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Earmarking of Taxes for Highways in Developing Countries

by

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Introduction

1. Public revenue is frequently earmarked by governments for the financing of a specific head of expenditure. One of the major objectives in doing so is to impose a constraint in the allocation of funds in the hope of ensuring that the flow of revenue to this head of expenditure is both larger and more steady than might otherwise be the case. Any comprehensive assessment of the device in any particular case must obviously depend upon the personal or political value judgments which are made regarding the priority of the sector of expenditure being considered, the desirability of restraining the free exercise of government choice in determining the pattern of expenditure, etc.

2. There is, however, a prior and more objective question which requires answering before such a broad assessment of earmarking is undertaken. This is simply to determine whether it appears to be effective in practice in achieving its objective of increasing expenditure on the relevant service. This study is a first and brief attempt to begin this examination on a systematic basis. It is made necessary by the fact that a priori analysis provides no convincing arguments one way or the other. On the one hand, some would argue that earmarking ensures a minimum level of expenditure for a government function, for which there is little immediate public support, thus avoiding the need for a repeated pressure on the legislature for funds.[1/] Furthermore, it is added, earmarking, by linking the tax to a designated function, may be one of the few ways to increase taxation.[2/] On the other hand, it is argued that by conveying the impression that the revenue needs of the sector have been adequately met by the earmarking provision, in fact there will frequently be less expenditure on the service, than might otherwise have been the case.

1/ Elizabeth Deran: "Earmarking and Expenditures: A Survey and a New Test." National Tax Journal, December 1965, p. 357.

2/ The benefit theory of taxation. Highway user charges linked to highway developments provide one of the better illustrations.

3. The direct significance of the study to Bank operations should be readily apparent. At the most general level we make -- explicitly or implicitly -- the value judgment that economic development should have accorded to it, the highest priority in national government policies. Thus we have an interest in ensuring that budgetary expenditure of a developmental nature is as high as possible. In addition, the study is significant to Bank operations at the sector and project levels, where the speed of implementation of programmes and projects in which the Bank is involved is frequently dependent upon the availability of funds to meet the local currency component of the expenditure.

4. The present study has examined the highway sector. This was selected firstly because earmarking of taxes for highways is a common phenomenon, and secondly because the operational experience of the Bank in this field would facilitate the collection of data. With data both from countries, which earmark revenue to highways and those which do not, the object of the study was to establish, if there is any statistically significant relationship between total expenditure on roads, as a proportion of gross domestic capital formation; and:

a) The existence and non-existence of earmarked revenue for roads;

b) Earmarked taxes, as a proportion of gross domestic capital formation.

5. Negatively, it should be emphasized that the study does not purport to examine whether investment in highways has been optimal or not. The question of road user charges and their relation to highway expenditure has also been outside its scope. Earmarked taxes and user charges differ, firstly since road user charges are not necessarily earmarked for road development, and secondly because taxes earmarked for roads are not always charges upon road users, although the latter does appear to be most common.

6. It can be argued that earmarked taxes for roads, as a proportion of public investment, instead of a proportion of gross investment, would have been a more operational concept. Gross investment rather than public investment was chosen, because:

a) The problem of variations in the scope of the public sector in the total investment aggregate is avoided; and

b) Data are more readily available for gross investment than for gross public investment.1/

1/ Accurate data on gross public investment are frequently not available because of poor data of entities in the public sector outside the realm of the central government. Gross investment is often directly estimated from the flow of commodities in an economy, without distinction as to private and public sectors.

Data and Methodology

7. The study covers the time period 1955-65 and has been restricted to developing countries.[1] The selection of countries was determined by the availability of data. For each country, the main data collected were:

a) The annual expenditure on highways and bridges, including construction, maintenance and administration expenditure;[2]

b) The amount of earmarked taxes collected annually for highway development;[2]

c) Gross domestic capital formation;

d) Gross National Product.

The sources were IBRD country reports and highway appraisal reports, together with files and working papers in the transportation division of the Projects Department, and in Area Departments. The data vary as to quality and coverage. When budget and plan documents were relied on, actual expenditures were used to the extent possible.

