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THE IMPACT OF MARKETING BOARD POLICY
ON THE LEVEL AND VARIABILITY OF
COTTON PRODUCER PRICES IN UGANDA;
1945 - 1969.

BY

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ABSTRACT

This paper seeks to examine the impact Marketing Board operation has had on the level of cotton producer prices as well as the success of marketing policy in stabilising these prices. A model of the Ugandan cotton sector is presented in a relationship between a set of endogenous policy target variables (i.e. interseasonal and intraseasonal producer price variability) and a set of exogenous variables and parameters (i.e. producer prices, ginners' allowance, export tax rates, etc.) some subset of which are potential instruments of policy. Within these relationships, we analyse the interrelatedness of unit export revenue, ginners' allowance, ginners' prices as well as producer prices. We come to the conclusion that in the price determination exercise performed by the Marketing Board, producer prices are a "residual" item. Furthermore, we analyse and quantify the extent to which the Marketing Board has reduced the variability of producer prices. We conclude that prior to 1965, the level of prices set was frequently inoptimal and this encouraged intraseasonal fluctuations. However, we find that the Board has absorbed 15% of the total interseasonal instability, but because of the residual nature of producer prices in the disposal of unit export revenue, the price variable could not have been a "policy instrument" in the model. Therefore, prices could not have been positively adjusted so as to minimise their variability.

Export tax rates do not seem to have been varied for the purpose of stabilising prices either. Considering that this tax is unjustifiable from the point of view of world demand elasticity for Uganda cotton as well as the fact that the tax is resource distortive, we are then left with only one justification for this tax: a second-best solution to the government's fiscal needs. Finally, we observe that the Board's administrative costs have expanded out of proportion with the Board's level of operation due to internal inefficiency and political pressure on the Board to expand its bureaucracy as employer of "last resort". Nevertheless, we are led to conclude that a neutral tax such as a land tax with less "announcement effects" could be used to obtain the necessary fiscal revenue that might then be deployed to employ people in more productive occupations than marketing the cotton crop.

INTRODUCTION

There are several dimensions to the problem of agricultural marketing, but certainly the pricing question still attracts the greatest interest on the part of researchers in various parts of Africa. The pricing issue is not only important because it directly relates to the income and welfare of farmers, but also because prices are major signals in channeling resources into alternative lines of production thereby influencing the long run structure of the economy.

In studying the design and implementation of policy in respect to the cotton sector of the Ugandan economy, no analysis would be complete without making reference to the existing form of institutional arrangement in the pricing and marketing of the crop. The set up is dominated by the existence of a statutory Marketing Board which functions as an export monopoly and price stabilisation board.¹ Among other things, this body, called the Cotton Exporters Group during the period 1941 to 1949 and the Lint Marketing Board since 1949, has been charged with the responsibility for stabilising prices to producers over a given planting and harvest season, and as much as possible from one season to another. Simultaneously, the Board is vested with authority to fix a minimum price to be paid to farmers for all grades of cotton. This is done at the beginning of the crop marketing season.² It fixes the allowance payable to buying and processing agents. It determines when the crop season begins and when it ends; it designates official markets at which agents may buy cotton; it prescribes conditions of sale, handling, and storage; and it determines the grades of all cotton deliveries. It has power to advance "crop finance" to (some) marketing middlemen as well as power to determine the level of inventory in its storage facilities and the level of the "Price Assistance Fund".

It is important at this stage that we have working definitions of certain terms related to the design and execution of policy in order that we may be able to put the "duties" and "powers" of the Marketing Board into analytical perspective. Conceptually, we can describe the structure of the cotton industry in Uganda by the following

1. For a classification of Marketing Boards, see 20.

2. Prior to 1969, the Board fixed minimum producer prices at the beginning of the planting season, April/May, but announced "actual" prices at the beginning of the marketing season (November/December).

structural equation:

$$(1) \quad f(x_1, x_2, \dots, x_n; a_1, a_2, \dots, a_m) = 0$$

where x_1, x_2, \dots, x_n are n endogenous variables comprising such items as output of cotton, the variance of producer prices, etc., a_1, a_2, \dots, a_m are m exogenous and / or lagged variables or parameters comprising such items as export prices, export tax rates, ginner's allowance, etc. Following Jan Tinbergen (46) we shall define a "policy target variable" as some subset of x_1, x_2, \dots, x_n with which the policy is concerned. In our analysis, such policy target variables are intraseasonal producer price variability and interseasonal producer price stability. Furthermore, an "instrument of policy" will be defined as a parameter belonging to the set a_1, a_2, \dots, a_m which is controlled administratively by the Marketing Board. In this analysis, producer prices, ginner's and processors' allowances and government export tax rates, all of which may be under the control of the Board, could be instruments of policy. A "measure" will be defined as a change in an instrument of policy. Finally, we shall say that "policy" consists of a set of target variables or target preference functions and a set of measures aimed at the fulfillment of these targets.

The purpose of this paper is to utilise time series data on domestic and world market prices as well as other data to study the process by which producer prices as well as middleman prices are determined and also to ascertain the extent to which marketing policy has been so designed and so executed as to minimise producer price variability in Uganda's cotton sector; this being one of the principal targets. In presenting the data and its interpretive analysis, we shall basically be testing the null hypothesis that given the mechanism by which producer prices are determined, these prices are "policy instruments" and they have therefore been so determined as to minimise their interseasonal as well as their intraseasonal variability. Against this statement, we shall also be simultaneously testing a competing (alternative) hypothesis that given the same mechanism by which producer prices are set, these prices are not "policy instruments", and therefore they could not have been so determined by the marketing authorities as to consciously and positively minimise their variability.

