IMPACT OF PUBLIC SECTOR EXPENDITURE ON AGGREGATE OUTPUT LEVELS IN BARBADIAN AGRICULTURE, 1968-1986: AN EXPLORATORY EMPIRICAL ANALYSIS*

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INTRODUCTION

Since the late 1970s, the performance of the agricultural sector in Caribbean countries has rapidly declined, or at least stagnated, relative to that of their respective overall economies. Available data indicates that there has been a significant decline in the contribution of agriculture to GDP, ranging from 10 per cent in Jamaica to more than 20 per cent in Guyana. The overall picture also shows a decline of trend in aggregate agricultural output (and per capita food production) with substantial decreases in traditional commodities relative to domestic food production. Almost every country experienced a decline in output and exports of traditional agricultural products, ranging from 4 per cent for coffee to more than 35 per cent for sugar, citrus and rice. With respect to non-traditional agricultural production, the relative increase in its importance has not had a significant overall impact because of its inability to satisfy domestic food needs and there is increasing regional dependence on imported food.

One consequence of the economic decline and associated problems in Caribbean countries is the adoption of policies directed at improved macroeconomic management and adjustments, removal of price control, adoption of alternative trade policies, changes in interest rates, exchange rates, money supply and international capital flows, all of which directly and/or indirectly affect the performance of the agricultural sector. While knowledge of the impacts of these policies has generally improved, their impacts on Caribbean agriculture are yet to be fully evaluated.

One critical area which is receiving increasing attention is the role and influence of public policy on the agricultural sector. Much empirical work has not addressed this issue in the Caribbean and this paper attempts to address one aspect of this policy area. The paper reports findings on estimates of the impact of public expenditure on agricultural sector output levels in Barbados over the 1968-1986 period. There is much governmental intervention in agriculture in the Caribbean. As such, it is hypothesized that public expenditure as a policy mechanism should have (*ceteris paribus*) a significant impact on the sector's level of output, which is one measure of performance.

The paper is organised as follows. First, a brief review is given of the output performance of agriculture in the economy of Barbados and government's expenditure policy in the sector. Second, there is a discussion on the methodological approach underpinning the analysis. Third, a presentation of the empirical results of the analysis, and fourth, concluding statements.

OVERVIEW OF AGRICULTURE AND PUBLIC SECTOR EXPENDITURE IN BARBADOS

In 1988, agriculture (including fishing) accounted for about 7 per cent of GDP and about 9 percent of total employment in Barbados. Sugarcane is the single largest component in the sector and sugar alone contributed to about 43 per cent of agricultural value added.

The agricultural sector has experienced significant changes in the last two decades and three distinct but interrelated features can be discerned. First, the sector's contribution to overall economic growth has progressively declined by more than 50 percent in the period (Table 1). Second, the pattern of growth of the agricultural sector was dissimilar to that of the overall economy. While real total output has consistently increased by an average of 2.9 per cent per annum (1970-88), sectoral growth exhibited wide swings with the average annual growth rate being negative in the same period. Third, the decline in agriculture has largely been a result of a progressive but significant decline in the sugar subsector. Even though non-sugar agriculture has experienced some stability and even some output increases in recent years, the dominance of sugar within the context of the sector's economic decline, far outweighed any growth which the non-traditional subsector may have experienced.

In the decade of the 1960s real expenditures in agriculture by the government as a proportion of total outlay in the economy almost doubled, declined in the 1970s and was further significantly reduced in the last decade. Budgetary allocations to the sector have more or less stagnated since 1979, averaging about a one per cent rate of growth per annum. The elasticity of total agricultural expenditures in the period 1970-88 averaged 1.85 per cent which was similar to the elasticity of total expenditure in the economy over the period.

The pattern of capital expenditures in the sector was similar to that of total spending in the sector. There was a significant increase in real capital expenditures between 1960 and 1978 by the government but the level of spending remained unchanged over the last decade. In 1960, capital spending was BD$1.7 million; by 1978, spending was BD$8.8 million and it remained at the same level in 1988. With respect to the distribution of such expenditures, there has been no clear pattern during the period. The most important components of expenditure in the sector in the last seven years have been outlays on two major projects to promote diversification of the non-sugar sector - the Spring Hall Land Lease project and the Rural Development project.

