

---PRELIMINARY DRAFT---

DEVELOPING CARIBBEAN HUMAN CAPITAL: AN EXAMINATION OF  
PUBLIC SPENDING ON EDUCATION

by

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### I. Introduction

In 1890 the famous German political economist Adolph Wagner hypothesized that real per capita output of the public sector will grow faster than the real per capita output of the economy during a period of industrialization. Much of this growth in real per capita public sector output is attributed to investment in the infrastructure that industrial development requires. As public sector output outpaces the growth of national income, its composition is influenced by changes in the structure of the population.

Our primary focus here is the educational output of the public sector, and we take the view that a change in the age structure of the population will affect the composition of the public educational output. From this perspective, wise educational policy is one that not merely

responds to population change but one that anticipates the demand for education that such a change will bring. The aim of this paper is to assess the extent to which budget policy in Jamaica during the 1970s met this challenge. But before we focus on Jamaica, it is useful to place the Jamaican educational effort within the context of the larger Commonwealth Caribbean.

## II. Comparative Caribbean Educational Effort

During the 1970s the share of national resources allocated to education by the more-developed Caribbean countries grew significantly, with the exception of Trinidad and Tobago. As Table I shows, public expenditure on education by Trinidad and Tobago as a percentage of gross national product was the lowest of the four countries, 3.4 percent in 1977, compared to 8 percent for Barbados and 7.5 percent for Guyana. The greatest growth in educational effort occurred in Jamaica and Guyana, where the GNP shares rose from 3.6 percent in 1970 for Jamaica to 7.1 percent in 1976, and for Guyana from 4.7 percent in 1970 to 9.8 percent in 1978.

Not only did the share of the GNP allocated to education increase for the more-developed Caribbean countries, but there was also a noticeable shift in the distribution of their educational spending toward higher education (Table II). This shift was most dramatic in Jamaica, where the share of educational spending on tertiary education grew from 8.8 per-

TABLE I

PUBLIC EXPENDITURE ON EDUCATION AS A PERCENT OF GNP FOR  
SELECTED YEARS

Country	1970	1975	1976	1977	1978	1979
Barbados	6.6	6.3		8.0		
Jamaica	3.6	5.9	7.1			
Trinidad & Tobago	3.9	2.8		3.4	4.2	
Guyana	4.7	4.9		7.5	8.2	9.8

Source: UNESCO, STATISTICAL YEARBOOK 1982.

cent in 1970 to 21.1 percent in 1976. In general, the share of spending on primary education for all countries declined, while the share for secondary education remained stable.

Despite the stability of the share of public spending on secondary education, the share of the secondary school age population enrolled in school rose between 1970 and 1979 (Table III), with the most significant increases occurring in Barbados and Jamaica, where the shares grew from 71 percent to 85 percent and from 46 percent to 57 percent, respectively.

### III. Public Spending and Educational Progress in Jamaica

Between 1960 and 1970 the enrollment ratio for primary education in Jamaica rose from 92 percent to 119 percent, while that for the secondary education rose only slight-

TABLE II  
*PERCENTAGE DISTRIBUTION OF*  
 PUBLIC EXPENDITURE BY LEVEL OF EDUCATION FOR SELECTED YEARS

Country/Year	Primary	Secondary	Tertiary
Barbados:			
1970	34.7	33.9	13.0
1975	27.3	29.7	18.5
1977	28.8	31.9	15.6
Jamaica:			
1970	44.7	35.6	8.8
1975	33.5	32.3	19.8
1976	30.3	35.3	21.1
Trinidad & Tobago:			
1970	52.5	24.0	13.9
1976	42.8	20.0	21.0
1978	37.0	27.0	9.0
Guyana:			
1970	46.5	34.4	14.7
1975	44.8	33.3	15.9
1977	35.2	32.3	19.5
1979	33.1	33.1	15.2

Source: UNESCO, STATISTICAL YEARBOOK 1982.

ly, from 45 percent to 46 percent. In the following decade, as a result of ambitious government programs to increase access to secondary education, the enrollment ratio for secondary education grew dramatically, from 46 percent to

TABLE III  
SCHOOL ENROLLMENT RATIOS FOR SELECTED YEARS

Country/Level	1970	1975	1977	1978	1979	1980
Barbados:						
Primary	108	101	116	122	115	117
Secondary	71	77	81	81	85	85
Jamaica:						
Primary	119	98	98	99	99	--
Secondary	46	57	58	58	57	--
Guyana:						
Primary	99	93	98	98	115	--
Secondary	56	56	61	60	59	--
Trinidad & Tobago:						
Primary	107	99	94	--	--	--
Secondary	42	39	--	--	--	--

Source: UNESCO, STATISTICAL YEARBOOK 1982.