DETERMINATION OF PRODUCER PRICE

The Lint Marketing Board and the government set the minimum producer prices for seed cotton, but they do not physically make payment to the growers. The Board as a paying agent only pays the processing middlemen (ginners) for deliveries to the Board of lint and seed. The ginners in turn pay the farmers for the purchase of seed cotton. The Lint Marketing Board, therefore, simultaneously determines price at two levels -- the minimum price that ginners can pay farmers and the actual price that ginners can receive from the Board for lint and seed. The difference between actual price received by farmers and actual price received by ginners is the ginner's approved processing and baling cost allowance plus a per unit profit margin determined mutually by the Board and ginners. In this respect therefore, the entire price fixing mechanism can be called a per unit cost pricing exercise.

At the beginning of a crop season, the Marketing Board forms some ex ante idea of average selling price and the marketable quantity of cotton lint and seed for the season. The ginning and baling allowance to the middlemen is determined in advance of the season by a formula described in the next section. Then with due allowance for its own marketing costs and (supposedly) the level of the Price Assistance Fund, the Board decides what minimum price growers will be paid by ginners for seed cotton.

DETERMINATION OF PRICES PAID TO GINNERS

Allowances

A Lint Price Fixing Committee was set up in 1955 under section 7(1)a of the Lint Marketing Board Ordinance, 1949, to devise a formula for lint prices payable to ginners by the Marketing Board. Its problem in essence was to determine the cost structure of ginners. It listed sixty-five standard items of expenditure for the ginning firms. These are mainly materials, labour, property rental and insurance.³ In calculating allowable total middleman's costs, each of these items is weighted by the average bale output per "working" ginnery

3. The complete list of all items is given in the Appendix.

in each cotton district for the preceding crop season. Then, allowances are made on the basis of the cost of these weighted items.

As an illustration, call "G" one particular ginner in a specified cotton ginning zone. Let his inputs be indexed i . By definition, $i=1, 2, \dots, 65$. Let x be the physical magnitude of the i -th input. If the average bale output per working ginnery in the zone was "e" in the previous crop season and p_i is the price of the i -th input, then G's ginning and baling allowance would be:

$$e \frac{\sum_{i=1}^{65} p_i x_i}{65e}$$

In fact, since the magnitude of "e" is an average and therefore does not vary with individual ginners, the expression above represents the middleman's cost allowance given by the Lint Marketing Board in its pricing decision.

From year to year, some of the p_i is adjusted to allow for changes in the cost of materials or services. Often because of interdependence between some of these items, adjustment in one of them necessitates adjustment in others. As an example, in 1959, because the prices receivable by growers were increased over their 1956 level, ginners' allowances for insurance of cash in transit, anticipatory exchange and interest on seed cotton purchases had to be revised upwards.

Reimbursement of Ginners for Paying Farmers the Statutory Minimum Price

In the process of fixing ginners' prices the Board also considers reimbursing the ginners for the price they had to offer farmers. The farmers' price set by the Marketing Board is based on a seed cotton value while the reimbursement must be based on a lint cotton value. The Board's problem, therefore, is to interpret the seed cotton value into a lint cotton value.

First, the Board has to have a measure of the lint output ratio for each variety of cotton and for each cotton district. Lint output ratio is defined as the weight of lint derived from one unit

weight of seed cotton. (In Uganda, the lint outturn ratio is on the average 1/3.) If the minimum allowed producer price (for seed cotton) were P^D , then its lint equivalent would be P^D/n . In general, for a lint outturn ratio $n(0 < n < 1)$, and a producer price P^D , $\frac{P^D}{n}$ is the amount the ginners receive from the Lint Marketing Board to allow for the ginners' payment to the farmers of the minimum producer price set by the Board.

The Board's Charge to Ginners for Cotton Seed

In the ginners, lint and cotton seed are joint products and both have a value. The ginners get a price also for the seed; a bi-product of the ginning process. The Lint Marketing Board therefore makes a nominal charge to ginners for this saleable seed. The charge is used to adjust downwards the final ginners' price for lint. This lint price adjustment factor is determined in the following way: suppose again n was the lint outturn ratio and m an allowable wastage factor satisfying the condition $0 < m < 1$. Then, $1 - (m+n)$ shows how much seed is produced and offered for sale to the Lint Marketing Board per pound of seed cotton purchased by ginners from growers. Furthermore $\frac{1}{1 - (m+n)}$ shows the amount of seed cotton required to produce one pound of cotton seed. Therefore, $\left(\frac{1}{1 - (m+n)}\right)^n$ shows the amount of cotton lint which will be produced from the seed cotton required to produce one pound of cotton seed. Furthermore, if the Board makes a nominal charge to ginners for seed of S cents per pound, then the cotton seed factor by which the price of lint will be adjusted downwards is:

$$\frac{S}{\left(1 - \frac{m+n}{1}\right)^n}$$

In the final analysis, therefore, if we denote the price of lint received by ginners from the Marketing Board by P^G , then,

$$P^G = e \frac{\sum_{i=1}^{65} P_i K_i}{65 e} \quad \frac{P^D}{n} = \frac{S}{\left(\frac{1}{1 - (m+n)}\right)^n}$$

Final Settlement Between Ginners And The Lint Marketing Board
At The End of The Crop Season

At the end of a current season the lint outturn ratios are recalculated on the basis of figures of total cotton lint and cotton seed sold by ginners to the Lint Marketing Board during the season. If these turn out to be higher than those of the previous season (on which the current season's ginners' price estimates were based), then ginners are required to refund to the Lint Marketing Board the difference between the recalculated "ex-ginnery" prices (for lint and seed) and the actual "ex-ginnery" prices paid by the Board. Conversely, if the lint outturn ratio turns out to be lower than in the previous season, then the Board pays ginners the difference between the recalculated ginners' price and the provisional price paid during the season.

