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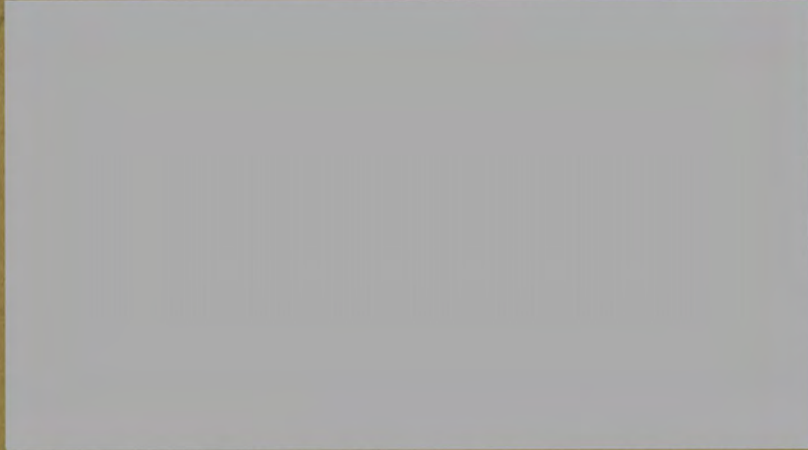


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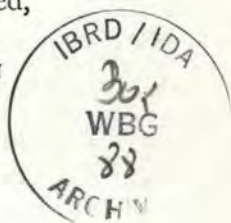


amongst the population.) Now discard every machine for which output per head is less than the notional wage and put the labour so released into investment in producing sigma machines. This would involve (when the initial stock of equipment is all of a low technique) ceasing to consume and living on air during the first phase of the plan. Alternatively, we might take literally the assumption of a zero gestation period for equipment so that the final position was reached before breakfast on the first day of the plan.

There are a number of feasible policies besides the one that I proposed, but Dr. Stiglitz's proposal is not amongst them.

JOAN ROBINSON

Cambridge.



### A NOTE ON GOVERNMENT EXPENDITURES IN DEVELOPING COUNTRIES<sup>1</sup>

THE proposition that a relationship exists between *per capita* incomes and the size and pattern of government expenditures seems to have won some acceptance in recent years; at least, it has led to various attempts to establish statistically such a relationship for developing countries with various levels of *per capita* incomes.<sup>2</sup> These attempts have been based on two presumptions: one, that the purely economic and institutional factors represented by a certain "stage of development" have a strong enough effect on government spending to impart a pattern distinguishable from the influences of political, historical and fortuitous factors, the other, that the "stage of development" is properly represented by a simple index such as *per capita* G.N.P. converted to a common basis at official rates of exchange. Both are questionable. Nevertheless, the studies carried out so far seem to have established some tendencies in government expenditure, and the following have had respectable statistical support:

(i) The share of total government expenditure in the gross national product of developing countries increases with *per capita* income,

<sup>1</sup> This note is based on a study carried out in the International Bank for Reconstruction and Development by J. Schmedtje and S. Lall, assisted by N. Abudabbeh, titled *A Cross Section Analysis of Government Expenditure Patterns in Developing Countries*, Economics Department Working Paper No. 21, June 28, 1968. The author thanks the Bank authorities for their permission to use the results of the study for publication.

The author is willing to supply more detailed information on the statistical content of this paper on request to him at the Oxford University Institute of Economics and Statistics, Manor Road, Oxford.

<sup>2</sup> In particular, Jeffrey G. Williamson, "Public Expenditure and Revenue: An International Comparison," *The Manchester School of Economic and Social Studies*, January 1961; H. H. Hinrichs, "Determinants of Government Revenue Share Among Less-Developed Countries," *ECONOMIC JOURNAL*, September 1965; R. S. Thorn, "The Evolution of Public Finances During Economic Development," *The Manchester School of Economic and Social Studies*, January 1967; and A. R. Roc, "The Government-Revenue Share in Poorer African Countries—A Comment," *ECONOMIC JOURNAL*, June 1968.



though for the poorest of these countries the "openness" of the economy (*i.e.*, imports/G.N.P.) seems to exercise a greater influence on income.

(ii) Current expenditures as a whole increase their share of the national product with rising incomes.