METHODOLOGY AND DATA

Model Specification

Recently there has been a growing interest in the determinants of and the effect of government expenditure policy on the agricultural sector of developing countries. It is now well accepted that government expenditures does affect agricultural output and productivity (de Janvry, Runsten and Sadoulet, 1987; Hayami and Ruttan, 1985; Elias, 1985). Basically, public expenditure is often viewed as an input in the production process which induces shifts in the supply of agricultural output (or total factor productivity - TFP). Expenditures by governments on research and extension contribute to improved technologies, improved factor productivity, improved rates of adoption and enhanced agricultural practices by farmers (Feder and Slade, 1984; Lockheed, Jamison and Lau, 1980 and Huffman, 1978).

Various approaches have been used to investigate the effects of public expenditure policy on the agricultural sector. Some studies have used farm data to analyze the effects of research and extension expenditures on agricultural production, income distribution, etc. (von Braum, Hotchkiss and Immink, 1989; Mellor and Dasai, 1985). Elias (1985) has used both aggregated and disaggregated expenditure data to assess the impact of different categories of government spending (viz. research, irrigation etc.) on aggregate agricultural output in several Latin American countries. The data used in this study however, do not permit disaggregation of expenditure categories over a sufficiently long observation period to facilitate a similar type of analysis. Instead, aggregate fiscal expenditures are considered. The study does however, examine the differential impacts of current and capital expenditures on the agricultural sector.

One potential source of bias in the analysis of the impact of government expenditure policy is the possible interaction between pricing policy and expenditure policy through the government's budget outlay. In several countries, pricing policy usually focuses on subsidy programmes provided through the budget to bring cheap food to urban centres. This is not considered very critical in the case of Barbados although in a dynamic context, other aspects of pricing policy such as exchange rate management can interact meaningfully with the government's budgetary process.

Government expenditures in agriculture can be considered as a direct productive input which enters the production process along with other inputs.[1] This approach has been followed by Elias (1985) in researching the effects of public agricultural spending on Latin American agricultural output and in a more general economic framework by Barro (1981), who looked at the macroeconomic impact of government purchases on total output in the USA.

A Cobb-Douglas production function is used to analyze the relationship between public expenditure and agricultural output. The aggregate agricultural production function can be written in general form as:

$$A(t) = f[K(t), L(t), F(t), P(t), LN(t), GEA(t)] \quad (1)$$

where A is real aggregate agricultural output, K is agricultural capital, L is the agricultural labour force, F and P are fertiliser and pesticide usage, respectively, LN is the land input and GEA is the public productive input (government expenditure). The positive signs of the marginal products of the inputs are conventional. However, a priori, GEA enters with an uncertain sign. This is basically due to aggregation of that variable which encompasses several categories of public spending in agriculture, each of which can potentially have different impacts on the level of output.

Using natural logarithms with OLS estimation technique, equation (1) can be expressed as:

Log 2: $l_{nat}=a_t+l_nB_1k_t+l_nB_2l_t+l_nB_3f_t+l_nB_4p_t$
$+l_4B_5g_t+l_nB_6l_{nt}+l_nB_7g_{eat}+U_t$

Where,

l_{nat} = real aggregate or subsector agricultural output level in time period t

a_t = intercept shifter

$l_nB_1k_t$ = quantity of agricultural capital in time period t

$l_nB_2l_2$ = quantity of agricultural labour in time period t

$l_nB_3f_t$ = quantity of fertilizer used in time period t etc.

U_t = error term, assumed to be random.[2]

Model Adjustments and Data Base

Several problems arise in determining the most appropriate estimate of the public expenditure input. Quite clearly, both recurrent and capital sector-specific spending by the fiscal authorities comprise only part of the total volume of public spending which can affect agricultural production decisions and growth of the sector. Spending on education and health can also influence the sector's output level by improving the stock of human capital available to the sector. This line of reasoning supports the need for a broader measure of GEA than the simple sector-specific expenditure. In practice however, it's virtually impossible to determine the exact proportion of expenditure on health and education which affect agricultural output and there is little theoretical or empirical support to use any simple "*rule of thumb*" to determine an appropriate level of spending.

Sector-specific spending includes among other things, expenditures on administration, crop and livestock research and development, extension, marketing. As GEA includes a capital component and such outlays will likely have a persistent effect on output, Elias (1985) suggests use of a weighted average of past GEA values as an alternative measure of the public input. This approach assumes a specific rate of depreciation of GEA, representing the rate of physical capital such as public provision of irrigation equipment and/or the rate of obsolescence of research and similar capital components. This study does not follow that approach since the choice of an overall or mean depreciation rate is necessarily arbitrary. Instead, lagged and contemporaneous values of GEA are included in the estimated production function to capture the effect of capital expenditures. Total public spending in the sector is also disaggregated into recurrent and capital outlays in an effort to determine the possible differential impacts of different categories of spending.

