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THE RESPONSIVENESS OF AGRICULTURAL EXPORTS TO PRICE IN JAMAICA: EVIDENCE AND POLICY IMPLICATIONS

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Economists and policy makers are interested in the relationship between price changes and the supply response of primary products in developing countries in view of the need to develop policies to avoid balance of payments deficits, unemployment, deterioration in commodity terms of trade and reduction in the earnings of agricultural exports. Knowledge of the supply response to price changes is important in formulating policies relating to government price support programmes, exchange rate, tariffs and producers' association.[1]

This paper is an attempt to add to the stock of empirical knowledge of the supply response of agricultural commodities to prices for Jamaica; a small, open, export-propelled developing economy.[2] The only published study relating to the supply response is that of Williams[3] for coffee. The commodities to be analysed in this paper are of relevance to a number of developing countries, and cover the period 1954-72, a sufficiently long enough period for certain tentative conclusions and policy implications to be drawn.

Schultz[4] has contended that farmers in both the developing and developed countries respond positively and significantly to relative price changes. Others have suggested that the supply response in develop-

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1. The importance of the export price elasticity of supply is best illustrated with reference to the Marshall-Lerner condition for exchange rate stability. A favourable effect of a change in the exchang rate, r, on the trade blance, B, (assuming imports = exports) depends on whether the various elasticities are positive, *i.e.*,

$$\Delta B \left[\frac{e_x (n_x - 1)}{e_x + n_x} + \frac{n_m (e_m + 1)}{n_m + e_m} \right] > 0$$

where e_x and e_m denote the export and import price elasticity of supply, n_x and n_m represent the export and import price elasticity of demand.
Devaluation will improve the commodity terms of trade if $e_x e_m < n_x n_m$ and worsen the terms of trade if $e_x e_m > n_x n_m$.

2. As a measure of openness we find that for the period 1954-72 import coefficient (M/GNP) was 0.48, while the export coefficient (X/GNP) averaged 0.37.

3. R. L. Williams, "Jamaica Coffee Supply, 1953-68: An Exploratory Study", *Social and Economic Studies*, Vol. 21, No. 1, March 1972, pp. 90-103.

4. T. W. Schultz: Economic Crisis in World Agriculture, University of Michigan Press, Ann Arbor, U.S.A., 1965.

ing countries is perverse; and there is an alternative view which states that changes in supply are invariant to relative price changes because of rigidities, structural and sociological factors.

The remainder of the paper is as follows. Section I provides some information on the role of agriculture in the Jamaican economy. In section II we develop a model of the supply response. Problems relating to statistical estimation are discussed. Finally, section III presents and discusses the implications of the empirical estimates of the model for sugar, bananas, coffee and cocoa.

I

AGRICULTURE AND THE JAMAICAN ECONOMY

A brief analysis of the performance of the agricultural sector is offered as an illustration of the pattern of the development process which characterizes many developing countries. Table I summarises some of the information.[5]

TABLE I—PERCENTAGE DISTRIBUTION OF AGRICULTURAL OUTPUT TO GROSS DOMESTIC PRODUCT AND AGRICULTURAL EXPORTS TO TOTAL EXPORTS FOR SELECTED YEARS

	1954	1957	1962	1968	1972
1. Ratio of agricultural output to GDP at 1965 prices (per cent)	17.3	7.9	9.9	9.7	13.6
2. Ratio of agricultural exports to total exports at 1965 prices (per cent)	74.2	52.0	40.5	36.8	24.4

*includes SITC Sections 0, 1, 4.

Source: Adapted from various tables in John Gafar: The Structure of Jamaica's Foreign Trade: An Econometric Analysis, 1954-72, Unpublished Ph. D. Thesis, University of the West Indies. Jamaica, 1979.

