THE FISCAL SECTOR IN THE CARIBBEAN :

AN ECONOMIC TRANSFORMATION PERSPECTIVE

by

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INTRODUCTION

There is almost no controversy about the desirability of economic transformation in the Caribbean. Both before and after the publication of George Beckford's Persistent Poverty it was widely agreed that the viability of Caribbean economies was not consistent with salient features of their economic structure. Perhaps the most threatening of these features is the extent of the dependence of these economies on external sources of supply for even the most basic necessities of life.

Within this context the role of the State as an agent or as a leader in the process of economic transformation should always be judged in the light of the fundamental criterion of self- sufficiency in the basic necessities of life. In this paper we will concentrate on self-sufficiency in food production.

Given the narrowness of the resource base of individual Caribbean economies, it is almost axiomatic that survival and development must be seen as dependent on each economy's ability to export on the one hand, and on its ability to move towards self-sufficiency in food production on the other.

While the ability to export, and hence the ability to earn the foreign exchange required for necessary imports, depends on both external and internal factors, it seem reasonable to assume that the movement towards self-sufficiency depends primarily on internal factors. Moreover, while in the sphere of economic policy, there is always the need to be cognisant of a number of relevant trade-offs, the organisation of the domestic economy for the survival of the population, must necessiarly precede its organisation to attain any number of other proximate objectives.

In this context of the fundamental need to move towards self-sufficiency, policies adopted by the fiscal sector to foster economic transformation must be judged with some discrimination. For example, as important as the development of export capability may be, if such a capability is geared towards an enhancement of the economy's ability to import food it would be difficult to argue that such a development is unambigously in the direction of economic transformation. A similar argument can be made in respect of 'improvements' in income distribution, current levels of living, current levels of employment or even health.

In recognising the need to evaluate the fiscal sector on the basis of its contribution to self-sufficiency, it is therefore important first of all, to consider whether the information or empirical basis of such an evaluation is itself adequate. It is the purpose of this paper to review the quality of this information basis. What do we really know about the relationship between self-sufficiency in food

and decisions in the fiscal sector ?. Is there any consistent empirical basis for the claim that activity in the fiscal sector is well directed towards the self-sufficieny goal ?. Or is it true that such movement towards self-sufficiency as there might have been, has been unaided by the fiscal sector ?.

We will attempt to answer these questions in the context of four economies in the Caribbean : Dominica, Barbados, Trinidad and Tobago, and Jamaica. Our discussion will be developed in three sections.

In section I we explain the measure of self-sufficiency and review the data in respect of self-sufficiency and government expenditure policy. In section II we provide a more indepth comparative statistical analysis of the major variables and propose a number of competing hypotheses, one of which is evaluated. Section III discusses the relative acceptability of the other two hypothesis and ends with a general statement on the empirical results.

SECTION I : TRENDS IN FOOD SELF-SUFFICIENCY

AND GOVERNMENT EXPENDITURE.

We begin by defining the variable food self-sufficiency, SS_f, as the ratio of potential domestic food production, Y_f, to potential domestic food consumption, C_f, where C_f equals the sum of domestic production, Y_f, and imported food, M_f. So we have

$$SS_f = Y_f /(Y_f + M_f)$$

which implies that $0 \leq SS_f \leq 1$. We define as an improvement, a movement towards the value 1, and as a deterioration any movement towards the value 0.

Like most definitions, the SS_f definition is subject to limitations. For in defining SS_f as a ratio of potential values we are actually avoiding trying to deal with two issues. First, not all domestic food production goes to consumption even in the case where $M_f \neq 0$. In other words, food exports may not indicate anything positive about self-sufficiency. Second, the implicit assumption of a composite commodity implies that Y_f and M_f are perfect substitutes. This assumption is made only to facilitate the use of available data. For we propose to measure potential food production by the value added of the agricultural sector, and food imports by payments made for whatever basket of food enters during a given period.

In Table I below we display the SS measure for each of the four countries under study, SSD being the measure for

Dominica, SSB the measure for Barbados, SSJ the measure for Jamaica, and SST the measure for Trinidad and Tobago. For Trinidad and Tobago and Dominica we were able to obtain complete series for the period 1966-1984. For Barbados and Jamaica the series range from 1968-1983 and 1966-1980 respectively.