The Marketing Board's Purchase Price of Cotton Seed from Ginners

There is no comparable systematic way in which prices of cotton seed paid to ginners by the Board are determined. Usually these prices are much below their market value and the Board makes its biggest profits from the trade in cotton seed. The Marketing Board maintains that cotton seed is just a bi-product of the ginning process and ginners have expended no resources to produce it. Farmers, too , who in the final analysis are responsible for producing the seed, are rarely aware that in selling seed cotton, they are selling lint and seed as two products potentially marketable separately. These factors have given the Lint Marketing Board a strong hand, and the Board has in the past appropriated for itself most of the value of cotton seed. The seriousness of this pricing error was not realised until 1972, as is described below.

Cotton seed is the raw material for the manufacture in Uganda of edible (cooking) oil. During 1972, the oil mills in Uganda were unable to get enough cotton seed from the Marketing Board because deliveries to the Board of cotton seed by ginners almost came to a stop. There developed a black market trade outside Uganda in Uganda's oil seed and even in the small quantity of edible oil still manufactured in the country from the minimal seed available.

This consequence of the seed pricing problem was potential before 1972 but was never real because the ginners, 60% of whom were of Asian origin, were politically and economically cooperative with the state marketing system. As soon as political misunderstandings

developed between the two parties, cotton seed and therefore edible oil disappeared from the country. Notwithstanding the racial overtones, this was essentially a pricing problem.

LOCAL GOVERNMENT BONUS

The local authorities are paid a bonus of shillings 1.40 per 100 pounds of raw cotton produced in each administrative district. This was originally given to the district administrations as a reward for these local authorities' assistance in expanding production of cotton. This income is now regarded by the local administrations as a source of general finance rather than an incentive to encourage cotton growing. (7,p.18)

EXPORT DUTY

Export duty payable on all lint cotton exported or sold for export is assessed on a sliding scale based on F.O.R. (free on rail) Uganda Station value of lint. The scale for first quality lint (A.R. Lint) is as follows:

Table 1: Cotton Export Tax Rate (Uganda Cents).

F.O.R. Value /lb.	Tax
50 and below	0
50.01-60.0	2
60.01-70.0	3
70.01-80.0	4
80.01-90.0	6
90.01-100.0	9
100.01-110.0	11
110.01-120.0	13
120.01-130.0	15
130.01-140.0	17
140.01-150.0	19
150.01-160.0	21
160.01-170.0	23
170.01-180.0	25
180.01-190.0	27
190.01-199.58	29
199.59-209.56	31

Table 1 cont.

209.57-219.54	33
219.55-229.52	35
229.53-239.50	37
239.51-249.48	39
249.48-259.46	41
259.46-269.44	43
269.44-279.42	45

Export duty is the most important item of expenditure apart from implicit payment to growers in the Marketing Board trading accounts. There may, therefore, be an a priori reason to believe that it exerts a lot of pressure on the level and variability of producer prices. This problem is discussed below.

OTHER ELEMENTS IN THE PRICING DECISION

Other factors of significance in the pricing decisions of the Marketing Board are administrative expenses, transport, storage, maintenance and "miscellaneous" expenses incurred by the Lint Marketing Board.

MINIMUM PRODUCER PRICES AS A RESIDUAL ITEM

We are now in a position to see the effect on producer prices of the very mechanism by which these prices are derived. For every expected f.o.r. price of A.R. lint, the Marketing Board deducts the ginner's allowance, export duty, the local government bonus, transport costs and the Board's expenses. To the balance is added a profit derived from the sale of cotton seed. The sum is multiplied by the lint out-turn ratio in order to convert it to a price per pound of seed cotton. Thus one observes that the minimum producer price fixed is essentially a residual item. This has the serious implication that the greater the portion of the export price taken up by other items, either as a result of legislative measures or as a result of pure inefficiency in running the marketing institutions, the lower is bound to be the residual item, the producer prices set by the Board. The Lint Marketing Board may also, other things being equal, end up with a net surplus or loss according to whether or not it underestimates the realisable f.o.r. price for lint cotton and profit from cotton seed.

This vulnerability of producer prices to effects of policy measures aimed at other goals within the marketing model and the equal vulnerability to the marketing institution's inefficiency is borne out by the report of the 1966 Government Commission of Inquiry into the Cotton Industry. This Commission's report suggested to the government that producer prices should be decreased to make them "realistic" so that the Marketing Board will not continue to bear deficits. (7,p.11) This recommendation was made as if the level of producer prices explained the size of the Marketing Board's deficits. Such a recommendation was clearly based on an insufficient analysis of the structure of per unit prices, and demonstrates the inbuilt downward pressure on producer prices.

OPTIMALITY OF PRODUCER PRICE AND GINNERS' EQUILIBRIUM

Ginners try to maximise their total profits from any one crop season's operations. With the form of allowances described in the preceding section, they try to increase their profit per unit by purchasing the 65 "allowed" input items from the cheapest source and often at the expense of quality. Cases are documented in the marketing reports where complaints have been lodged against some ginners for using sub-standard gunny bags and outdated weighing spring balances which understate the weight of seed cotton purchased from growers. (7,p.20) Whenever possible, they also try to overstate the cost of these items, especially wages to African employees. With the level of unit profit determined, since it does not vary with the volume of sales, a ginner's total profits will depend on his level of turnover and efficiency of operation.