Between 1954-72, population increased by 1.8 per cent per year, agriculture in real terms by 2.5 per cent per annum, GDP by 5.7 per cent and total exports by 7.4 per cent per annum. Available statistics indicate that GDP at 1965 prices increased from $296 million in 1954 to $902 million in 1972, or increased approximately three times between 1954-72; while real agricultural output rose modestly from $51 million in 1954 to $83 million in 1972, or by 1.6 times during 1954-72. In contrast, output of mining and quarrying (primarily bauxite output for exports) increased 9 times; manufacturing 3.5 times; construction and

5. The data used in this study are taken from various publications of the Department of Statistics, Jamaica and are referred to in the paper. The data on GDP were obtained from the National Income and Product Accounts, export price indices used in this paper are unit value indices and taken from Gafar: *op. cit.*, while additional information on foreign trade is taken from Annual External Trade Department of Statistics, Jamaica.

installation 3.2 times and miscellaneous services (which includes tourism) approximately 2.8 times during 1954-72.

In contrast with a general decline in the percentage share of output originating in the agricultural sector, the combined percentage shares of output originating in the mining and manufacturing sectors increased substantially from 17.7 in 1954 to 28.6 in 1972. The phenomenal increase in the growth of output in the mining sector is due to the massive inflows of foreign direct investment in the bauxite-alumina industry. On the other hand, the increase in the growth of output in the manufacturing sector is attributable to the policy of import substitution. Import substitution was encouraged behind a wall of generous protectionist policies—tariffs, negative lists, exemptions from income-tax, over-valuation of the exchange rate, duty-free raw materials, as well as accelerated capital depreciation allowances.

Recent studies by Balassa and Associates.[6] Little *et al.*[7] and Lewis, Jr.[8] have made it clear that the protectionist policies favouring manufacturing did so at the expense of agriculture. In fact, Little *et al.*[9] found that agriculture was subsidising manufacturing by 10 to 20 per cent or more of agriculture value added as a result of the import substitution policies. The protectionist policies penalised labour intensive industries in situations of surplus labour, created incentives for capital-labour substitution and discriminated against the production of local raw materials and capital goods needed for industrialisation.

Another factor responsible for the decline in agricultural output and exports (a phenomenon characteristic of many developing countries) is the reduction in farms by land use. According to the 1968 Census of Agriculture, total acreage in farms by land use declined from 1.9 million acres in 1954 to 1.5 million acres in 1968 (*i.e.*, a decline of 22 per cent), while for the same period cultivated acreage declined by 27.3 per cent, which suggests there was a general movement away from agriculture.[10]

In spite of the declining importance of agriculture, as measured by its percentage share of GDP and total exports respectively, agriculture nevertheless continues to be the largest employer of labour accounting

6. B. Balassa and Associates: The Structure of Protection in Developing Countries, Johns Hopkins Press, Baltimore, U.S.A., 1971.

7. I.M.D. Little, Tibor Scitovsky, and F. M. G. Scott: Industry and Trade in Some Developing Countries, Oxford University Press, London, 1970.

8. S. R. Lewis, Jr., "Agricultural Taxation and Inter-Sectoral Resource Transfers", Reprinted in G. M. Meier (Ed.): Leading Issues in Economic Development, Third Edition, Oxford University Press, London, 1976.

9. *op. cit.*

10. In 1968 the allocation of land for export agriculture accounted for 65 per cent of the total acreage of crops in 'pure stand'; with sugar accounting for 44 per cent, bananas 12 per cent, citrus 5 per cent, coffee and cocoa 4 per cent.

for 34 per cent, 39 per cent and 31 per cent of the employed labour force in 1958, 1968 and 1972 respectively. The sugar industry is still the single largest employer of labour, but in recent years its leading position as the primary source of foreign exchange earnings has been overtaken by exports of bauxite-alumina and tourism, respectively. The percentage share of sugar exports to total exports fell substantially from 36 per cent in 1954 to 9 per cent in 1972 (averaging 22 per cent for the period), the share of bananas fell from 17.1 per cent in 1954 to 3.8 per cent in 1972 (averaging 9 per cent between 1954-72), while that of exports of cocoa and coffee valued together about 2 per cent of total exports for the period under study. In short, the four commodities to be analysed accounted for approximately 33 per cent of total commodity exports for the period 1954-72.[11]