8. Where a country is administered on a federal or decentralized basis, precaution was taken to get data representing total national expenditure on highways and the total amount of earmarked taxes for roads. Data on local expenditure were not available for all countries.[3]

9. In obtaining data on earmarked taxes, it was necessary to distinguish between the road funds composed entirely of earmarked taxes, those which in addition receive contributions from the general budget and other sources, and thirdly those which have no earmarked elements.[4] The study has been concerned only with the element which can properly be said to be earmarked.

10. Ideally, we would have wished 10-year time series for the period 1955-65 to have been available for all countries. However, data of this coverage were available only for a limited number of countries. Acceptable data for the cross section analysis were found for 18 countries which have earmarking for highways, and for 19 non-earmarking countries. For each country and for each year, for which observations had been obtained, the percentage of road expenditure to gross investment was calculated. An average for the period was then taken for each country covering the period

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1/ With the exception of New Zealand.

2/ Excludes urban street and road expenditure.

3/ Argentina has been excluded from the analysis, since no data were available for the Provinces' total road expenditure and earmarked revenue. Earmarking appears never to have been fully accepted in Argentina. (See Annex 5.)

4/ Since 1962, Kenya has a road fund of the third category.

for which observations were made. This was done both for the non-earmarking and the earmarking countries. For the latter, the average percentage of earmarked taxes to gross investment was calculated in the same manner.[1/2/]

11. The analysis is presented in two parts: the first part presents a cross section analysis and the second part a time series analysis. In the first part, road expenditure as a proportion of gross investment is analyzed for the earmarking and the non-earmarking countries. The earmarking countries then are studied to determine if there is an observable relationship between on one hand, road expenditure as a proportion of gross investment, and on the other hand earmarked taxes as a proportion of gross investment. In the second part, the time series of the earmarking countries are examined in a similar way.

Survey Results

12. The survey showed that altogether no less than 31 developing countries had or initiated legislation for the earmarking of taxes for highways in the period 1955-65, although lack of data restricted the study to the examination of 18 of these countries.[3/] Earmarking for highways is more common than first expected. It is widespread in South America where ten countries were found to have earmarking for this purpose. However, in Central America, Costa Rica is the only country which employs earmarking. Earmarking is widespread in former French-ruled Africa, where nine earmarking countries were found. Earmarking is less common in former British ruled countries in Africa. In Egypt, earmarking still takes place, but it has been discontinued in Ghana, Kenya and Uganda.

13. The percentage of earmarked taxes to highway expenditure varies considerably in the earmarking group with a mean proprotion of 37 per cent. Peru comes closest to a 100 per cent coverage with 88 per cent, followed by Ethiopia and New Zealand with 68 per cent and 62 per cent,

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1/ Fiscal years do not agree everywhere with calendar years. There should be little harm to the analysis, particularly since averages for the period are used in the cross-section analysis.

2/ The means were also calculated by the alternative method of taking the percentage of accumulated road expenditure to accumulated gross investment, over the period. There was no significant difference in the mean proportions of road expenditure to gross investment obtained by the two methods; the two means of earmarked taxes to gross investment were identical for the sample of earmarking countries.

3/ There may be others, but it would require the sending out of a questionnaire to identify these. For a list of the earmarking countries, where data were lacking, see Table 3 - Annex 1.

respectively. (See Table 1 - Annex 1). The residual element of expenditure on roads in the countries was met out of external aid, and/or allocations from the general budget.