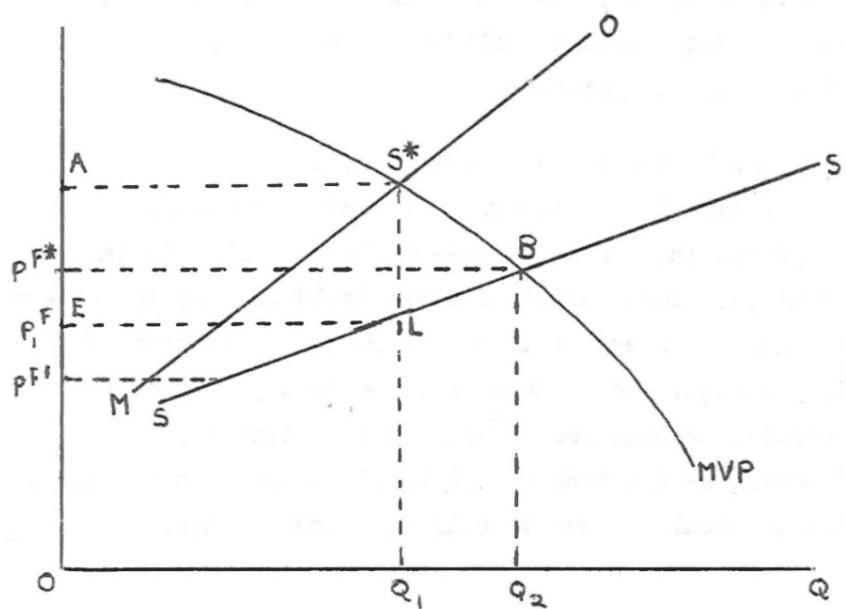
The decision by the Board to interfere in the pricing mechanism at the ginning level primarily to protect the interests of farmers presupposes that market forces would be unable to settle a fair producer price. Such market failure could be a consequence of the behaviour of the ginners as if they were in a situation of oligopsony. In principle each ginner could be in a position of monopsony, especially because poor transportation limits the possibility of moving seed cotton over long distances. On the other hand, this situation could be due to collusion among ginners.

In order to analyse the evidence about the optimality or inoptimality of previous ginners' prices fixed by the Board in relation to those fixed for farmers, let us start with the following assumption: given the pricing system and the legal obligation by the Board to purchase all deliveries of lint cotton, a ginner's marginal revenue is not a function of the level of his sales to the Board. For the ginner, therefore, there is no trade-off between the level of sales and the marginal increment to total revenue from these sales. This is a condition comparable to the perfect competition case; an infinitely elastic demand curve for the ginner's output.

On the input side, we shall portray conditions of potential monopsony and its associated equilibrium. Then we will show the possible equilibrium positions corresponding to the Board's minimum producer price, the instrument by which the marketing arrangement imposes on the ginners perfect competition conditions in the market for seed cotton input. Within this framework, it is possible to explain past intraseasonal producer price fluctuations as a response to inoptimal producer prices which the ginners were required by the Board to pay to farmers.

The possible perfectly competitive equilibria that the Marketing Board may impose on a ginner and his potential monopsony equilibrium are depicted in Figure 1.

Figure 1: Equilibrium of a Ginner Under Monopsony and the Scope of Marketing Board Regulation.



Beginning with the ginner's potential monopsony position, in Figure 1, MO is the marginal outlay curve (or marginal expenditure), SS' the supply curve for seed cotton and MVP is the ginner's marginal value product -- the increment to total revenue due to the purchase of an additional unit of seed cotton. This quantity depends on the marginal product of seed cotton in the production of lint cotton since the ginner's price is fixed by the Board, thereby artificially creating a perfectly competitive demand curve for lint cotton.

A profit maximising ginner would aim at purchasing OQ_1 of seed cotton, pay farmers a price of OP_1^F and make monopsony profits equal to the rectangle ELS^*A .

In trying to change the market structures (determining the equilibrium of the ginner) towards perfectly competitive conditions, the Marketing Board should try to shift point L on the supply curve to point B by trying to determine a farmers' price P^{F*} . Such a price would make the effective supply curve $P^{F*}BS'$. At this price, the farmers would not only be getting a higher price for their seed cotton but also the volume of seed cotton ginned would increase from OQ_1 to OQ_2 which is socially desirable.

The Stability of Intra-Seasonal Producer Prices

The history of Marketing Board pricing in Uganda's cotton industry is a story of mixed success. With regard to the policy goal of stabilising intra-seasonal producer prices, success has occasionally in the past been impaired by the inability of the Board to set an optimal producer price at the beginning of the season.

In the context of the model depicted in Figure 1, the only optimal producer price is OP^{F*} . If the Board were to fix a price greater than OP^{F*} , then the supply of seed cotton to ginner would be in excess of their demand. It would necessitate a downward revision of the price. There has in the last eight years been a crisis in the ginning industry in the sense that ginner and Commissions of Inquiry have complained that the ginning industry cannot operate optimally because not only is the ginning margin too small, but also the Board fixes the producer price too high, such as in excess of OP^{F*} in Figure 1. The merits of this contention will be discussed.

When the Board has set the farmers' price well below OP^{F*} , the effect has been much more distinct and much more interesting from the point of view of industry adjustment. In the context of the model in Figure 1, consider a farmers' price set by the Marketing Board at $OP^F < OP^{F*}$. At a producer price so low, the ginning industry tends to be more competitive. Ginners would compete for deliveries of seed cotton by farmers. This would have the effect of pushing up producer prices from time to time within one crop season above the Board's stipulated minimum. This phenomenon reduces the marginal profit by reducing the marginal value product (assuming diminishing returns) and increasing the marginal outlay. The difference between actual producer price and the minimum producer price set by the Board could then be looked at as a measure of the Board's error in assessing the optimal producer price in relation to the ginners' price.

In Uganda from time to time the producer price for seed cotton has been bid up by ginners during a single crop period thus implying that lower than optimal producer prices had been fixed by the Lint Marketing Board. This was a common phenomenon during the period 1950 to 1960.