II

THE MODEL

We begin by assuming that the export price in terms of foreign currency is P_f (in the case of sugar P_f is negotiated in advance, while in other cases P_f is assumed to be given) and the exchange rate is r. Domestic export price is

$$P = rp_f \qquad \ldots(1)$$

For convenience we assume that the price paid to the farmer, p is a constant proportion of P, *i.e.*,

$$p = \alpha P;\ 0 < \alpha \leqslant 1 \qquad \ldots(2)$$

Total supply (Q_s) is given by

$$Q_s = X + Qd \qquad \ldots(3)$$

where

X = exports,

Qd = domestic demand.

If we assume profit maximization behaviour, total supply may be expressed as :

$$Q_s = Q_s\ (p,Z,t) \qquad \ldots(4)$$

where Z is a vector of input prices (for example, wages, rent on land,

11. Statistics relating to the value of exports for sugar, bananas, cocoa, and coffee for selected years are given below.

(*$J million*)

Commodities	1954	1957	1962	1968	1972
Sugar	22.0	25.2	29.2	34.0	33.8
Bananas	10.5	13.6	9.0	13.8	11.9
Cocoa	2.5	1.1	1.0	1.0	2.1
Coffee	2.0	1.3	0.6	0.8	2.0
Total exports	61.3	100.8	123.1	183.0	293.1

Note:— $J2 ≠ 1.

rental rate on capital, fertilizer price, etc.) and a time trend, t, to represent secular shifts due to such factors as technological change.

One of the difficulties encountered in this study is that there is no reliable and consistent time-series data relating to wages, rental rate on capital, and other input prices. On reflection, while this is obviously a data limitation, the problem is not wholly intractable for under perfect competition p is the unit costs of production. These costs, in turn, depend in part on the input mix used in production (a_i's) and in part on factor prices (Z_i's). It follows that p can be represented as:

$$p = \sum_i a_i Z_i \qquad \ldots(5)$$

From the point of view of statistical estimation, since there is necessarily a direct relationship between output price and input prices, inclusion of both sets of prices separately could lead to problems of multicollinearity. But this is an empirical matter altogether. Another problem encountered in this study is that while we have information on P we however have none on p. But this is again not serious given equations (1) and (2), and if we assume that all other variables are constant, it is possible to write Q_s as:

$$Q_s = F_1 (P) \qquad \ldots(6)$$

Similarly, if we hold income constant domestic demand is

$$Q_d = F_2 (P) \qquad \ldots(7)$$

Write total exports in terms of an excess supply function:

$$X = X (P) = Q_s - Q_d = F_1 (P) - F_2(P) \qquad \ldots(8)$$

Differentiating equation (8) with respect to P and writing the result in terms of elasticities, we have

$$\frac{\partial X}{\partial P} \cdot \frac{P}{X} = \frac{\partial Q_s}{\partial P} \cdot \frac{P}{Q_s} \cdot \frac{Q_s}{X} - \frac{\partial Q_d}{\partial P} \cdot \frac{P}{Q_d} \cdot \frac{Q_d}{X}$$

$$e_x = e_s(Q_s/X) - (1-Q_s/X)e_d \qquad \ldots(9)$$

where

e_x = price elasticity of exports,
e_s = price elasticity of supply,
e_d = price elasticity of demand.

It is obvious that e_s will be equal to e_x if and only if $Q_s = X$, otherwise $e_x \neq e_s$. The sign and magnitudes of e_x depends on e_s, e_d and X/Q_s respectively. If $Q_s > X$, $e_s > 0$, and $e_d < 0$, it follows that $e_x > e_s$.