TABLE I : FOOD SELF-SUFFICIENCY FOR DOMINICA, BARBADOS, JAMAICA AND TRINIDAD - (1966-1984).

obs	SSD	SSB	SSJ	SST
1966	0.635	NA	0.624	0.438
1967	0.637	NA	0.616	0.471
1968	0.644	0.521	0.572	0.513
1969	0.578	0.466	0.570	0.477
1970	0.616	0.450	0.532	0.493
1971	0.682	0.416	0.566	0.480
1972	0.726	0.411	0.541	0.533
1973	0.736	0.371	0.526	0.516
1974	0.713	0.421	0.468	0.476
1975	0.705	0.503	0.518	0.576
1976	0.713	0.439	0.458	0.576
1977	0.655	0.467	0.668	0.539
1978	0.640	0.428	0.557	0.489
1979	0.699	0.451	0.576	0.496
1980	0.632	0.492	0.527	0.466
1981	0.621	0.433	NA	0.424
1982	0.624	0.444	NA	0.435
1983	0.660	0.477	NA	0.432
1984	0.635	NA	NA	0.473

In the case of Dominica we see that starting with a self-sufficiency measure of 63.5 % in 1966 this country ended the period at more-or-less the same level. Barbados started at a level of 52.1 % in 1968 and ended at 47.7 % . Jamaica

opened the period at 62.4 % in 1966 and fell to 52.7 % by 1980. Finally, Trinidad and Tobago started in 1966 at a 43.8 % level of self-sufficiency and ended in 1984 only slightly higher at 47.3 %.

In order to better understand the movements in the SS measure over the respective periods we summarise in Figures 1, 2, 3 and 4, the historical experience of self-sufficiency in each of the four countries.

FIGURE I : FOOD SELF-SUFFICIENCY IN DOMINICA, SSD, (1969-1983).

— SSD
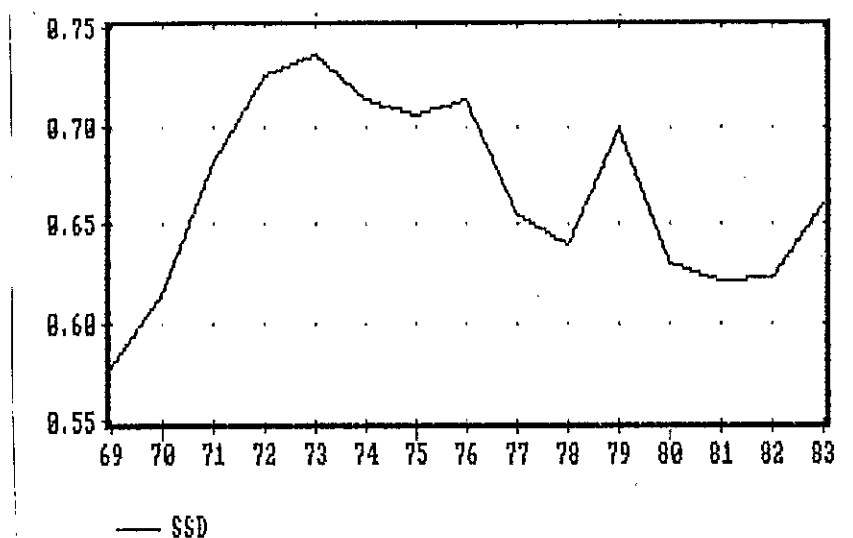
In the figure I, we see that after rapidly rising over the four - year period 1969-1973 SS for Dominica began a fairly steady decline till 1978. Then after peaking in 1971, the decline continued till 1982 after which the measure started to once more.
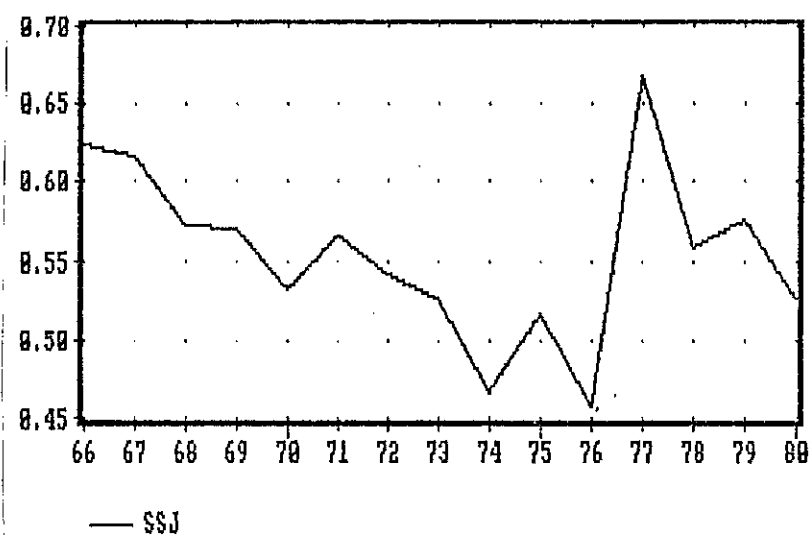
FIGURE 2 : FOOD SELF-SUFFICIENCY IN BARBADOS SSB, (1968-1983).

