual averages with annual price changes arising from shifts in these functions. Thus the average of transaction prices is taken as equal to the equilibrium price (Tomek G.1981). This is the implicit assumption of most empirical studies including this, which uses average prices for the monthly and yearly analysis. The advantage of these reported average prices is that, it is treated as an unbiased estimate of the true equilibrium price. Also,

geometrically, figures, were used to show in graphical forms monthly and annual price variation over the period of analysis (1991-2002). The monthly prices were grouped into two categories (A&B). Category "A" is the combination of monthly prices for five years (1991-1995) and category "B" for six years, (1996-2002).

TABLE 8: PERCENTAGE RATE OF CHANGE OF MONTHLY PRICES OF COCOA BEANS AT TRHE WORLD MARKET

YEAR	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUST	SEPT	OCT	NOV	DEC
1996		2	0.4	9.2	14.6	16	12	11.8	10.8	11.5	9.9	11.5
1997	9.7	8	20	25	23	32	32	33	41	38	34	39
1998	35	32	39	39	45	40	39	38	35	27	25	18
1999	12.7	10.9	4.8	-48	-14.3	-5.7	-9.6	-15.8	-16.1	-20.7	-27.1	-29.2
2000	-7.2	-13.6	-24.4	-26	-24.6	-23.1	-23.1	-27.1	-25.7	-25.8	-32.1	-32.5
2001	-19.8	2.7	-45	7.2	-7	-15.4	15.4	-11.8	-13.8	-7.7	-4.4	15
2002	20	30	38	38	38	53	53	61	78	82	48	64

SOURCE: COMPUTED FROM TABLE 7

TABLE 9 THE ANNUAL AVERAGE COCOA PRICE VARIATION AT THE WORLD MARKET 1991-2002

Year	Prices/tonne	Price index	Rate of change
1991	872.36	100	=
1992	780.52	89.5	-10.5
1993	800.04	91.7	-8.3
1994	973.86	111.6	11.6
1995	945.23	108.4	8.4
1996	1002.98	114.9	14.9
1997	1177.06	182.1	82.1
1998	1236.46	141.7	41.7
1999	833.45	95.5	-4.5
2000	672.76	77.1	-22.9
2001	855.17	98.0	-2
2002	1369.17	156.9	56.9

SOURCE: QUARTERLY BULLETIN OF COCOA STATISTICS VOL. 6 NO.1, 2003/04

The finding of this research is that world market prices for cocoa are unstable, as they are characterized by erratic price fluctuations. The major effect of cocoa price fluctuations on these countries is the inability of the exporting countries to forecast market prices, and expected annual income from cocoa export earnings. This tends to create and perpetuate the problem of improper budgeting and perpetually prior policy formulation for these countries, which cripples national planning.

RESULT AND DISCUSSION

World market monthly prices of cocoa beans (1991-1995) are shown in table 3. The observation is that between January 1991 and December 1994 the price of cocoa rose from \$ 873.57 to \$8978.97 per tonne representing 112% increment as shown in table 4. Between 1991 and December 1995 the price per tonne increased from \$8733.75 to \$928.39, representing 106.3%.

The study also revealed that between 1991 and 1995 world market monthly prices of cocoa recorded the lowest during 1992 trading season and the highest figure during 1994

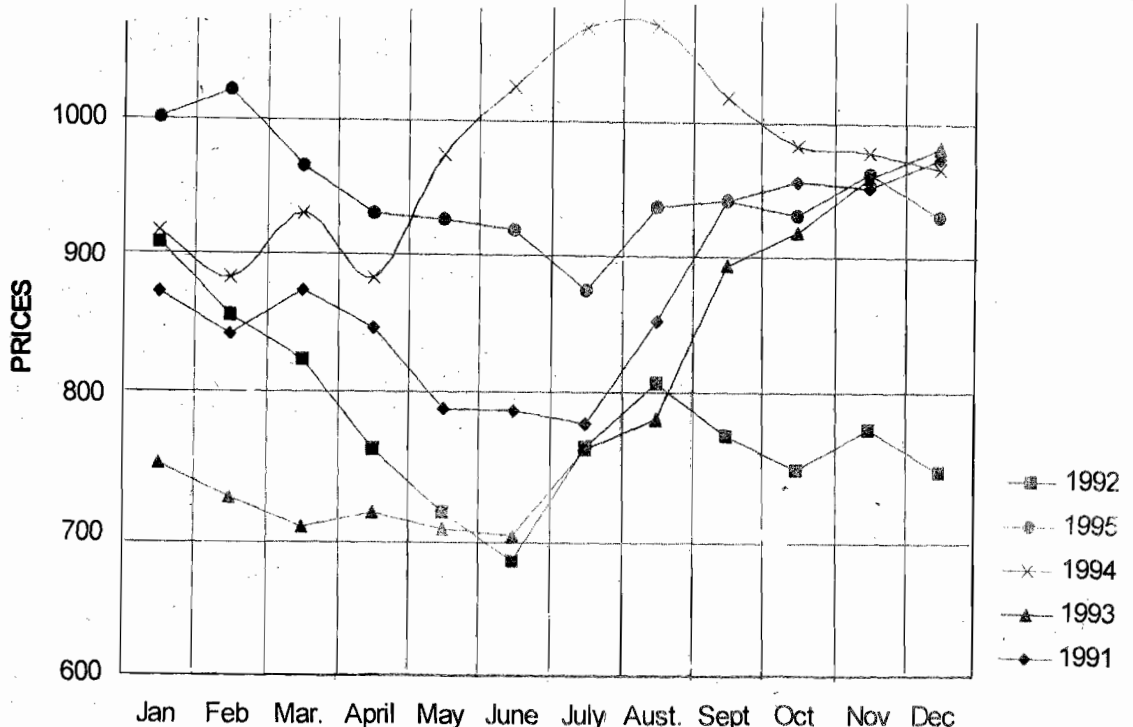


FIGURE 1 CATEGORY A: WORLD MARKET MONTHLY PRICES OF COCOA BEANS (1991 - 1995)

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