Largely for the reason of not obtaining the appropriate data the model is reformulated in terms of distributed lags.[12] The model is for-

12. See F. M. Fisher *et al.*, "An Econometric Model of the World Copper Industry", *The Bell Journal of Economics and Management Science*, Vol. 3, No. 2, 1972, pp. 568-609.

mulated in terms of a stock adjustment. Given P we assume that farmers would supply an amount denoted by Q_t^* according to the long run supply equation.

$$Q_t^* = a + bP_{t-1} \qquad \ldots.(10)$$

It is possible that farmers do not immediately move to Q* as P changes, but they respond by the following process:

$$Q_t - Q_{t-1} = \lambda (Q_t^* - Q_{t-1}) \qquad \ldots.(11)$$

where λ is the speed of adjustment of supply, and $0 < \lambda \leqslant 1$. Substitute equation (11) in equation (10) we get

$$Q_t = \lambda a + \lambda bP_{t-1} + (1-\lambda) Q_{t-1} \qquad \ldots.(12)$$

The general solution for Q_t is

$$Q_t = a + \lambda b \sum_{i=1}^{n} (1-\lambda)^i P_{t-i} \qquad \ldots.(13)$$

The short run price effect on supply is measured by λb; while the long run effect is b. The model embodied in equation (13) can be arrived at differently depending on the assumption which we make regarding expectations. For example, consider the adaptive expectations model, and suppose that the supply is:

$$Q_t = a + bP_t^* \qquad \ldots.(14)$$

where P* is the expected long run price. Suppose that P* is governed by the following process:

$$P_t^* - P_{t-1}^* = \lambda (P_{t-1} - P_{t-1}^*) \qquad \ldots.(15)$$

The solution for P_t^* is

$$P_t^* = \lambda \sum_{i=1}^{n} (1-\lambda)^i P_{t-i} \qquad \ldots.(16)$$

Substitute equation (16) in equation (14) and we get equation (13) The stock adjustment formulation is preferred to the adaptative expectations because of the nature of sugar cultivation and in the case of coffee it takes time for farmers to adjust the acreage under cultivation. Moreover, as in the case of sugar, P is negotiated for a specific period, hence price expectations are not likely to be formed by the process illustrated by equations (15-16). Having developed the supply side of the model in some detail, it is now possible for us to specify the export supply function in its stochastic form as:

$$X_t = \alpha_1 + \alpha_2 P_{t-1} + \alpha_3 X_{t-1} + u_t \quad \ldots(17)$$

where u represents the error term and $\alpha_3 = 1 - \lambda$.
Since equation (17) includes a lagged dependent variable, and since autocorrelation is quite possible, direct application of OLS to equation (17) will lead to inconsistent and inefficient parameter estimates. Again, since it is not possible to treat satisfactorily a general model of autocorrelation, we assume a first order auto-regressive process :

$$u_t = \rho u_{t-1} + e_t \quad \ldots(18)$$

and

$$|\rho| < 1$$

$$E(e) = 0, \text{Cov.}(e) = \sigma^2 I.$$

Equation (18) is estimated using a search technique. The final estimates of ρ were obtained by searching over alternating values of ρ ranging from —1 to + 1 by steps 0.01 and choosing those results for which the sum of squares minimized is the least. Dhyrmes has[13] shown that this technique is a consistent estimator, and if e_t is normally distributed, it is also a maximum likelihood estimator.

III

THE ESTIMATED EQUATIONS AND POLICY IMPLICATIONS

The preferred regression equations depicting the response of exports to price are summarised in Table II. Before interpreting the estimated equations we note that the figures in brackets are the estimated t statistic; the goodness of fit of the estimated equation is measured by the adjusted coefficient of determination, $\bar{R}^2$; SE is the estimated standard error; ρ is an estimate of the first order degree autocorrelation; and ρ is an estimate of the speed of adjustment. The price variable used in each equation is appropriately identified.