— SSB
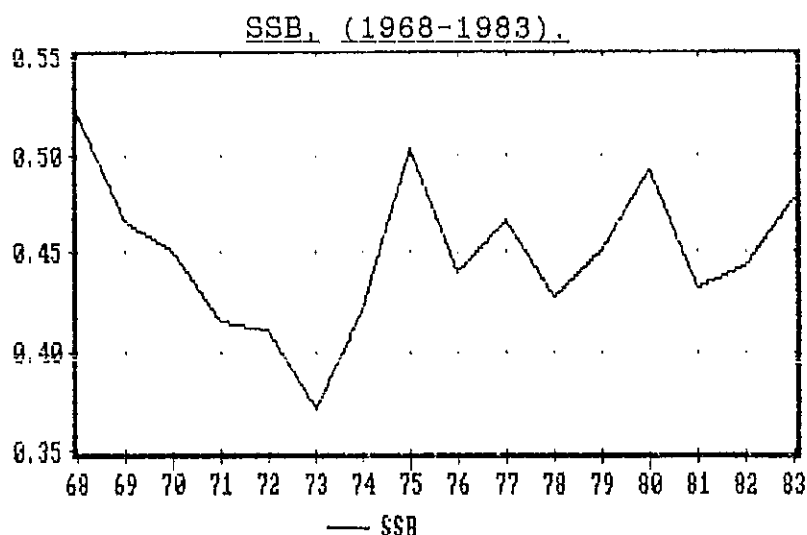
According to the Barbados picture after a steady and fairly rapid decline in SS over the period 1968-1973, a sharp rise in 1974 was followed by narrower fluctuations till the end of the period.

FIGURE 3 : FOOD SELF-SUFFICIENCY IN JAMAICA, SSJ, (1966-1980).

— SSJ

The Jamacian experience, according to the diagram, has been one of a fairly steady downward movement in SS over the period 1966-1976 followed by a sharp rise in 1977 and steady decline thereafter. The period nevertheless ended at a level of SS higher than the low point of 1976.

FIGURE 4 : FOOD SELF-SUFFICIENCY IN TRINIDAD AND TOBAGO,
SST, (1966-1984).

—— SST
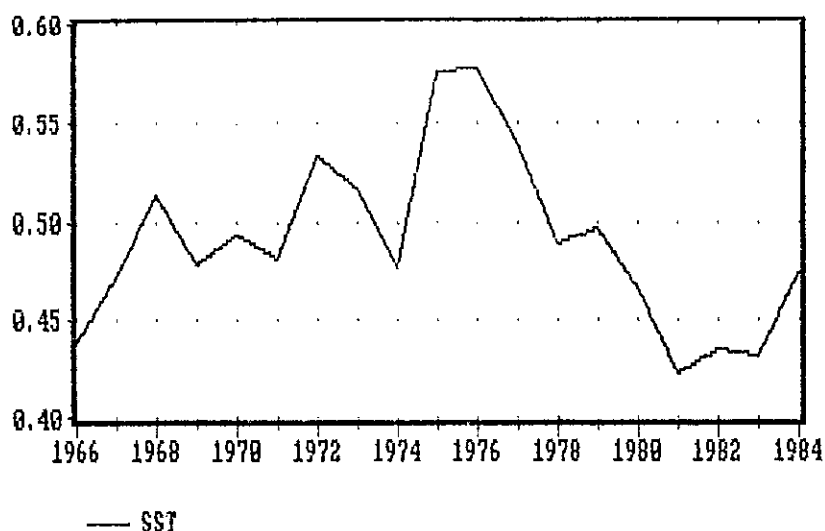
The picture for Trinidad, is one of fluctuating but upward movement until 1974 and of more or less steady decline over the period 1975-1982. The explanations here is, presumably in terms of agriculture being relatively neglected when oil revenues are bouyant.

Since the main focus of the paper is on a possible relationship between fiscal policy and food self-sufficiency it will be useful to examine the trends in agriculture-related government expenditure in each country. As can be seen in Figures 5 through 8, the story here is quite simple.