57 percent. The behavior of the enrollment ratios is significant for it reflects the adequacy of new capital expenditures to meet the anticipated growth in demand for education as well as the adequacy of current spending to permit full utilization of new capital facilities. Current (or operating) expenditures, therefore, measure the actual supply of education by the government. The demand for education, on the other hand, is measured by the number of primary and secondary school age

children to be educated.

A change in the supply of education has two dimensions--a change in quantity and a change in quality. An increase in the seating capacity of schools and an increase in enrollment are obvious measures of an increase in the quantity of education. But they say nothing about quality. For a complete assessment of the quality of education, we need to look beyond these measures to such things as the structure of the curriculum, the competence of the teachers, and the availability of instructional materials. This, however, is beyond the scope of this paper. For our purpose, we shall use real current spending per enrolled pupil as a proxy measure for the quality of education. This is defined as nominal current spending per pupil divided by the consumer price index. The rationale here is that the quality of education depends on the amount of real resources allocated to it, and real current spending provides a reasonably accurate measure of real resources. If, as more children are being educated, real current spending per child remains fixed, then the <sup>quantity</sup> ~~quality~~ of education will have increased but not its quality. Two considerations arise here. One is that if the quality of education is high to begin with, then a fixed real current spending per enrolled child presents no problem. The other is that greater efficiency in spending on education could result in declining real current spending per enrolled pupil. In this eventuality, a decline in real current spending would not be in conflict with

an increase in the quality of education.

The relevance of this latter consideration, however, depends on whether or not the educational plant is being operated below its optimum level of production. If it is, then an increase in enrollment would lead to a reduction in the average cost of educating each child. In Jamaica, the evidence indicates otherwise. Throughout the 1970s, primary and secondary schools have been operating well above capacity. The number of children enrolled has exceeded the constructed seating capacity of the schools. The efficiency consideration, therefore, is not relevant. Thus we postulate a conflict between falling real current spending and the quality of education.

The direction of change in real current spending (RCS) per pupil depends directly on the behavior of marginal real current spending (MRCS), which is the absolute change in real current spending divided by the absolute change in the number of pupils enrolled. In order to prevent the quality of education from declining, the MRCS must at least be equal to the real current spending per pupil or average real current spending (ARCS) of the previous period. When this condition is met, the quality of education per enrolled pupil will remain stable. This level of quality may be totally inadequate, but at least no pupil is made worse off.

A change in current spending is a function of capital spending of a previous period. If a change in current spending is inadequate to maintain previous levels of quality, we may infer that the level of capital spending was also

inadequate. We can determine the required level of capital spending by constructing the following simple model:

$$\Delta \text{RCS} = a \text{ RKS} \quad (1)$$

where  $\Delta \text{RCS}$  is the change in real current spending,  $\text{RKS}$  is real capital spending, and  $a$  is the current spending coefficient. To maintain the quality of education, the following condition must exist:

$$\text{ARCS} = \text{MRCS} \quad (2)$$

But

$$\text{MRCS} = \frac{\Delta \text{RCS}}{\Delta E} \quad (3)$$

where  $E$  is enrollment. Thus

$$\frac{\text{RCS}}{E} = \frac{\Delta \text{RCS}}{\Delta E} \quad (4)$$

It follows, therefore, that

$$\frac{\Delta \text{RCS}}{\Delta E} = a \frac{\text{RKS}}{\Delta E} \quad (5)$$

$$\frac{\text{RCS}}{E} = a \frac{\text{RKS}}{\Delta E} \quad (6)$$

$$\frac{\Delta E}{E} \text{RCS} = a \text{RKS} \quad (7)$$

$$\text{RKS} = \frac{\left(\frac{\Delta E}{E}\right) \text{RCS}}{a} \quad (8)$$

Thus the amount of real capital spending required to maintain real per pupil current spending is equal to the rate of change in enrollment times total real current spending divided by the current spending coefficient.