In their survey article on estimating agricultural supply, Askari and Cummings[14] observed that the price variables frequently used include (*i*) the price of the commodity; (*ii*) the ratio of the price of the commodity to some consumer price index; (*iii*) the ratio of the price of the commodity to some index of input prices; (*iv*) the ratio of the price of the commodity to the index of prices of competitive commodities.

In this study the ratio of the export price to the consumer price index was used as a measure of the real export price. However, in the case of the supply response of bananas the export price of coffee was used as the appropriate price variabe, since coffee and bananas are considered as competitive commodities, and also, because when the

13. P. J. Dhyrmes: Distributed Lags: Problems of Estimation and Formulation, Holden Day Inc. San Francisco, U.S.A., 1971.

14. Hossein Askari and John Thomas Cummings, "Estimating Agricultural Supply Response with the Nerlove Model: A Survey", *International Economic Review*, Vol. 18. No. 2, June 1977, p. 258.

TABLE II—ESTIMATED REGRESSION EQUATIONS OF EXPORT SUPPLY : 1954-72

Estimated equations	ρ	SE	$\bar{R}^2$	λ
1. Sugar (S) (thousand tons)				
(*a*) $S_t = 53.39 + 0.91\ P_{t-1} + 0.59S_{t-1} - 1.59t$ (2.29) (3.41) (0.96)	—0.17	35.76	0.60	0.41
where $P \equiv P_s/P_b = 100$ in 1965				
(*b*) $S_t = 296.3 + 0.49Ps_{t-1} + 0.46S_{t-1} - 1.57t$ (1.47) (2.86) —(3.17)	—0.32	29.89	0.72	0.54
2. Bananas (B) (thousand tons)				
$B_t = 18.71 + 0.21P_{t-1} + 0.72B_{t-1}$ (2.01) (3.78)	—0.40	13.97	0.71	0.28
where $P \equiv P_b/P_{xc} = 100$ in 1965				
3. Cocoa (CA) (thousand lb.)				
$CA_t = -4.66 + 2.34P_{t-1} + 0.84\ CA_{t-1} + 0.25t$ (1.53) (2.62) (1.93)	—0.38	2.12	0.79	0.16
where $P = P_{ca}/P_c = 1$ in 1965				
4. Coffee (XC) (thousand lb.)				
$XC_t = 0.227 + 8.50P_{t-1} + 0.20XC_{t-1} - 0.38t$ (4.12) (1.20) (3.36)	—0.10	9.91	0.83	0.80
where $P = P_{xc}/P_c = 1$ in 1965				

Notes:—

P_b = price index of banana exports;
P_{ca} = price index of coffee exports
P_s = price index of sugar exports.
P_c = consumer price index;
P_{xc} = prices index of coffee exports.

ratio of export price of bananas to the consumer price index was used, the results obtained were disappointing.

The goodness of fit of the regression equations is quite satisfactory. In all cases the estimated price coefficients confirm the contention of Schultz, and are statistically significant at the 5 per cent (one tail) level. The speeds of adjustment as measured by λ are plausible, but the high value of λ for the coffee industry is surprising, since it takes five years for coffee trees to mature.

Our estimates of export supply price elasticities computed at the point of the sample means are summarised in Table III, together with some other estimates of total supply obtained by other researchers to enable us to make some comparisons. The names of the authors and countries of study are appropriately identified in Table III. We observe that our estimates of export supply elasticities compare favourably with the estimates of total supply elasticities obtained for other countries, and that our elasticity estimates indicate low price responses, especially in the short run, for the commodities. However, it is to be observed that