The data used for estimation cover the period 1968-86 and are from several sources including the Central Bank of Barbados, the Government of Barbados, the World Bank and FAO. Unfortunately, some of the data for important production-related variables are of questionable quality.

Conceptually, the flow of services from the input variables are the *characteristics* actually entering the production function. As only data on input stocks are available, the gross measures of inputs consumed are used, implicitly assuming that there is a constant relationship between the stock and the flow of services.

There were also problems associated with measurement of the capital variable. Ideally, a measure of agricultural capital which includes buildings and a variety of other assets would be an appropriate measure of the capital stock. One construct which aggregated several categories of capital was tried but results using this were most unsatisfactory. As a result of these problems, the stock of agricultural equipment was used as a proxy for total agricultural capital.

Real values (money value deflated by the implicit GDP deflator) of fertiliser and pesticide consumed are used and the land variable is the number of hectares harvested. Labour is the number of persons employed in the sector and an agricultural production index was used as the output variable.[3] Both the input and output variables are aggregated across different sub-categories. Given that there is likely to be a high degree of substitutability or complementarity between these different sub-categories, the aggregation bias should not be too severe.[4]

EMPIRICAL RESULTS

Several models were used to estimate the impact of government expenditure on aggregate agricultural output. These models, designated as equations R_1-R_8 are summarised in Table 2. The model was first estimated using only capital (k), labour (l), land (ln), fertilizer (f) and pesticide (p) as inputs (R^1). The results conform with the theoretical postulate. The regressors are significant at the five percent level or better, although in all the models the pesticide variable exhibited a negative coefficient.[1] R-square is 0.78. R-bar square is approximately 67 per cent and the F-value of 7.64 suggest a significant regression. A time trend variable was originally included in R_1 to capture the influence of technological advances. This was deleted from the final estimating because it proved to be insignificantly different from zero, possibly due to other variables having a significant trend component and being highly correlated with the trend variable.

The estimates improved somewhat when the public expenditure variable representing real sector-specific spending (gea) was included (R_2). The results indicate that government outlays in the sector has a negative impact on agricultural output.[6] While the government variable can be considered as significant though negative at the 10 per cent level, F-tests for the aggregate (categories of public expenditure) or deletion of individual components of this variable suggests that they do not sufficiently explain the variation in agricultural output and could therefore be deleted. In any case the coefficients on the government variables are small, summing to just -0.22. Using the contribution of agriculture to real GDP (agricultural value added) as the output variable also yielded qualitatively identical results.

One important concern in the analysis is the interrelationship of the variables used for estimation. The production function is conceivably part of a wider system of interrelated behaviourial relationships. For example, the levels of capital, labour and other inputs are chosen by the producer ostensibly in a cost-minimizing decision. Thus, these may not be truly independent variables as presupposed by the OLS techniques.[7] A case can also be made for an endogeneity of GEA. Taking these into consideration, an instrumental variables technique was used to check the validity of the OLS estimates. These results are reported in equation R_3. The instrumental variables approach confirms the negative but small impact of government's expenditure and the other regressors each have the same sign of the OLS estimates, reflecting the soundness of the OLS regression.[8]

An attempt was made to disaggregate total agricultural output into sugar and non-sugar production using relative weights. Ideally, the weights used to scale the input variables should be based upon the actual (not the theoretically prescribed or 'optimal') quantities used in sugar versus non-sugar production. Since this information was not available, the procedure followed was to use a variety of different weights thought to be 'reasonable'. Only the sugar equation (using the value added concept) was well defined and the results are reported in equation R_4.

The estimated equation satisfied various diagnostics. The government expenditure variable is significant at the ten percent level and is positive. The elasticity of a(t) with respect to gea(t) is relatively small, just over 21 percent. The results indicate that estimates of an equation with only the contemporaneous government expenditure variable improved over the lagged forms of that variable. However, when public expenditure is disaggregated into recurrent (cagea) and capital components (cagea), the results again indicate that the impact of the latter has a negative though insignificant (both economically and statistically) effect on agricultural output (R_5). While the sign for the current component is positive the parameter is not significantly different from zero.