Earmarking and Non-Earmarking Countries - Cross Section Analysis

14. The 18 earmarking countries were compared with the 19 in which no earmarking existed. Is there any significant difference in the ratio of road expenditure to gross investment between the two groups? For the earmarking countries, the average percentage of highway expenditure to gross investment is 9.9 percent with a standard deviation of 5.6.[1/] The average for the non-earmarking group is lower, 8.1 percent with a standard deviation of 4.2. The average per capita incomes are nearly identical in the earmarking and non-earmarking group with means of US$ 287 and US$ 291 per capita, respectively. The median income in both groups is about US$ 200. It follows that the comparison betwen the two groups is not biased on account of disparities in average incomes.[2/]

15. The difference between the two samples was statistically tested with the t distribution, to determine whether the mean of the population of earmarking countries is significantly different from that of the population of non-earmarking countries. It was assumed that the proportions of road expenditure to gross investment are normally distributed, and secondly that the variances for both populations are equal.[3/] Although the difference in the mean proportions brings with it the suggestion that the ratio of road expenditure to gross investment is in general higher in earmarking, than in non-earmarking countries, it should be emphasized that statistically the difference is not significant at any meaningful level of significance.

16. No appreciable difference in the average incomes was found between the two groups. But is there any difference in the relationship between GNP per capita, and road expenditure as a proportion of gross

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1/ Within the earmarking group, Madagascar has by far the highest ratio of highway expenditures to gross investment, 28.3 percent. When Madagascar is left out, the difference between the two groups becomes less marked: the mean for the earmarking countries is 8.8 percent with a standard deviation of 3.3.

2/ GNP per capita at factor cost obtained from IBRD World Economic Tables, November 1966.

3/ The hypothesis that the two populations have the same variance was tested, and found justified at a significance level as high as 20 percent.

investment, between the two groups, which might be attributed to the existence of earmarking? For the earmarking group the correlation coefficient is 0.0; for the non-earmarking group it is -0.30.[1] The difference is small, but it suggests some support to the thesis that earmarking imparts rigidity into the allocation of funds, in favor of the earmarked function. The negative correlation for the non-earmarking countries suggests that normally the ratio of road expenditure to gross investment decreases with rising income levels. This may reflect in part the fact, that a definition of road expenditure is used, which excludes urban street and road expenditure. Moreover, it might also reflect a fundamental relationship between road expenditure and rising per capita incomes.

17. How is the relative allocation of funds to the road sector influenced, when the earmarked revenue varies as a proportion of gross investment? The correlation coefficient between the ratio of road expenditure to gross investment and earmarked taxes as a percentage of gross investment was found to be 0.72. The correlation coefficient is significantly different from zero.[2/3] In other words, as earmarked taxes for roads are increased in a country, and more than the increase in gross investment, it appears to be the case that the highway sector receives a higher proportion of total investment. Since the regression coefficient is 1.5, the relationship can be expressed: When earmarked taxes for roads increase by one percent in relation to gross investment, this is associated with an increase in the proportion of road expenditure to gross investment of 1.5 percent.

18. Is there a causal relationship here? To postulate this, would implicitly assume that all relevant variables, except for earmarked taxes as a proportion of gross investment, behave identically in the earmarking countries. The correlation between GNP per capita and road expenditure as a proportion of gross investment was found to be zero (see paragraph 16 above). It follows, that there is no meaningful relationship between earmarked amounts as a percentage of gross investment and GNP per capita (see Table 1 - Annex 1). Richer earmarking countries do not earmark relatively more (less) than poor ones. There is also no evidence that vehicles per capita bear any relationship to road expenditure as a proportion of gross investment.[4] For these reasons, it is safe

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1/ The difference between the two correlation coefficients is not significant at a significance level of 5 percent.

2/ At a level of significance of one percent. The corresponding regression equation is $\frac{R}{I} = 4.8 + 1.5 \frac{T}{I}$; where R = Road Expenditure, I = Gross Investment and T = Earmarked Taxes.

3/ When Madagascar is excluded, the correlation coefficient is 0.36, and the regression coefficient 0.58. This correlation coefficient is not significantly different from zero, at a level of significance of 5%.

4/ This relationship was tested for the earmarking countries. The correlation coefficient is zero. The data for vehicles per capita for 1960 were obtained from U.N. Demographic and Statistical Yearbooks.

to say that different levels of income, measured either in GNP per capita or in vehicles per capita, do not bring in any distortions into the examined relationship, which might modify the conclusion, that there appears to be a causal relationship between a higher proportion of earmarked taxes to gross investment, and a higher proportion of road expenditures to gross investment.