TABLE III—ESTIMATES OF THE PRICE ELASTICITY OF AGRICULTURAL EXPORTS

Commodity	Price elasticity	
	Short run	Long run
1. Sugar		
(*a*) Our estimates:		
Equation (*a*) Table II	0.29	0.71
Equation (*b*) Table II	0.17	0.31
(*b*) Raj Krishna (Punjab, India), 1915-43	0.34	0.60
(*c*) Askari (Philippines), 1914-61	0.08 to 0.13	0.13 to 1.16
(*d*) Parikh (Punjab, India), 1900-39	0.30 to 0.39	1.08 to 1.15
2. Coffee		
(*a*) Our estimate	0.92	1.51
(*b*) Williams (Jamaica), 1953-68	0.70 to 0.80	—
(*c*) Sayloo (San Paolo, Brazil), 1948-70	0.10 to 0.16	0.51 to 0.64
(*d*) Arak (Brazil), 1945-62	—	0.96
3. Cocoa		
(*a*) Our estimate	0.41	2.56
(*b*) Bateman (Ghana-medium), 1945-62	0.42 to 0.51	1.28
(*c*) Behrman (Cameroon), 1947-63	0.68	1.81
(*d*) Olayide (Nigeria), 1948-67	0.15 to 0.20	—
4. Bananas*		
Our estimate	0.16	0.57

Note:— *The author has not been able to locate (given library facilities) any study relating to the supply response of bananas for any country. The supply elasticities by authors and countries are taken from Askari and Cummings, *op. cit.*, Table 1.

export supply price elasticity will be greater than price elasticity of total supply so long as total exports (X) of the commodity is less than the total supply of the commodity (Q_S) [see equation (9)]. Behrman[15] has

15. J. R. Behrman: Development, the International Order, and Commod ity Agreements. Addison-Wesley Publishing Co., U. S. A., 1978, pp. 76-77.

estimated that the world demand elasticities of the commodities under study are extremely low, ranging from —0.0 to —0.3 in the developed and developing countries.

One of the issues currently debated at the international level, and associated with the call for a new international economic order, is the need to secure remunerative prices for exports and stabilise export receipts. Since the commodities under study are characterized by low demand and supply elasticities (and assume that storage costs are financed by some international agency and not by the exporting country), a policy aimed at stabilising export prices would lead to an increase in average export revenues.[16]

As noted in section I, both agricultural exports and agricultural output have declined, thereby creating difficulties to meet the demand for food, and solve the balance of payments and unemployment problems.[17] There is considerable wage differential between the bauxite sector and the agricultural sector due in part to the relative profitability of the sectors. Commenting on the matter of wage rates the distinguished West Indian economist, Sir Arthur Lewis[18] noted: "Why is the economy not able to provide full employment? The simple answer is, because our money costs of production are too high in relation to world prices....

Our costs have become too high because our money incomes are determined for all economic activity by what the richest industries can afford to pay, namely the mines and the tourist industry, without regard to the productivity levels of other industries. In fact, the expansion of mines threatens to destroy all other economic activity, while itself providing an almost negligible amount of employment. Of course incomes in other industries have not reached the level of incomes in the mines, but they are always striving to get there. In the process, costs in other industries are raised beyond what productivity can support and the result is massive unemployment."

Agriculture, as Meier[19] observed, promotes economic development by creating opportunities for employment, supplying foodstuffs and raw materials to the modern sector, providing a surplus to be invested in other sectors, and earning of foreign exchange through exports. If agricultural output fails to expand to satisfy the demand for food, this would

16. See Behrman: *op. cit.*, Chapters 3 and 5 for a lucid exposition of this point.

17. Out of a labour force of 949 (000) in 1978 the number of unemployed was 247 (000) or 26.5 per cent. In 1978, agriculture accounted for 36 per cent of the employed labour force; mining (bauxite) 1 per cent and manufacture 11 per cent.

18. Sir Arthur Lewis, "Four Steps to Full Employment", Reprinted in Meier (Ed.): *op. cit.*, p. 234.

19. Meier (Ed.): *op. cit.*, pp. 563-592.

result in either increases in food prices, or food imports, thereby imposing further burdens on the balance of payments.[20]

Suppose that it proves difficult for the authorities to eliminate the wage differential, or reduce the maladjustments in cost-price ratios of the agricultural sector adversely, this raises the issue of the type of exchange rate policy to be followed.