Recent Developments

The process whereby a ginner bids up producer prices in an attempt to attract some share of seed cotton that would otherwise be purchased by other ginners may cease with collusion among ginners. Furthermore, the bidding capacity of ginners depends on their actual realisable profit margin. The ability of the ginning organisation in Uganda to bid up producer prices has decreased and almost ceased in recent years. Firstly, as the ginning industry becomes more and more controlled by the co-operatives, there is less competition (especially since 1965) as compared to the pre-1965 period when private entrepreneurs dominated the industry. Secondly, the co-operatives are reputed to exhibit less business acumen, and they do not get as favourable terms from the Board in fixing profit margin as the private entrepreneurs did. This leaves them with less profit potentially transferable to producers. Thirdly, because of various types of inefficiency, especially in personnel and financial management, co-operatives are high-cost organisations vis-à-vis their private entrepreneurial counterparts. This reduces their realisable marginal profit. Therefore, unlike the pre-1965 era, the recent period of co-operative domination of ginning has been characterised by a situation where actual producer

prices during the seasons are the same as the minimum producer prices set by the Board at the beginning of each season.

THE HISTORICAL STRUCTURE AND STABILITY OF INTERSEASONAL PER UNIT PRICES UNDER MARKETING BOARD TRADING

Having discussed the factors relevant to the determination of producer prices and the mechanism by which the marketing system determines these prices, we can now analyse the relative significance of these factors in the determination of past producer prices and the extent to which the Marketing Board has been able to behave in a way such as to stabilise producer prices vis-à-vis world market prices.

In Table 2, the absolute magnitude of each of the six factors determining the level of producer prices is presented. Furthermore, the percentage of the total export price is shown for each factor. It will be noticed in row 1 of the table that producer prices have at their highest been 23.9% of the c.i.f. export price. The ginning and baling allowances were a lower percentage of c.i.f. export price than the producer prices were up to 1958, but remained higher from then up to 1965. Then the Lint Marketing Board substantially reduced this allowance to make good its deficits. Export tax as a percentage of export price was highest at 10.7% in 1951, and until 1953 was a bigger share of export price than producer price. The relative percentages of the two remained about the same up to 1957, when export prices started falling. Thereafter, the percentage of export taxes has been substantially lower. Until 1952, the share of Marketing Board net surplus (deficit) was more than twice as large as the share of producer price in the export price. Thereafter, its share was lower but positive up to 1958. It has since been negative and somewhat increasing in absolute value except for the year 1960. By far the biggest share of the export price is the item listed as "Administrative, Freight, Insurance, Marketing and Miscellaneous Expenditure". Unfortunately, because of data deficiencies, it was not possible to break down this item completely into its component parts, but as can be seen, its share of the export price is unbelievably high. Almost each year it is more than twice the share of producer prices. It is worth noting that this figure also reveals an index of the bureaucratic inefficiency of the Marketing Board and also the

Table 2. A Comparison of Producer Prices, Ginning and Baling
Export Price.

	1950	1951	1952	1953	1954
1. Producer Prices per lb. of seed cotton	33	45	50	50	51
2. % of Export Price.....	12.2	10.8	12.4	16.7	16.8
Ginning and Baling for Export.....	23	25	33	57	46
% of Export Price.....	8.5	6.0	8.2	19.0	15.1
3. Local Gov't Bonus and Railage Charges.	16	18	22	8	12
% of Export Price.....	5.9	4.3	5.5	2.7	3.9
4. Administrative, Freight, Insurance, Marketing and Miscellaneous Expenditure	97	91	107	135	125
% of Export Price.....	35.9	21.9	26.6	45.0	41.1
5. Export Tax	42	86	80	44	49
% of Export Price	15.6	20.7	19.9	14.7	16.1
6. Marketing Board Net Surplus/Deficit.....	.59	.151	.111	.6	.21
% of Export Price.....	21.9	36.3	27.5	2.0	6.9
7. Export Price of Lint Cotton, c.l.f. Liverpool quoted by ICAC.....	270	416	403	300	304

Source : Uganda Lint Marketing Board, Annual Report.

Allowance, Marketing Costs, Export Duty and Marketing Board Surplus (Deficit) with

Cents Per Pound

1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967
61	55	56	58	47	48	55	57	57	51	56	40	45
19.8	18.5	18.4	22.3	18.6	17.6	21.3	n.a	23.9	20.2	22.2	17.9	20.1
42	50	53	53	52	53	57	58	58	74	50	36	40
13.6	16.8	17.4	20.4	20.2	19.5	22.1	n.a	24.4	29.4	19.8	16.1	17.9
10	14	14	16	16	16	18	8	18	22	30	30	22
3.2	4.7	4.6	6.2	6.2	5.9	7.0	n.a	7.6	8.7	11.9	13.5	9.8
129	125	128	140	151	94	110	122	99	143	109	147	100
41.9	41.9	42.0	53.9	58.5	34.6	42.6	n.a	41.6	56.7	43.3	65.9	44.6
49	46	51	30	26	35	33	28	49	31	32	24	22
15.9	15.4	16.7	11.5	10.1	12.9	12.8	n.a	20.6	12.3	12.7	10.8	9.8
.17	.8	.3	-37	-34	-16	-15	-49	-43	-9	-25	-54	-15
5.5	2.7	1.0	14.2	13.2	5.9	5.8	n.a	18.1	3.6	9.9	24.2	6.7
308	298	305	260	258	272	258	n.a	238	252	252	223	224

"underrealisation factor".⁴ But we can only at best make general statements based on a priori knowledge since the data is not sufficiently detailed for an empirical establishment of these possibilities.

INTERSEASONAL STABILITY OF PRODUCERS' ~~INCOME~~ PRICE

Instability Index

Traditionally, two alternative measures of instability have been used in this type of study, average annual percentage change and average annual percentage deviation from trend. However, there are serious limitations to the use of annual percentage change as an index of instability in time series analysis.

In the first place, if there exists differing trends from period to period, it is not possible to make meaningful comparisons among the instabilities of various periods; those with rising or falling trends will show an upward bias in this instability measure relative to those with no trend, the bias increasing with the steepness of the trend.