19. It is clear how the causality works, when earmarking covers 100 percent of road expenditure and earmarked taxes are the single source of funds, domestic as well as external, for highway expenditure. The two percentages become identical, as gross investment is the common denominator. When earmarking increases as a proportion of gross investment, the ratio of road expenditure to gross investment will grow with the same proportion. In fact, the average percentage of earmarked taxes to road expenditure for the 18 countries in the earmarking group is only 37 percent. Although earmarked taxes only cover a part of total road expenditure, it appears that the mere existence of earmarking functions as a guarantee for a higher level of investment in the road sector.

20. There are also (when trying to explain this relationship) important indirect effects of earmarking, which should be kept in mind. An accepted and well functioning earmarking arrangement will reduce the risk of discontinuity of investment in the sector concerned. This will encourage the development of entrepreneurial skills and improve long term planning. There is evidence that at times entrepreneurial talent and not capital and not projects is the real bottleneck to highway construction. The Iranian Road Study showed that, when suddenly funds are made available there may not be capable contractors to execute the works.[1/] Evidence from Colombia and Ecuador supports this finding.[2/] When capable entrepreneurs have been the bottleneck in highway construction, and earmarking of funds helps to remove this obstacle, road expenditure will increase. Another factor must also be taken into account. It can be expected that improved long term planning will reduce construction unit costs. This factor may work either towards reducing or increasing total road expenditure, dependent upon the elasticity of demand for road works. If the demand is very elastic with respect to prices, both factors will generate a higher level of road expenditure.

1/ IBRD Economic Report EC-147, September 26, 1966. "An Economic Reappraisal of a Road Project". The First Iranian Road Loan of 1959. (IRN-222)

2/ In fact, a condition of the IBRD highway loan to Ecuador of 1964, precisely provided for the setting up of a National Highway Fund, through which payments to contractors and suppliers would be channelled . It is reported that this arrangement has been helpful in supporting the contractor industry and improving highway construction in Ecuador.

Time Series Analysis (Earmarking Countries)

21. The time series make it possible to limit the nuisance variables, which bring in uncertainty in cross-section analysis. Instead of comparing earmarking and non-earmarking countries, countries were studied which started or ended their practice of earmarking, to determine what impact this had on the percentage of road expenditure to gross investment. Five countries were looked at. Kenya, Madagascar and Mauritania, all discontinued earmarking for roads, while it was initiated in Chile and Costa Rica.

22. There is a clear correlation between the introduction of earmarking and a higher relative level of road expenditure, and between the discontinuance of it and a fall in the percentage of road expenditure to gross investment. Longer time series and more cases would have been desirable to make us more confident of this relationship. Still, the picture is sufficiently clear to support and not contradict the thesis, that earmarking for roads is associated with a higher relative allocation of funds for this function, than when earmarking does not take place (see Annex 3).

23. It was worthwhile to plot the earmarked taxes as a percentage of gross investment, and road expenditure as a percentage of gross investment, against each other, for seven countries in scatter-diagrams. For five of these countries, Brazil, Ethiopia, Kenya, New Zealand and Peru, there is a clear linear trend attesting to a positive relationship between the two ratios. The fitting of a straight line to these data was justified (see Annex 4). The correlation coefficients are 0.84, 0.89, 0.99, 0.83 and 0.65, respectively.1/ The weighted mean of the regression coefficients is 1.7.2/ The subsample is small. Nonetheless, on the basis of the time series for these five countries, it is demonstrated that when earmarked taxes increase (decrease) by one per cent in relation to gross investment, road expenditure as a proportion of gross investment increases (decreases) by 1.7 per cent. This result does compare very favorably with the relationship 1:1.5 obtained in the cross-section analysis.

Conclusion

24. The cross-section analysis has shown that:

a) There is no statistically significant difference in the proportion of road expenditure to gross investment between the two samples of earmarking and non-earmarking countries, although there is a difference of 1.8 percentage points.