When both the total output and total government expenditures are disaggregated into sugar and non-sugar output and recurrent and capital outlays respectively, there are well-defined results for the sugar equation (R_6). These show that the capital component of public expenditures have a positive though economically and statistically small effect while recurrent spending is positive and significant at the ten per cent level.[9]

Elias (1985) also suggests estimation of a function of the impact of government expenditures using agricultural indicators as determinants. This would help to ascertain the extent to which such expenditures are influenced by events in the agricultural sector. It would also give an indication of the interaction between the public budgetary process and private agricultural decisions. In a sense, this estimate is an indirect check on the exogeneity of the public expenditure variable in the production function.[10] That is, if the public spending in the agricultural sector is found to be *well explained* by agricultural magnitudes, then this suggests that a simultaneous approach incorporating private and public decision functions may be theoretically preferable.

The suggested function is defined as:

$$SEA(t) = g[constant, ASH(t), RP(t), RW(t), PAW(t), SLA(t), \ldots U(t)] \quad (3)$$

Where SEA is the share of agricultural expenditures in total public spending, ASH is agriculture's share in GDP, RP is the relative price of agricultural commodities *vis-a-vis* the manufacturing sector, PAW is the world price of important crops in real terms, SLA is the share of the agricultural labour force in the total labour force and U(t) is the error term.

RP is derived from implicit GDP deflators, PAW is an index of the EEC sugar price paid to domestic sugar producers, with a base year of 1974. In addition, as there is no prior indication that agricultural spending corresponds to a one-to-one basis with total spending, the log of agricultural spending (gea) is used as the dependent variable and total spending is a right-hand side variable (ge).

The signs expected for the arguments in equation (3) depend on the various objectives of the public authorities. A government can set its policies and manipulate its available policy instruments to attain several different objectives simultaneously (although all may not be mutually independent or attainable). For example, the fiscal authorities may have as one of its objectives, to promote the growth of the agricultural sector (in terms of output); other aims may well be to promote income equality between the agricultural and other sectors or to stabilise agricultural incomes. If promoting growth is the objective of government, then the coefficient on the share of agriculture in GDP should be positive and greater than unity. The signs of the other determinants depend on how the objectives affect the income distribution (see Elias, 1985). There is also no prior reason to expect that the signs should be the same for even *similar* countries and/or for all time periods for a single country. Signs therefore reflect the mean *bias* of policy over a sample period for the particular country studied.

Using a double logarithmic version, OLS estimates of the above function are given in Table 2 in equation R_7 and R_8, respectively.[11] TREND is a variable for time trend and ge is (the natural log of) real total public expenditure. The estimate show that total government spending has a significant positive impact with an elasticity of approximately one. The EEC sugar price also has a positive impact on government agricultural spending as does the share of agricultural labour in the total labour variable, although the latter variable has an impact which is insignificantly different from zero. The relative wage variable is now significant (at the 10 per cent level) and all other signs and (virtually all parameter estimates) are as before. Other determinants carry a negative sign although only the relative wage variable is close to being statistically significant. Overall, the equations are pretty well fitted and satisfy the model's residual diagnostics and exhibit structural stability. These results are basically similar to those derived by Elias for seven Latin American countries; he also found that ASH and SLA affect agricultural expenditures positively, while the relative wage variable had a negative effect.

It is tempting to conclude that the insignificance of ASH constitutes *prima facie* evidence that the government's policy has been anti-growth. However, growth policies can be reflected through other variables apart from ASH so that this conclusion is at best tentative. Also, non-quantifiable institutional and other factors may add to the explanation of the variation in government expenditure. Use of a more complete structural model may be appropriate to investigate the interaction between fiscal policy, agricultural production decisions and agricultural output.

CONCLUSION

The above analysis suggests that government spending on agriculture has had a small and uncertain effect on agricultural output, depending on the level of disaggregation of that output. Unfortunately, inspection has shown that some of the data are poor and this may contribute to the estimates derived. The negative impact of expenditures on total sectoral output is far from surprising or unique and this may be explained by the aggregation of public expenditure across several different components which can have varying impacts on output.

In contrast, the impact of public expenditure is positive when the contribution by the sugar sector to total output is isolated. Although the results for non-sugar output were too poorly defined, an attempt to consolidate the contradictory signs in the global output and the sugar output equations suggest that spending by government has had a relatively significant but negative (to counteract the significant positive effect on sugar production) effect on non-sugar production (vegetables, root crops, livestock, and fruit production).