Secondly, where the intention of the stabilising operation is to smooth out short term fluctuations from longer term movements, year to year changes may not be as important as the distance each year from the long run pattern. We therefore do not use this index in our analysis.

Observation of data shows that straight line or exponential trends do not reflect accurately the relevant medium term movements of Uganda's cotton export prices and incomes in the postwar period which were to be smoothed. Therefore, a five year moving average was employed instead. The average of deviation from the five year moving average, each expressed as a percentage of the centered five year moving average, therefore, has been calculated as the most appropriate measure of instability.

4. P.T.Bauer defines "underrealisation" as the revenue per unit forgone by the Board's inability to realise the highest possible world market price which private exporters do seem to realise for comparable commodities. See 27, p.340.

Algebraic Definition of the Index

Let X be the observed variable in each of the samples, T the size of the sample and t a time subscript.

Definition (i) :
$$A_t = \frac{X_{t-2} + X_{t-1} + X_t + X_{t+1} + X_{t+2}}{5}$$

Definition (ii) :
$$Y_t = 100 \left(\frac{X_t - A_t}{A_t} \right)$$

Definition (iii) :
$$I = \frac{\sum_{t=3}^{T-2} Y_t}{T-4}$$

The latter definition is the relevant instability index.

Stability of Producer Prices vis-a-vis World Market Prices

Table 3 shows the data on producer prices for the period 1945 to 1969 and the computed instability index. Table 4 shows the data on cotton export prices and the computed instability index. The total instability of Uganda's cotton export prices, as measured by average annual percentage deviation from a centered five year moving average trend, is 8.5% ($I^W = 8.5$ in Table 4). Instability index of producer prices is 6.7% ($I^D = 6.7$ in Table 3). One must admit, therefore, that total instability even of world export prices has been relatively small. Nevertheless, total instability has been decreased by roughly: $\frac{1}{8.5} (8.5 - 6.7) = 15\%$.

EFFECTS OF POLICY MEASURES ON THE STABILITY OF PRODUCER PRICES

We shall now try to see to what extent the price stabilising effect calculated in the last section is due to any positive policy towards that goal. We shall first show graphically the Board's per

Table 3. Instability of Cotton Producer Prices Under Export Monopoly Trading,
1945 - 1969.

		Cents Per Pound													
		1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956		
Producer Prices of Cotton (X_t)		16	18	20	22	30	33	45	50	50	51	61	55		
Trend of Producer Prices (5-year centered moving average) (A_t)		-	-	21.2	24.6	30.0	36.0	41.6	46.0	51.4	53.4	56.6	58.0		
Annual percentage Deviations from Trend (Y_t)		-	-	-0.6	-9	0	-9.0	+10.0	+8.7	-2.0	-4.5	+8.0	-5.1		
1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	Average		
56	58	47	48	55	57	57	51	56	40	45	50	50			
57.2	54.6	54.6	54.8	54.6	55.6	57.2	54.2	51.8	50.4	50.2	-	-			
+2.1	+8.0	-14.0	-12.0	+3.0	+4.9	0.3	6.0	8.1	20.0	13.1	-	-			$I^D=6.7$

Source: i) Uganda Ministry of Agriculture, Annual Report, 1962-1970.

ii) Uganda Ministry of Finance, Background to the Budget, 1971.

iii) East African Statistical Department, Economic and Statistical Bulletin, 1965-1967.

Table 4. Instability of Uganda's Cotton Export Prices (based on c.i.f. Liverpool Quotations, 1945-1969).

	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956		
Export Price of Cotton (X_t)	142	137	151	241	250	270	416	403	300	304	308	298		
Trend of Export Prices (5-year moving average) (A_t)	-	-	184	210	266	316	328	339	346	323	303	295		
Annual % Deviation from Trend (Y_t)	-	-	-18.0	+14.8	-6.0	-14.5	+23.8	+18.9	-13.3	-5.9	+1.7	+1.0		
	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	Average
	305	260	258	272	258	n.o.a.	238	252	252	223	224	257	252	-
	286	279	271	n.o.a.	257	256	254	245	238	234	234	-	-	-
	+6.6	-6.8	-4.8	n.o.a.	+0.4	n.o.a.	-6.3	+2.9	+5.9	-4.8	-4.3	-	-	$I^w = 8.5$