(iii) Social expenditures increase as a percentage of total government expenditure with rising incomes.

Most of these patterns of growth of public expenditure have been established by use of simple regression techniques on cross-section data, though one study also used time series and multiple regression analysis.<sup>1</sup> Our study, based on relatively recent data (1962-64 averages) for forty-six developing countries, relied solely on simple regression analysis. The exact definitions and coverage of the items studied may not have been identical to those of the studies mentioned above, but I believe that the differences were not large enough to preclude comparison. Our study used sources not available to the others,<sup>2</sup> and in this it may have been broader based; it certainly covered the ground in greater detail.<sup>3</sup>

The countries studied were divided into three income groups: (i) *per capita* G.N.P. of up to \$124; (ii) *per capita* G.N.P. of \$125-\$249; and (iii) *per capita* G.N.P. of \$250-\$675. Since the values for income and ranking of countries were rather different from those of other studies, they are given in full in the following table:

*Per Capita G.N.P. (1964)*

(i) \$0-\$124		(ii) \$125-\$249		(iii) \$250-\$675	
	\$		\$		\$
Malawi	38	Ceylon	132	Malaysia	258
Ethiopia	49	Congo (Brazz.)	135	El Salvador	264
Burma	61	U.A.R.	138	Colombia	273
Tanganyika	67	Bolivia	138	Guatemala	285
Uganda	77	Philippines	141	Peru	289
Kenya	82	Zambia	160	Costa Rica	360
Afghanistan	82	Morocco	174	Mexico	433
India	88	Tunisia	180	Panama	445
Pakistan	88	Ecuador	190	Chile	448
Sudan	92	Honduras	193	Greece	513
Nigeria	95	Paraguay	195	Trinidad and Tobago	588
Sierra Leone	105	Iran	206	Argentina	644
Thailand	109	Dominican Republic	208	Japan	661
Cameroon	112	Brazil	216		
Republic of Korea	119	Algeria	217		
		Ghana	229		
		Iraq	235		
		Turkey	239		

<sup>1</sup> R. S. Thorn, *loc. cit.*

<sup>2</sup> The economic reports of the IBRD were the main source for the fiscal data, though U.S. AID, U.N. and published government figures were also used in some cases.

<sup>3</sup> The categories of government expenditure studied were: general services, defence, economic services and social services, each in total, current and capital terms separately. Selected items of economic services ((1) agriculture, (2) mining, industry and utilities, and (3) transport and communications) and social services ((1) Education, (2) Health and (3) Housing and General Welfare) were also tested separately.



Two sets of regressions were carried out for each group of countries separately and in combination, the first with total expenditure and various categories of expenditure expressed as percentages of G.D.P., the second with various categories of expenditure expressed as percentages of total expenditure. In all, 222 correlations were tried; the results were very disappointing. Only 13 correlations were found significant at a 10% level, which was the limit of acceptability set by us; these correlations are given in full in the appendix. The others were rejected as statistically non-significant. The results of the analysis can be summed up thus:

(a) There was no significant relationship between *per capita* G.N.P. and total government expenditure expressed as a percentage of G.D.P. for any group or combination of groups of countries.

(b) There was no significant relationship between *per capita* G.N.P. and total current expenditure for any group or combination of groups of countries.

(c) Social services as a whole showed no significant tendency to increase as a proportion of total expenditure or of G.D.P. with rising incomes.

(d) Education expenditures (a selected item of social-service expenditures) tended to increase as a proportion of total government expenditure for groups I + II and all three groups together, but to fall for Group III by itself. Of the three regressions, the correlation coefficient (*R*) was highest for Group III, and lowest for Groups I + II + III. Clearly the impetus to expand spending on education weakened for governments of countries that has passed *per capita* incomes of around \$250.

(e) Health expenditures showed a similar tendency to increase as a proportion of total government expenditure with higher incomes for groups I + II and all three groups together, with the former regression coefficient higher than the latter. Health expenditures also tended to increase for groups I + II as a percentage of G.D.P. They did not, however, show any significant tendency to decline for group III.

(f) Agriculture showed a consistently declining trend, as a proportion of both total expenditure and G.D.P. for Groups I + II and all groups taken together.