1/ All are significantly different from zero at the one per cent level.

2/ Weighted by number of years.

b) The correlation coefficient between GNP per capita, and road expenditure as a proportion of gross investment, is zero for the earmarking and -0.3 for the non-earmarking countries; the difference for the two samples is not significant.

c) There is a positive relationship between earmarked taxes as a proportion of gross investment, and road expenditure as a proportion of gross investment. The correlation coefficient obtained from the cross-section analysis is 0.7, and is significant. If, however, Madagascar is excluded from the analysis a positive correlation is still obtained but it is not statistically significant.

25. The time series analysis lend support to that:

a) Earmarking is associated with a somewhat higher degree of road expenditure to gross investment, than when earmarking does not take place.

b) There is a uniform relationship between earmarked revenue and road expenditure, both as a proportion of gross investment.

26. Hence, the results from the cross-section analysis (24 a) and b)), and from the time series analysis (25 a)) point in the same direction, that earmarking is associated with a higher spending on the function, than in the absence of earmarking. The significance tests, however, showed no significance with respect to the differences between earmarking and non-earmarking countries.

27. However, it must be recognized that in this testing the two main assumptions are those of normal distribution of the variable examined, and of a random sample in relation to the population. But there is another factor which also limits the usefulness of these test; there is no way of bringing the size of the sample in relation to the population, to moderate or strengthen the conclusion. Obviously, the larger the sample is in relation to the population, the lesser becomes the relevance of significance testing. This factor deserves to be kept clearly in mind in the interpretation of the results of our study, for nearly half of the developing countries have been examined.

28. With respect to the earmarking countries, the cross-section analysis (24 c)) supported by the time series analysis (25 b)) showed that there is a positive correlation between earmarked taxes, as a proportion of gross investment, and road expenditure as a proportion of gross investment. Tentatively we would conclude that the analysis suggests that there is a positive relationship and a likely causality between the amount earmarked and the amount spent on roads.

Table 1 - Annex 1

EARMARKING STUDY
CROSS-SECTION ANALYSIS
(Columns (3) to (6) are averages for the years indicated)

Earmarking Countries	Time Period	(1) GNP per Capita (1964) 1/	(2) Vehicles per 1000 of population (1960) 2/	(3) Gross Domestic Capital Formation as a % of GNP	(4) Road Expenditure as a % of Gross Domestic Capital Formation	(5) Earmarked Taxes as a % of Road Expenditure 3/	(6) Earmarked Taxes as a % of Gross Domestic Capital Formation
Brazil a/	1955-64	216	17.2	16.5	13.3	43.0	5.7
Chad b/	1963	70	2.4	13.7	8.9	18.8	2.1
Chile c/	1964-65	448	16.4	13.6	10.3	1.9	0.2
Costa Rica d/	1961-63	360	23.5	15.5	8.4	7.8	0.6
Egypt e/	1961-65	138	3.5	16.9	1.9	25.0	0.5
Ethiopia f/	1961-65	49	1.2	11.0	9.0	68.2	6.0
Gabon g/	1960-61	275	12.7	39.2	6.7	33.3	2.2
Ivory Coast h/	1960-64	197	7.0	15.6	7.5	57.9	4.7
Kenya i/	1955-62	82	9.6	17.7	7.2	48.4	3.3
Madagascar j/	1956-63	83	7.8	9.1	28.3	33.2	11.6
Mauritania k/	1958-59	138	2.7	9.0	12.9	22.4	3.1
New Zealand l/	1955-65	1,757	270.3	24.3	11.6	61.6	7.1
Niger m/	1960-65	75	1.0	11.2	12.4	8.6	1.0
Paraguay n/	1963-65	195	3.6	16.1	8.8	31.9	2.7
Peru o/	1955-64	289	13.3	20.9	3.7	87.8	3.1
Senegal p/	1963	165	11.3	10.3	12.9	30.9	4.0
Turkey q/	1964	239	4.1	13.4	8.4	47.9	4.0
Yugoslavia r/	1962-64	386	5.1	34.5	5.4	35.8	1.7
Average		287	22.9	17.1	9.9	36.9	3.5

1/ Source: GNP at factor cost, IBRD World Economic Tables, November 1966.
2/ U.N. Demographic and Statistical Yearbook, Total Passenger and Commercial Vehicles.
3/ The percentages in column (5) obtained from Table 2, Annex 1. Dividing column (6) by column (4) gives slightly different percentages for Chad & Madagascar, due to the estimation procedures.
a/- r/ See Table 2, Annex 1.