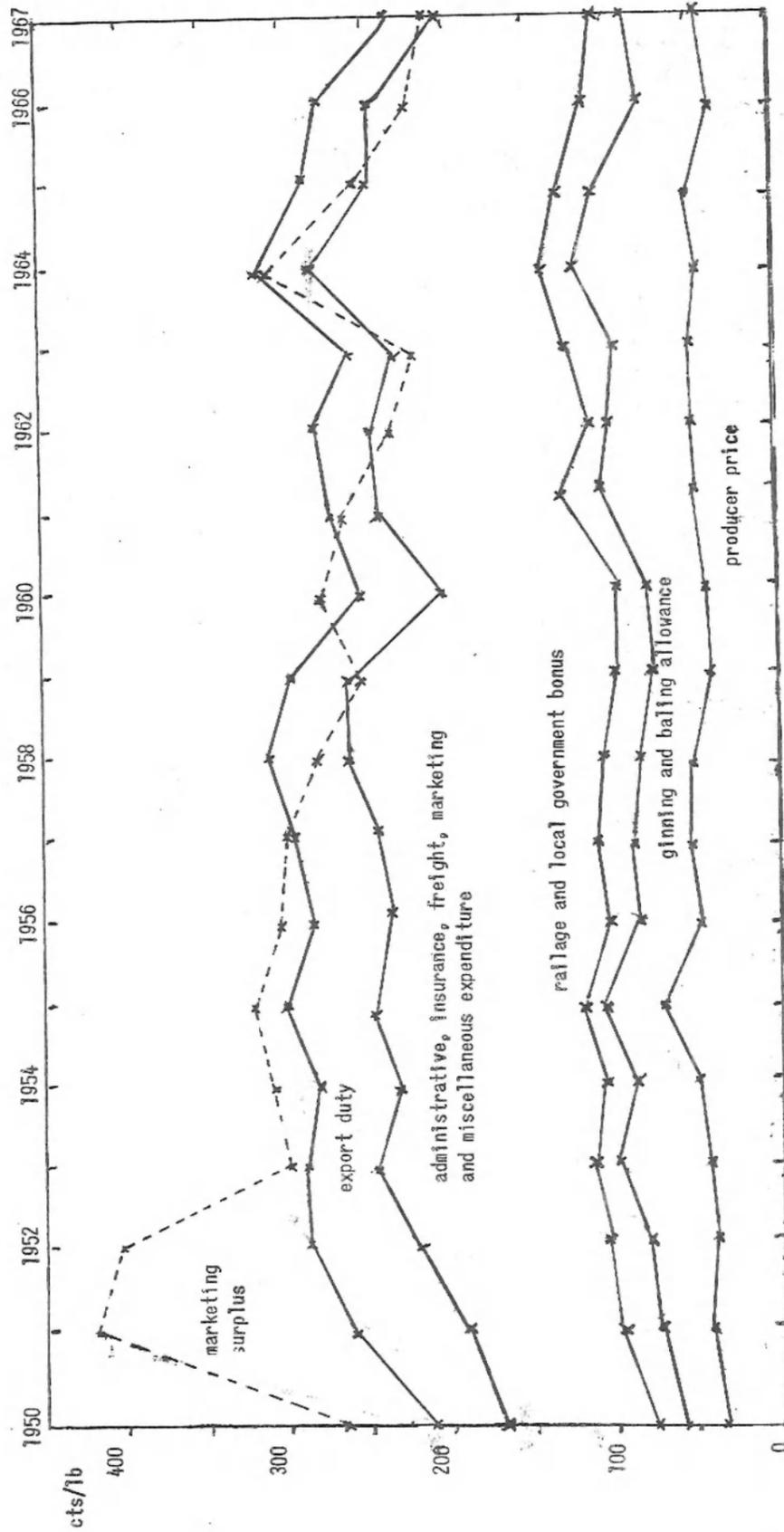
Source: International Cotton Advisory Committee. Report, 1940-1970.

unit revenue and expenditure. This is done in Figure 2. In this graph, we observe that the least stable items have been Marketing Board surplus and administrative insurance, freight, marketing and miscellaneous expenditure. By and large, the rest of the items' shares of export price have been stable except ginning and baling allowance after 1964. However, we cannot say that the instability of the Board's marketing surplus, the Board's administrative, marketing and miscellaneous expenditure and the recent instability of the ginners' allowance have been the factors shielding producer prices from export price instability. Firstly, the reduction of the ginners' allowance has been a deliberate attempt by the Lint Marketing Board to make up for its marketing deficit rather than to stabilise prices. This was a measure that the 1966 Cotton Industry Report deplored, since according to the Report producer prices rather than ginning allowance should have been adjusted downwards to make them "more realistic". (7, p.11) As is suggested by Figure 2, the existence and persistence of deficits has been more due to the increase in the Board's operating costs than to an unrealistic level of producer prices. This deficit does not even seem to depend on the fluctuations in export price. In fact, since 1959 export prices seem to have stabilised along a trend exhibiting a two-year cycle. Since it is also observable that export duty relative to producer prices has been more or less stable, the bulk of the Board's trading deficits can only be explained by the increase in the Board's operating costs relative to export prices and relative to the level of cotton exports. In essence, the Board should be made to operate more efficiently in order to overcome its deficits.

What can we then identify as the policy measures in our marketing model: changes in export tax rates, changes in the rate of annual Marketing Board surplus, changes in the level of the Price Assistance Fund, changes in export revenue or changes in producer price itself? Before we can determine whether these have or have not constituted policy measures, we must first determine which of them are potential policy instruments as defined in the first section. We shall start by determining the number of degrees of freedom to execute a policy measure in this model.

If the marketing system can independently adjust producer prices, local government bonus, ginning and baling allowance, the rate of export duty, the level of the Price Assistance Fund and administrative, marketing and miscellaneous expenditure, then it cannot independently adjust Marketing Board surplus. This failure would be a result of the

Figure 2. Producer Prices in Relation to Ginning and Baling Allowance, Marketing Costs, Export Duty and Marketing Board Surplus/Deficit, 1950-1967.



existence in the system of an exogenous factor, export income, which clearly the Board cannot control. Therefore, in general, we can say that the system potentially has six degrees of freedom. We have already pointed out that producer price is a residual item. It is, therefore, not independently controlled by the marketing authorities. Therefore it is not a policy instrument and changes in producer price do not represent policy measures.

The instability of the Board's surplus has also been a result of increases in the administrative, marketing and miscellaneous expenditure. Therefore, the Board has failed to control both administrative cost and deficit, so that possibly one but not both can be classified as policy instruments. Since the Board claims to be eager to reduce its deficit but has not done so, it is clear that analytically the surplus/deficit item on the balance sheet is not a policy instrument as defined in the first section. This leaves the possibility open that administrative expenditure may be an instrument of policy.

Government bonuses, ginning and baling allowance and the level of the Price Assistance Fund can all be administratively controlled independently and they are therefore potential policy instruments.