(g) Transport and communication expenditures tended to increase as percentages of total government expenditure for Groups II + III and all three together. The trend was, in contrast to items of social-service expenditure, stronger for the two richer groups than for all groups together.

(h) Total economic service expenditures increased their share of total expenditure for the two richer groups, but the correlation coefficient was fairly low. Current economic service expenditures increased



as a proportion of G.D.P. for Group III by itself, and though the regression coefficient was quite low, the correlation was the best obtained in the entire exercise.

On the whole, the correlation coefficients for these significant regressions were rather poor, so that changes in *per capita* income explained a relatively small part of the changes in items of government expenditure; taken with the large number of non-significant correlations, this raised considerable doubts concerning the meaningfulness of the exercise as a whole and the validity of the results of other similar attempts. *Per capita* income did seem to influence government expenditure on some items, but on larger categories it seemed not to exercise any influence at all. This signifies one of two things:

First, assuming that the level of development does have an effect on the pattern and size of government expenditure, *per capita* G.N.P. may be the wrong thing to relate expenditure to—*per capita* G.N.P. figures are notoriously unreliable for the poorer countries; they are not satisfactory indicators of the level of development of a country, particularly of the sophistication and complexity of its institutions; they are difficult to compare or to reduce to a meaningful common denominator.

Second, if *per capita* income is the right index of the level of economic development, then it either has no special effect on the pattern of government expenditure or its effects are overlaid by the influence of other factors.

In the first case it can be argued that other indices of development, if any can be found, be used as explanatory variables. In the second it can be argued that explanatory variables not directly connected to the level of development, such as imports/G.N.P.,<sup>1</sup> or dummy variables for certain non-economic factors,<sup>2</sup> be used either with *per capita* income or independently of it. It may also be argued with some plausibility that all such efforts to establish general patterns for government expenditures by simple correlation techniques be discarded altogether in favour of more particular and pragmatic case studies. The results of our study, or the lack of them, seem to support the last, the defeatist, solution.

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<sup>1</sup> H. H. Hinrichs, *loc. cit.*

<sup>2</sup> R. S. Thorn, *loc. cit.*

## APPENDIX

*Results of Regression Analysis*

*Set I.* Significant Correlations between types of government expenditure as percentages of G.D.P. and *per capita* income (*Y*). Standard error is given in brackets.

Income group.	Type of expenditure.	Regression equation.	Correlation coefficient ( <i>R</i> ).	No. of observations.
1. III	Current economic services	$-0.140 + 0.005Y$ (0.248) (0.002)	0.676*	10
2. I + II	Health services	$0.460 + 0.004Y$ (0.140) (0.002)	0.305†	31
3. I + II + III	Agriculture	$2.170 - 0.003Y$ (0.197) (0.001)	-0.314*	39

*Set II.* Significant correlations between types of government expenditure as percentages of total government expenditure and *per capita* income (*Y*).

Income group.	Type of expenditure.	Regression equation.	Correlation coefficient ( <i>R</i> ).	No. of observations.
1. II + III	Total economic services	$22.123 + 0.020Y$ (1.545) (0.011)	0.323*	29
2. III	Education services	$25.310 - 0.020Y$ (1.218) (0.010)	-0.552†	11
3. I + II	" "	$8.330 + 0.039Y$ (0.970) (0.016)	0.406*	31
4. I + II + III	" "	$12.450 + 0.011Y$ (0.859) (0.006)	0.268†	42
5. I + II	Health services	$1.790 + 0.023Y$ (0.541) (0.009)	0.419*	31
6. I + II + III	" "	$4.100 + 0.007Y$ (0.523) (0.004)	0.278†	42
7. I + II	Agriculture	$13.880 - 0.036Y$ (0.940) (0.016)	-0.390*	29
8. I + II + III	"	$10.590 - 0.011Y$ (0.787) (0.006)	-0.288†	39
9. II + III	Transport and communications	$6.970 + 0.020Y$ (0.830) (0.006)	0.539*	26
10. I + II + III	Transport and communications	$9.157 + 0.014Y$ (0.931) (0.007)	0.324*	39

\* Significant at the 5% level.

† Significant at the 10% level.



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