The sugar sub-sector is well organised and basically represents a homogeneous unit. This may permit government services to be better absorbed and utilized in a positive manner. The non-sugar sector in contrast, comprises numerous small farmers producing disparate outputs and with vastly different capacities to respond effectively to fiscal stimuli. Institutional bottlenecks and bureaucratic procedures also inhibit timely access by small farmers to government services. These institutional inefficiencies could be one of the reasons why the overall impact of the public input is so small. In any case, the results seem to at least indicate that the government should review its expenditure policy, especially in terms of a sub-sectoral distribution and seek to determine bottlenecks or inefficiencies therein. The quality of the data does not permit stronger conclusions.

It is also important to suggest that a model which incorporates the impacts of economy-wide policies on the agricultural sector may provide more useful information on those factors which significantly influence its performance. Trade and macroeconomic policies in particular, can critically influence the development of the sector through their effects on relative prices and incentives. This approach would be extremely relevant in the context of the Barbadian economy because agriculture (particularly sugar) is a large employer of labour and a major foreign exchange earner.

REFERENCES

Barker, Tyrone (1988): "Taxation: The Barbados Experience", *Bulletin of Eastern Caribbean Affairs,* ISER, University of the West Indies, Barbados, July/August.

Barrow, Robert, J. (1981): "Output Effects of Government Purchases", *Journal of Political Economy,* Vol.89, No.6, December.

Central Bank of Barbados. *Economic and Financial Statistics.* (Various issues.)

de Janvry, Alain, David Runsten and E. Sadoulet (1987): "Technological Innovations in Latin American Agriculture", *IICA Programme Paper Series,* No.4, Costa Rica, November.

Elias, Victor J. (1985): "Government Expenditures on Agriculture and Agricultural Growth in Latin America", *IFPRI Research Report,* No.50, Washington, D.C., October.

FAO Annual Production Yearbook. FAO, Rome, (several issues).

Feder, Gershon and R. Slade (1984): "The Role of Public Policy in the Diffusion of New Agricultural Technology", *Agricultural and Rural Development Department Report 26,* World Bank, Washington, D.C.

Garcia, Jorge and Gabriel Montes Llamas (1988): "Coffee Boom, Government Expenditure and Agricultural Prices: The Colombian Experience", *IFPRI Research Report, No.68,* Washington, D.C., August.

Hayami, Y. and Vernon Ruttan (1985): *Agricultural Development: An International Perspective.* Johns Hopkins University Press, revised edition.

Huffman, W.E. (1978): "Assessing Returns to Agricultural Extension", *American Journal of Agricultural Economics,* Vol.60, December.

Lockheed, M.E., Jamison, D. and Lau, I.J. (1980): "Farmer Education and Farm Efficiency", *Economic Development and Cultural Change, Vol.29.*

Mellor, John and Gunvant, M. Desai (1985): *Agricultural Change and Rural Poverty: Variations on a Theme by Dharm Narain.* Johns Hopkins University Press.

Ministry of Finance and Planning, Barbados: *Economic Report of Barbados,* various issues.

Von Braum J., Hotchkiss D. and M. Immink (1989): "Non-traditional Export Crops in Guatemala: Effects on Production, Income and Nutrition", *IFPRI Research Report, No.73,* Washington, D.C., May.

World Bank: *Economic Memorandum on Barbados,* various issues.

TABLE 1. BARBADOS: PERCENT RATE OF GROWTH OF TOTAL GDP, AGRICULTURAL GDP AND CONTRIBUTION BY AGRICULTURE AND SUGAR TO GDP (1970-88)

Year	Growth Rate		Contribution to Total GDP	
	Total GDP	Agriculture GDP	Agriculture	Sugar
1970	9.8	16.7	15.5	11.0
1971	10.4	-7.1	13.0	9.2
1972	1.2	-15.9	10.8	7.5
1973	2.8	5.0	11.0	7.6
1974	-2.3	-5.4	10.7	7.3
1975	-1.9	-3.3	10.5	7.6
1976	4.4	7.2	10.8	6.6
1977	3.6	2.0	10.7	7.5
1978	4.9	-0.1	10.2	6.0
1979	7.9	8.2	10.2	6.3
1980	4.4	5.5	10.3	7.2
1981	-1.9	-17.1	8.7	5.3
1982	-4.9	-2.5	8.9	5.1
1983	0.4	3.9	9.2	4.8
1984	3.6	9.5	9.8	5.5
1985	1.0	-0.5	9.6	5.4
1986	5.2	4.4	9.5	5.7
1987	2.2	-11.2	8.3	4.2
1988	3.9	-6.9	7.4	3.9

Sources: Compiled from Annual Economic Reports of Barbados and Annual Statistical Reports of the Central Bank of Barbados.