Having identified potential policy instruments, we are now in a position to say what policy measures have actually been invoked. The data in Table 2 and its graphical form, Figure 2, show that there has not been any significant instability (change) in local government bonus and the rate of export duty. However, there have been changes in baling and ginning allowances; the level of the Price Assistance Fund was constantly changed and the fund was eventually abolished. The level of administrative, marketing and miscellaneous expenditure has fluctuated too. These are all the changes which could indicate possible policy measures taken by the cotton marketing authorities. The baling and ginning allowance measures were designed to ease the Marketing Board deficit, the Price Assistance Fund measures were to subsidise the Government's fiscal programs, and the administrative, marketing and miscellaneous expenditure measures were to finance an expanding marketing bureaucracy. None of these measures had the effect of subsidising producer price.

The inescapable conclusion is that the much-talked -about producer price subsidy associated with Lint Marketing Board trading and very well publicised by the Board in its annual reports is in fact a subsidy to the Board to cover its soaring operating costs, which have not been matched by increases in the volume of cotton traded or the amount of revenue earned by the Board.

One then asks the question: What factor has brought about the 15% reduction in instability? A plausible answer may be that prices were fixed so low in the early stages that this level could have been maintained irrespective of any price-related policy measures within the marketing model.

CONCLUSION

The minimisation of interseasonal and intraseasonal variability of producer prices has been one of the principal targets in the design and implementation of marketing policy in Uganda's cotton industry. It has been shown in our analysis that although world market price fluctuation about a five-year centered moving average was 8.5%, the comparable fluctuation of domestic producer prices was only 6.7%. Thus the Board has exercised a price stabilising effect equal to 15% of the total magnitude of instability. While we must observe that the total instability even of world export prices has been relatively small, we must nevertheless accept that the Board achieved some producer price stability in the face of fluctuating world market prices. However, given the residual status of producer prices in the disposal of unit export earnings by the Board, we cannot accept that the stability of these prices vis-a-vis export prices has been a result of any systematic policy measures. We therefore reject the null hypothesis that because the Board determines producer prices, it has, therefore, adjusted them as a policy measure to achieve their stability. We accept the alternative hypothesis that given the mechanism by which the marketing arrangement determines producer prices, prices are not a policy instrument and therefore the relative stability of these prices vis-a-vis world market prices is purely coincidental.

The analysis has also shown that the marketing structure is operating inefficiently. The system as portrayed has potentially six degrees of freedom or different ways in which the Board could

execute a policy measure. However, under the present organisation, the Board has failed to control its deficits (surplus) not because it cannot control export revenue (which it cannot control anyway), but because it cannot control administrative, marketing and miscellaneous expenditure. Thus the deficit is not a result of any factors exogenous to the system but is a result of internal structural defects. When we also recall that the nature of the mechanism by which producer prices are determined does not make producer prices a policy instrument, then the Joint Marketing system as presently constituted has only four degrees of freedom, two less than could be attained. Thus we have an unusual situation in which the Board's surplus(deficit) which should be expected to depend on the uncontrollable variations in export revenue (with the Board or government controlling all other items) actually originates from the endogenous variables in the system. In making this point, however, we cannot forget the political pressures upon the Marketing Board to expand its bureaucracy as an employer of last resort. Furthermore, we must not lose sight of the fact that given the fairly price elastic world market demand for Uganda cotton, there could be no justification for an export tax other than on the basis of a necessary second-best solution to the government's fiscal needs. It would be more efficient for the country to pay producers a higher price using a more neutral, less resource distortive tax such as a land tax or income tax to obtain government revenues which could then be used to employ individuals for more productive purposes than marketing the cotton crop. From the point of view of the welfare of farmers, the marketing inefficiency described above is an additional burden. Since producer price is a residual item, it is depressed in absolute terms not only by the tax levy and other items sometimes not even specified, but also by the sizeable inefficiency-related administrative costs.

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APPENDIX

THE LIST OF GINNERS' INPUT ITEMS ALLOWED UNDER THE LINT MARKETING BOARD'S
SYSTEM OF DETERMINING GINNERS' ALLOWANCES

At the beginning of the crop season, a range of input items in the ginning process is determined ex ante by a Lint Price Fixing Committee. This committee is appointed by the government and is a liason between the ginning industry and the price fixing authority. Its role, however, is basically advisory.

The full list of input items which the Lint Marketing Board takes into account in determining ginner's cost allowance as the basis for fixing ginner's price includes enterprise licence, manager's (buyer's) salary, cashier's salary, African wages for buying (ordinary porters), medical charges, travelling expenses from head office to ginnery, steelyards and spring balances used at ginnery, issue of hessian squares to producers, specie commission and transport, insurance of seed cotton at ginnery, insurance of cash in transit, market stores licenses, ground rent and/or store rentals, store repairs, store buyer's commission, twine for bagging, depreciation of gunny bags, insurance of seed cotton at market stores, inspection of market stores and store cotton, steelyards or spring balances used at market stores, ginning and baling license, ginnery and labour camp ground rent, repairs to buildings, insurance on buildings, insurance on plant, machinery and ginnery stocks, clerk's salary, engineer's salary, fitter's salary, wages at ginnery, general expenses at ginnery, specie commission on wages and salaries, depreciation and repairs to labour camp, rations for labour, workmen's compensation insurance, fuel and power, oils and greases, machinery and gin spares, Hessian, baling hoops, baling studs, twine, stencil ink and brushes, loading of lint at stations, sampling on lines, head office manager, accountant's salary, head office wages, head office rent, head office expenses, postage, telegrams, telephone, etc., fidelity insurance, pool expenses, anticipatory exchange, interest on seed cotton purchases, head office management, Kyalo transport, bachaluzi commission store to ginnery transport of seed cotton, depreciation on buildings, plant and machinery, buying profit, ginning profit, gunny bags for bagging cotton seed, sewing and marking of cotton seed, booking and loading charges for cotton seed, storage and insurance of cotton seed, handling allowance for cotton seed and charge to ginner's for cotton seed.

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