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In each case there is a fairly steady upward movement both in
nominal overall expenditure and in nominal agriculture
expenditure. The notable deviations were sharp changes in
the latter in Dominica in 1978, and in Jamaica in 1978 and
1982. It is also noteworthy that in every case the movement
in overall government expenditure seems to be different from
the movement in government agriculture expenditure only in
scale. Incidentally, the scale on the right hand side of our
diagram refers to total recurrent government expenditure
while that on the left refers to agricultural expenditure.

FIGURE 5 : GOVERNMENT EXPENDITURE IN TRINIDAD,
TOTAL (TG) AND AGRICULTURE (TAG).

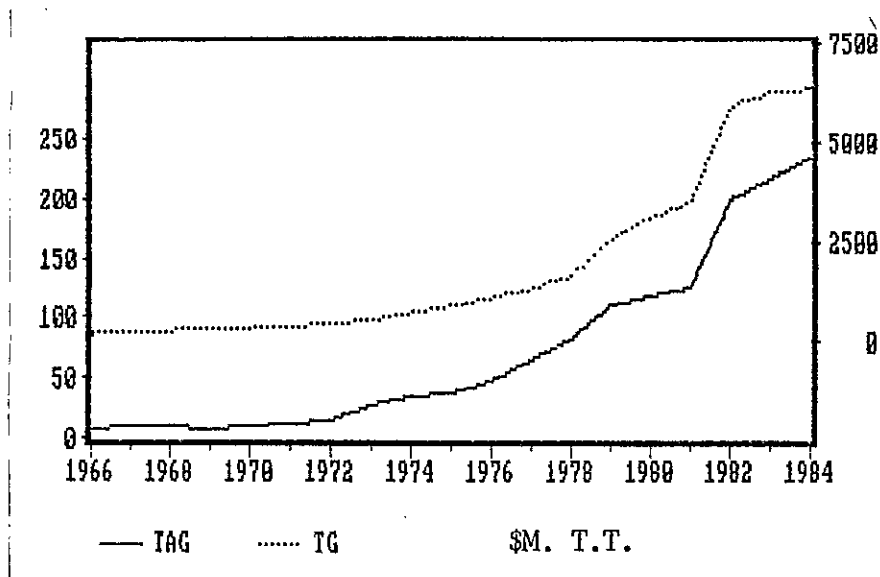— JAG   ⋯⋯ JG $M. J.