Notes:

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[1]*In practice, government spending may also interact with other input variables such as capital and labour.*

[2]*The Cobb-Douglas function has not been often used in studies that restrict the sum of the input elasticities to unity. The present study does not impose this.*

[3]*The contribution of agriculture to real GDP (agricultural value added) was also utilized as the output concept in the analysis.*

[4]*This still leaves the problem of aggregating across livestock and crops. Fortunately, the livestock and fruit sub-sectors are relatively small in Barbados.*

[5]*A Cusum-squared test indicated that the estimates of the standard Cobb-Douglas function were stable.*

[6]*A correlation matrix shows that some of the inputs are highly correlated.*

[7]*This all depends on the sequencing of input and output decisions.*

[8]*While the implication of the single equation estimates might be 'statistically' acceptable theoretical objections could be levied against it.*

[9]*These results replicate the positive effect for the sugar equation found for the aggregate public spending model.*

[10]*It should be pointed out that the issue of exogeneity and the degree of exogeneity required for estimation vis-a-vis forecasting and policy simulation is quite complex; the above is only a crude first check.*

[11]*The labour variable is omitted in equation R_8.*

TABLE 2. PARAMETER ESTIMATES OF THE IMPACT OF GOVERNMENT EXPENDITURE ON AGRICULTURE OUTPUT IN BARBADOS, SELECTED PERIODS, 1968-86

Equation		Output a(t))	Intercept a(t)	k(t)	f(t)	p(t)	l(t)	ln(t)	gea(t)	gea(t-1)	gea(t-2)	cgea(t)	cgea(t-1)	cgea(t-2)	R-Square:	F-Statistic	Durbin-Watson
R1	Aggr.	-31.68	+ 4.22	+ 0.21	- 0.65	+ 1.17	+ 2.15										
(1970-86)		(-5.66)	(5.71)	(3.68)	(-3.83)	(4.22)	(2.96)								0.78	7.64	2.09
R2	Aggr.	-30.96	+ 4.37	+ 0.25	- 1.55	+ 1.15	+ 1.92		-0.09	-0.13							
(1970-86)		(-6.1)	(6.48)	(4.47)	(-3.42)	(4.47)	(2.48)		(-1.42)	(-1.76)					0.85	7.30	2.67
R3	Aggr.	-29.76	+ 4.13	+ 0.25	- 0.40	+ 1.12	+ 1.73		-0.07	-0.19							
(1970-86)		(-2.31)	(2.53)	(3.31)	(-0.87)	(2.50)	(1.14)		(-0.68)	(-0.93)					0.82	5.87	2.71
R4	Sugar	-13.37	+ 1.62	+ 0.13	- 0.14	+ 0.71	+ 1.71	+ 0.21									
(1969-86)		(6.26)	(2.13)	(1.44)	(0.77)	(2.37)	(1.58)	(1.77)							0.83	9.47	2.15
R5	Sugar	-29.32	+ 3.19	+ 0.21	- 0.54	+ 1.13	+ 1.82					-0.04	-0.04	-0.04			
(1971-86)		(3.97)	(3.51)	(2.95)	(-2.09)	(3.69)	(1.89)					(0.31)	(-1.00)	(-0.92)	0.81	4.29	2.31
R6	Sugar	-14.01	+ 1.56	+ 0.12	- 0.16	+ 0.74	+ 1.77					0.06	0.28				
(1969-86)		(2.25)	(2.08)	(1.33)	(0.88)	(2.47)	(1.65)					(1.20)	(1.75)		0.84	8.55	2.19

Equation		Output	Trend	paw(t)	rp(t)	rw(t)	sta(t)	ash(t)	ge(t)	R-Square:	F-Statistic	Durbin-Watson
R7	Aggr.	-4.97	- 0.07	+ 0.66	- 0.39	- 0.74	+ 0.14	-0.48+	1.13	0.74	4.49	1.58
(1968-86)		(-0.7)	(-1.87)	(2.28)	(-0.58)	(-1.77)	(0.70)	(-0.48)	(1.90)			
R8	Aggr.	-4.24	- 0.07	+ 0.63	- 0.46	- 0.74		0.35 +	1.07	0.74	5.70	1.58
(1968-86)		(0.77)	(0.98)	(2.69)	(-0.93)	(-1.87)		(-0.56)	(2.33)			