Since the price responses associated with the commodities under study are low, it follows that a straightforward change in the exchange rate will not have any substantial effect on present supply. The implementation, therefore, of a system of dual exchange rates with imports and bauxite place on the lower rate while agricultural exports are given a preferred or higher rate (*e.g.*, bauxite may be given $J2.00 for every US $1.00 it brings in, agricultural exports given, say, $ J 3.00 for every US $ 1.00 they bring in, and importers pay $ J 3.00 for every US $ 1.00) may yield some interesting results.[21] First, the lower rate on bauxite and imports would have the effect to reduce imports (in terms of foreign currency) and to increase the long run export competitiveness of bauxite and non-traditional exports (*e.g.*, manufacturing), thus providing a favourable effect on the balance of payments. Second, a policy of favoured exchange rate for agriculture may in the long run have the effect to correct the distortions associated with the import substitution policies, result in a transfer of resources in agriculture thereby providing the impetus of greater utilization of the unexploited and under-utilized land which if put in use would contribute substantially to the solution of the land reform programme, increased production and employment, reduce food imports and the balance of payments deficit. Thirdly, a policy of favoured exchange rates for agriculture may prove to be socially desirable in maintaining the present levels of agricultural production and employment; facilitating diversification of the economic structure; reducing the level of migration from the rural areas to the city; and changing the distribution of incomes and consumption patterns. And, finally, since a substantial portion of basic foodstuffs is imported, a system of dual exchange rates as proposed would not only penalise im-

20. If there are no autonomous changes in demand for food, then the annual rate of increase in demand for food is given by $D = p + kg$, where p and g are the rate of growth of population and per capita income, and k is the income elasticity of demand for food.

Adams estimated that total food had an income elasticity of 0.45 (N. Adams, "An Analysis of Food Consumption and Food Import Trends in Jamaica", *Social and Economic Studies*, Vol. 17, No.1, March 1968, pp. 1-22); and Gafar: *op. cit.*, Chapter 1) found that real personal per capita income grew at 3.9 per cent per annum, $p = 1.8$. Substituting these numerical values in D, we get $D = 3.56$ per cent, and since agricultural output grew at the rate of 2.5 per cent per annum this means that domestic food supply will have to be supplemented by imports. In order to reduce imports and solve the balance of payments problem agricultural output must increase.

21. For a useful discussion on the role of dual exchange rates in a development context, see E. R. Schlesinger: Multiple Exchange Rates and Economic Development, Princeton University Press, Princeton, U.S.A., 1951; F. M. Bernstein, "Some Economic Aspects of Multiple Exchange Rates", *International Monetary Fund Staff Papers*, Vol. 1, No. 1, February 1950, pp. 224-237; and R. E. Baldwin, "Exchange Rate Policy and Economic Development", *Economic Development and Cultural Change*, Vol. 9, No. 4, July 1961, pp. 598-603.

ports, but encourage increased domestic production of foods (*e.g.*, meat, corn, vegetables, etc.) and the use of local foods and raw materials, thus creating the incentive for dynamic import substitution. However, since a substantial portion of imports is essential goods, the success of a dual exchange rate would depend on its effects on the cost of living, the wage spiral effect, various supply responses and multiplier effects in the economy, and the integrity and efficiency of the bureaucracy.

Conclusion

In this paper we showed that growth in real agricultural output and agricultural exports grew sluggishly throughout the period 1954-72. In fact, like a number of developing countries, the percentage share of agricultural exports declined substantially during the period under review. The econometric results dealing with supply response of various commodities are indeed encouraging and plausible, and must be viewed with satisfaction. The supply price elasticities were generally low, as might be expected, which suggets that in addition to price policies the policy maker may have to use other measures to stimulate the growth and expansion of agricultural policies. The implications of adopting a programme of price stabilisation on export revenues and the use of a system of dual exchange rates were examined and discussed.