— BAG   ⋯⋯ BG $M. EC
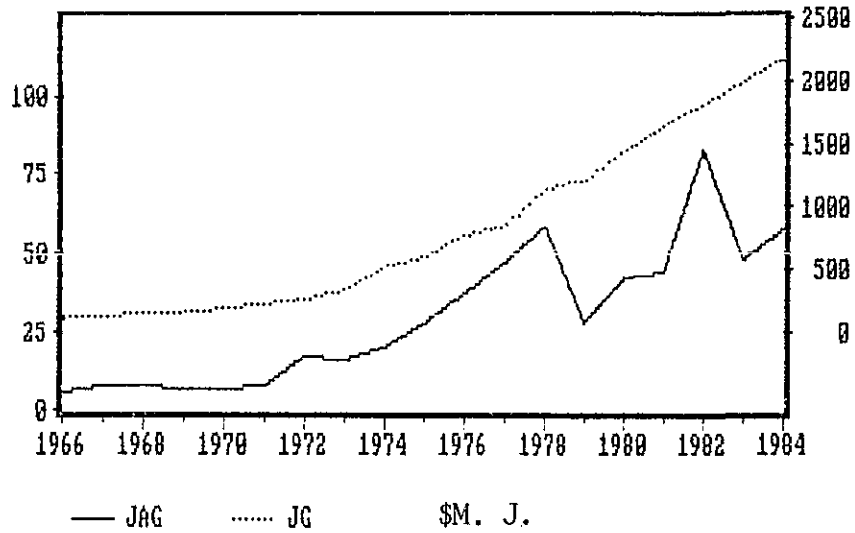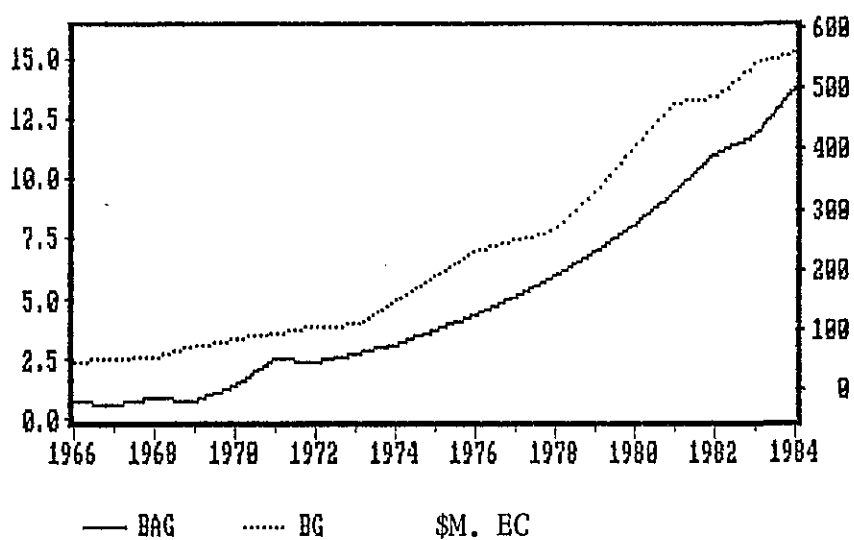
FIGURE 8 : GOVERNMENT EXPENDITURE IN DOMINICA, TOTAL (DG) AND AGRICULTURE (DAG).
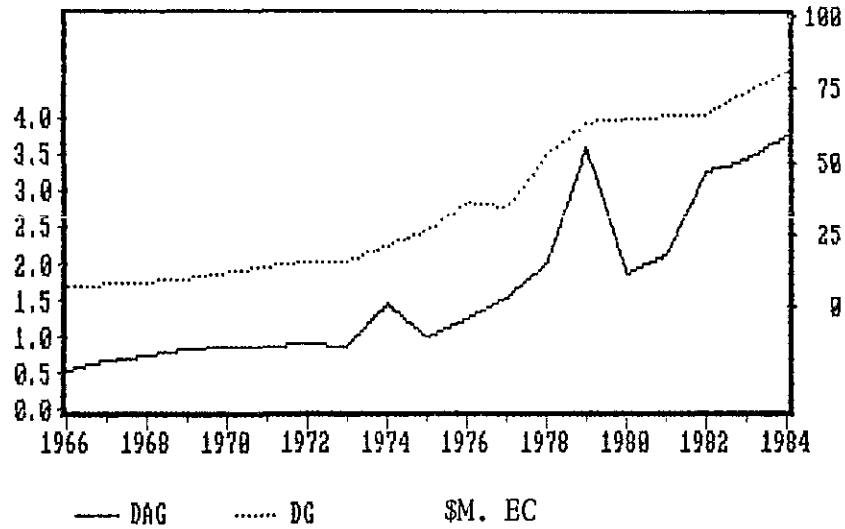
We turn in the next section to a more thorough structural analysis of the SS and government expenditure variable.

SECTION II: STATISTICAL ANALYSIS OF SELF-SUFFICIENCY AND

GOVERNMENT EXPENDITURE : AN INDIRECT APPROACH.

Following on the portrayals of the historical behaviour
of self-sufficiency and government expenditure we begin this
section with a comparison of the log-linear time trends in
these variables.   Table II.1 below reports the results of
24 OLS log-linear trend estimations, 12 without correcting
for autocorrelation .

TABLE II.1 : ESTIMATED TREND COEFFICIENTS

COUNTRY	VARIABLE	TREND COEFF.	CORRECTED TREND COEFF.	R^2	$R^2{}_c$
TRINIDAD (69-84)	SST	-0.009 (.005)	- 0.01 (.007)	.21	.43
JAMAICA (68-80)	SSJ	-0.0005 (.007)	-0.004 (.007)	.0004	.03
BARBADOS (71-83)	SSB	0.011 (.005)	0.007 (.006)	.28	.17
DOMINICA (70-83)	SSD	-0.007 (.104)	-0.003 (.006)	.20	.36
TRINIDAD	TG	0.22 (.007)	0.23 (.013)	.99	.99
TRINIDAD	TAG	0.22 (.008)	0.23 (.016)	.98	.99
JAMAICA	JGE	0.21 (.022)	0.22 (.012)	.99	.99
JAMAICA	JAG	0.17 (0.22)	0.17 (.034)	.84	.86
BARBADOS	BGE	0.16 (.005)	0.15 (.008)	.99	.98
BARBADOS	BAG	0.17 (.010)	0.16 (.017)	.96	.96
DOMINICA	DGE	0.16 (.008)	0.16 (.018)	.97	.98
DOMINICA	DAG	0.11 (.012)	0.11 (.012)	.85	.85

Note : Numbers in parentheses are standard errors.