Using the procedures set forth above, we can now assess the extent to which there was any improvement in the quantity and quality of primary and secondary education in Jamaica during the 1970s. In doing so, it is important to bear in mind that even if there is no capital spending on education in a given year, real current spending in the subsequent year may still increase, simply because of the greater utilization of existing capital facilities. In some instances, capital spending may generate little or no subsequent current spending when such capital spending merely replaces old capital stock. The replacement of an old school building with a new one, for example, may not require additional teachers.

Table IV shows that between 1974 and 1979, real per pupil current spending on primary education declined from J\$104 to J\$76. This decline was also accompanied by a fall in enrollment. At the secondary level, the decline in real per pupil current spending was more dramatic--from J\$356 in 1974 to J\$184 in 1979. The fact is that public secondary school capacity declined from 101,266 places in 1974 to 96,881 places in 1978, while enrollment grew from 130,660 to 158,039. These figures suggest that the government's objective of creating greater access to secondary education was not matched by the amount of real public spending required to maintain the standard of quality that prevailed in the early part of the 1970s. The decline

TABLE IV

JAMAICA; PUBLIC SPENDING ON EDUCATION AT THE PRIMARY AND  
SECONDARY LEVELS, 1974-1979 (J\$ million)

Year	Current Expen- diture	Capital Expen- diture	Consumer Price Index	Real Current Expen- diture	Real Capital Expen- diture	Total Enroll- ment	Real Current Spending per Pupil
Primary							
1974	38.0	4.1	85.1	44.6	4.8	429,516	103.9
1975	44.8	4.8	100.0	44.8	4.8	431,882	103.8
1976	43.3	6.0	109.7	39.4	5.4	425,579	92.6
1978	60.6	2.8	164.5	36.8	1.7	435,938	84.5
1979	68.5	4.1	212.4	32.2	1.9	424,514	75.9
Secondary							
1974	32.8	6.6	85.1	38.5	7.7	108,070	356.7
1975	44.0	15.5	100.0	44.0	15.5	130,660	336.9
1976	48.5	13.4	109.7	44.2	12.2	142,942	309.3
1978	60.9	11.8	164.5	37.0	7.1	158,039	234.3
1979	61.9	6.6	212.4	30.6	3.1	166,022	184.4

Source: ECONOMIC AND SOCIAL SURVEY.

in real spending per pupil must in large measure be attributed to the decline of the Jamaican economy in the latter half of the 1970s. This economic decline eroded the tax base and weakened the government's ability to finance spending at

levels that would at least maintain the quality of education at the 1974 level.

Using the 1974 real per pupil current spending of J\$356.7 as a benchmark, we can calculate the levels of real current spending that would have been required to maintain that level. In 1974, secondary school enrollment was 130,660, thus the total real current spending that year should have been  $130,660 \times 356.7 = \$46.6$  million. This is \$2.6 million greater than the actual real current spending for that year. For 1979, when the enrollment was 166,022, real current spending should have been \$59.2 instead of the actual \$40.6 million.

Data for the 1974-1980 period indicate that one dollar of real capital spending generated an average increase of 30 cents in real current spending in subsequent years. The underlying assumption here is that only net new capital spending generates subsequent current spending; replacement capital spending does not. Using equation 8, we can determine the required amount of real capital spending. In 1974 this was \$2.4 million--less than the actual amount by \$5.3 million. We may infer from this that the \$5.3 million was replacement investment. In 1978 required real capital spending should have been \$6.6 million, \$0.5 million less than the actual amount. This \$0.5 million we attribute to replacement investment.

That required current spending was inadequate to maintain real per pupil current spending must be attributed

to the inadequate new capital spending. Although actual real capital spending was large, a disproportionate share of it obviously went toward the replacement of capital facilities. The result was that enrollment grew much faster than the expansion of capital facilities.

#### IV. Conclusions

This paper has looked at education strictly from the vantage point of real public spending on the grounds that the quantity and quality of education are determined by the amount of real resources allocated to it. The conscious effort on the part of the Jamaican government during the 1970s to increase the supply of education met with only limited success. For while it succeeded in increasing access to secondary education, it did so at the expense of the quality of education as evidenced by the dramatic decline in real per pupil current spending. The likely effect of this is to drastically reduce the rate of return on investment in education, thereby reducing the significance of education as an instrument of upward mobility.