Certain features of the table are noteworthy. In consistency with the graphs presented in section I it is clear that for all of the four countries there is no identifiable upward linear trend in the self-sufficiency variable. It is also noticeable that non-systematic influences have dominated the behaviour of this variable over time, the R^2 values being extremely low.

In respect of the government expenditure variables, G and GE being the total expenditure variables and AG being the agricultural expenditure variable, quite a different picture emerges. The time trends are all significant and generally unaffected by autocorrelation. Finally, the R^2 values are all very high.

In the case of Trinidad and Tobago both government variables grew at an average annual rate of 22 - 23 percent. In Jamaica total expenditure grew faster than agricultural expenditure, the difference being around 4 percent. Barbados, like Trinidad had uniform rates of growth in both government expenditures, around 16 %. Finally, Dominica's total expenditure growth of 16 % exceeded its agricultural expenditure growth of 11 %.

Comparatively speaking we note that Trinidad's agricultural expenditure grew twice as fast as Dominica's while that of Barbados and Jamaica grew at the same rate. On the other hand, in respect of total government expenditure Trinidad and Jamaica grew at more or less equal rates while Dominica and Barbados also grew at equal, albeit lower rates.

What do these sets of log-linear time trends signify ?.
On the one hand, the self-sufficiency ratios have not
followed any upward trend. On the other hand, the government
expenditure trends have been unambigously upwards. Yet there
is no question that Jones-Hendrickson is correct when he says
that

'Fiscal policy is that policy which
facilitates structural transformation of
an economy'. [1]

The evidence so far presented brings three hypotheses
to mind. We shall denote them by H_1, H_2 and H_3 respectively.

H_1 : Fiscal policy has failed to improve self-
sufficiency and therefore in this respect has not fostered
economic transformation.

H_2 : Fiscal policy has successfully combatted the
otherwise normal tendency for self-sufficiency to
deteroriate, although in so doing it has not been able to
foster an increase in the mean self-sufficiency level over
time.

H_3 : Fiscal policy has operated like a two-edged sword
in respect of self-sufficiency. On the one hand, it has
caused agricultural GDP to increase, but on the other hand it
has caused imports to increase as well. The net effect of
fiscal policy on self-sufficiency is therefore neutral.

It may be argued that, as formulated, H_1 is not directly
testable, and that it will be necessary to be more specific
about what is meant by 'improvement' in the SS variable. On
the basis of indirect evidence, however, it would seem that

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H   cannot yet be rejected.   For if H   is false then we would
 1   1
expect to find a strong positive correlation holding between

the SS variables and the different expenditure variables.

In Table II.2 below we report the correlation values
which hold between self-sufficiency and three government
expenditure variables, the level of total current
expenditure, the level of government spending on agriculture
and the level of the ratio of agricultural to total
expenditure.

TABLE II.2 CORRELATIONS BETWEEN SELF-SUFFICIENCY

AND GOVERNMENT EXPENDITURE.

===
COUNTRY	VARIABLE CORRELATED WITH SS			CRITICAL r (p =.05)
	G	GA	GAR	
DOMINICA	-0.199	-0.122	-0.157	0.497
BARBADOS	-0.368	0.302	-0.526	0.514
JAMAICA	-0.051	0.016	-0.266	0.532
TRINIDAD & TOBAGO	-0.648	-0.615	-0.365	0.497

===

The table shows that out of 12 correlation values 10
have emerged with negative signs.   On comparison with the 95
% critical value of the correlation coefficient, however, we
find that 8 out of the ten values are consistent with a zero
correlation value and 2 with a negative correlation value.
These last two cases are for the correlation between self-
sufficiency in Trinidad and total expenditure in that

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country, and for Barbados, between that country's self-sufficiency and its agricultural expenditure ratio. Out of the 12 correlations two were positive - agricultural expenditure and self-sufficiency for Barbados and Jamaica - but these values are also consistent with zero correlation values.

In summary, therefore, 10 out of 12 estimated correlations are consistent with zero values while 2 are consistent with negative values. There would seem to be a prima facia case for not rejecting the H_1 hypothesis.

The case for not rejecting H_1 would be strenghtened if on a cross country basis we found that there was no correspondence between the SS values and the agricultural expenditure values. In table II.3 below we compare the ranking of mean SS values with the mean agricultural expenditure ratio values. We do a similar comparision of the ranking of the variability values of the two variables in table II.4

TABLE II.3   COMPARING RANK OF MEANS

OF COUNTRY SS AND COUNTRY AGR

RANK	SS MEANS	COUNTRY	RANK	AGR MEAN	COUNTRY
1	0.67	DOMINICA	1	.055	DOMINICA
2	0.55	JAMAICA	2	.047	JAMAICA
3	0.49	TRINIDAD	3	.041	TRINIDAD
4	0.44	BARBADOS	4	.021	BARBADOS

The table shows that there is a perfect correspondence of rankings across countries. This means that although on an individual country basis fiscal policy seemed to be not effective over time, the force of the H_1 hypothesis seems to be weakened on a cross sectional basis when relevant mean values are compared. Table II.4 compares cross sectional variation values.

TABLE II.4 COMPARING THE RANK OF VARIABILITY OF

COUNTRY SS AND COUNTRY AGR VALUES

RANK	SS VARIABILITY	COUNTRY	RANK	AGR VARIABILITY	COUNTRY
1	0.0540	JAMAICA	1	0.019	DOMINCA
2	0.0463	DOMINICA	2	0.013	JAMAICA
3	0.0460	TRINIDAD	3	0.007	TRINIDAD
4	0.0340	BARBADOS	4	0.004	BARBADOS

The table shows that there is near perfect correspondence between the variability ranking across countries - with Jamaica and Dominica above exchanging positions. Again this evidence is not favourable to the H_1 hypothesis.

In the next section we turn to an evaluation of H_2 which alleges a normal downward tendency in the SS variable, and of H_3 which claims that fiscal policy has mutually cancelling effects on the SS variable.

In the previous section our analysis of the trends in self-sufficiency and in government expenditure seemed to suggest three hypothetical explanations for the difference in the trend patterns observed. Through the use of mainly correlational analysis we were able to come to a tentative assessment of the first explanation suggested. In this section we propose to use a more direct approach in an attempt to evaluate the second and third explanations.

TESTING THE H_2 HYPOTHESIS.

The second explanation, H_2, claims that the self-sufficiency variable is normally downward biased over time and that the failure to observe this in the trend was a mark of the success of fiscal policy. In this sense fiscal policy is seen as a rectifying factor in the intertemporal behaviour of the self-sufficiency variable.

It would seem that there are two distinct conditions which must be fulfilled if H_2 can be accepted as a valid hypothesis. On the one hand we should be able to demonstrate the existence of the normal downward bias referred to. On the other hand we should be able to detect whether the presence of active fiscal policy makes a

difference to the behaviour of the self-sufficiency variable.

In respect to the first condition we decided to employ two - period autoregressions. The idea here is that if the first condition is to hold then the joint effect of the autoregressive coefficients, B_1 and B_2 should be negative. In fact we can examine a strong and a weak version of the first condition of H_2. The strong version would state that $(B_1 + B_2) < 0$ while the weak version would state that $-L_1 < (B_1 + B_2) < L_2$, where L_1 and L_2 are relevant probability limits. In other words, the limits in the strong case suggest that the relevant confidence interval for $(B_1 + B_2)$ would include only negative values, while in the weaker case the interval is required only not to exclude negative values. In respect of the second condition we decided to use a likelihood ratio test to decide whether the inclusion of the government expenditure variable made a difference to the autoregression already done. It is known that this test is able to discriminate between different specifications even when the individual coefficients do not pass the required signifiance tests. [2]

In table III.1 below we summarise the results of the tests done on the H_2 hypothesis. In the table we use the symbol AW and AS to denote weak and strong acceptability of the relevant condition of H_2. The symbol N is used to indicate that the condition is not accepted.

TABLE III.1   SUMMARY TESTS ON H_2 , BY COUNTRY

COUNTRY	RANGE 95%	H2(i)	CHI-SQ P95%	H2(ii)	H2
DOMINICA	(-0.42, 1.23)	AW	5.24	AW	AW
BARBADOS	(-1.09, 1.22)	AW	6.56	AS	AW
JAMAICA	(-0.77, 0.30)	AW	0.80	N	N
TRINIDAD	(-0.36, 1.60)	AW	1.3	N	N

What the table indicates is that the first part of the H_2 hypothesis - the existence of a downward bias in the self-sufficiency variable - is weakly acceptable in all of the four cases, with the role of fiscal policy as a rectifying factor being weakly supported by the data in two of the cases and not being supported at all in the other two.

When the results on both parts of H_2 are combined we have the result that while there is weak support for the hypothesis in the case of Dominica and Barbados, there is no overall support in the case of Trinidad and Jamaica.

In summary therefore it would seem that the evidence in respect of H_2 is at best only weakly supportive and at worst, inconclusive.

We now turn to the third hypothesis, H_3 .

The third hypothesis under review states that fiscal policy generates two effects on the self-sufficiency ratio – a positive effect through agricultural production and a negative effect through food imports. The observation that over time the self-sufficiency variable has reflected stationarity could therefore suggest that these two effects are equally powerful.

One test of this hypothesis would consider the different effects in terms of the relevant elasticities. So H_3 would actually state that $E_{A,G} = E_{M,G}$ where E denotes the elasticity, A, output in the agricultural sector, M, food imports and G the relevant government policy variable.

The procedure employed was to compare the point estimate for the import elasticity, $E_{M,G}$ with the interval estimate for the agricultural output elasticity, $E_{A,G}$. If the point elasticity fell within the range of the output elasticity we use the symbol A to denote the acceptability of hypothesis, H_3. The results of the tests are summarised in table III.2 below and the relevant regressions are presented in the Appendix.

TABLE III.2   SUMMARY OF TESTS ON H , BY COUNTRY
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COUNTRY	AGRICULTURAL OUTPUT ELASTICITY EA,G	95% EA,G RANGE	IMPORT ELASTICITY EM,G	TEST RESULTS
DOMINICA	0.639	0.639 ± 0.182	0.713	A
BARBADOS	0.697	0.697 ± 0.118	0.623	A
JAMAICA	0.619	0.619 ± 0.104	0.715	A
TRINIDAD	0.552	0.552 ± 0.065	0.608	A

The table indicates that the available evidence has been generally supportive of the H , hypothesis. It would
3
seem therefore that the Montek Ahluwalia dictum that

> 'a multiplicity of policy targets requires
> a multiplicity of policy instruments'. [2]

is relevant now as it has ever been. For with domestic fiscal policy geared to make a positive contribution to food self-sufficiency, it is necessary that commercial policy be pointed in a similar direction. Side by side with encouraging food production it becomes more and more important to keep the growth of imports from cancelling out the domestic fiscal effort.

In conclusion we may say that on the one hand, there is no strong evidence that fiscal policy has failed to support the drive towards self-sufficiency . On the other hand there seems to be fairly strong evidence to suggest that, by its very nature, fiscal policy by itself will not succeed in transforming the economy in terms of reduced

dependence on foreign sources of food supply. The strong link between expenditure supportive of agriculture and the level of food imports acts as a neutralizing force where self-sufficiency is concerned.

A.   Log-linear regressions used to test conditions (i) and (ii) of hypothesis, H_2.

COUNTRY (PERIOD)	SS(-1)	SS(-2)	GOV	R2	D.W.	LOG LIKELIHOOD
TRINIDAD (69-84)	0.618 (2.72)	.005 (.290)	–	.39	1.84	19.85
	0.486 (.301)	.016 (.290)	-0.021 (.021)	.43	1.79	20.50
JAMAICA (68-80)	-0.050 (.286)	0.278 (.271)	–	.10	1.81	13.22
	-0.054 (.292)	0.386 (.312)	0.083 (.11)	.15	1.61	13.62
BARBADOS (71-83)	0.228 (.325)	-0.167 (.318)	–	.06	1.88	14.99
	-0.054 (.290)	-0.275 (.264)	0.090 (.033)	.43	2.21	18.27
DOMINICA (70-83)	0.697 (.231)	-0.298 (.236)	–	.47	2.03	23.74
	0.715 (.201)	-0.165 (.214)	0.092 (.043)	.63	2.62	26.36

Note : The numbers in parentheses are standard errors.

B.   Log-linear regression used to test hypothesis, H_3.

COUNTRY (PERIOD)	DEPENDENT VARIABLE	GOVERNMENT EXPENDITURE	R^2	D.W.
TRINIDAD (67-84)	YA	GOV 0.552 (.27)	.96	0.73
	M	0.608 (.017)	.99	2.26
JAMAICA (67-80)	YA	GOV 0.619 (.048)	.93	1.93
	M	0.715 (.037)	.96	1.20
BARBADOS (70-83)	YA	GOV 0.697 (.054)	.93	1.55
	M	0.623 (.033)	.95	0.65
DOMINICA (69-83)	YA	GOV 0.639 (.085)	.81	0.52
	M	0.713 (.039)	.95	2.00

Note : The numbers in parentheses are standard errors.