Table 1 - Annex 2

EARMARKING STUDY
NON EARMARKING COUNTRIES
CROSS SECTION ANALYSIS
(Columns (3) and (4) are averages for the years indicated)

Country	Time Period	(1) GNP per Capita (1964) 1/	(2) Vehicles per 1000 of Population (1960) 2/	(3) Gross Domestic Capital Formation as % of GNP	(4) Road Expenditures as a % of Gross Domestic Capital Formation
El Salvador a/	1960-64	264	11.9	12.8	6.9
Ghana b/	1963-65	229	5.7	17.4	2.1
Greece c/	1957-64	513	9.6	23.6	4.3
Guatemala d/	1960-65	285	10.8	11.8	9.3
Honduras e/	1959-65	193	5.8	14.1	13.1
India f/	1956-63	88	1.2	11.9	5.9
Iran g/	1960-65	206	6.7	15.8	10.1
Israel h/	1956-61	1,066	7.6	29.5	2.1
Jamaica i/	1958-64	432	7.2	21.5	14.9
Korea j/	1958-65	119	1.1	12.7	2.2
Malawi k/	1957-65	38	4.1	15.5	14.6
Morocco l/	1960-65	174	14.8	10.9	10.8
Nicaragua m/	1960-65	296	10.0	15.8	12.0
Panama n/	1958-63	446	22.5	17.3	12.0
Portugal o/	1962-65	342	23.6	18.0	3.8
Tanzania p/	1960-65	67	3.6	11.7	10.1
Thailand q/	1961-65	109	3.7	20.5	5.7
Trinidad & Tobago r/	1954-65	588	57.1	29.0	5.6
Uganda s/	1962-65	77	4.6	9.5	7.7
Average		291	11.1	16.8	8.1

1/ Source : GNP at factor cost. IBRD World Economic Tables, November 1966

2/ Source : U.N. Demographic and Statistical Yearbooks . Total Passenger and Commercial Vehicles.

a/ - s/ See Table 2 - Annex 2

Table 2 - Annex 1

EARMARKING COUNTRIES
GNP, GROSS INVESTMENT, ROAD EXPENDITURE, AND EARMARKED TAXES FOR ROADS
(In Current Market Prices)

Earmarking Countries	Year	Units in National Currency	(1) GNP	(2) Gross Domestic Capital Formation	(3) Road Expenditure	(4) Earmarked Taxes for Roads	(5) (2:1)	(6) (3:2)	(7) (4:2)	(8) (4:3)
							Percentages			
Brazil a/	1955	In Billions of Cruzeiros	689.3	108.0	9.7	2.8	15.7	9.0	2.6	28.9
	1956		880.3	130.7	11.6	5.0	14.8	8.9	3.8	43.1
	1957		1053.2	160.4	21.9	10.9	15.2	13.7	6.8	49.8
	1958		1303.6	180.8	34.9	13.1	13.9	19.3	7.2	37.5
	1959		1791.4	305.0	41.6	21.1	17.0	13.6	6.9	50.7
	1960		2396.4	418.5	57.1	24.3	17.5	13.6	5.8	42.6
	1961		3475.1	648.7	70.6	37.2	18.7	10.9	5.7	52.7
	1962		5435.6	1000.1	120.9	53.3	18.4	12.1	5.3	44.1
	1963		9519.8	1680.1	246.9	96.7	17.6	14.7	5.8	39.2
	1964		18726.0	3106.5	524.0	216.4	16.6	16.9	7.0	41.3
Chad b/	1961	In Billions of CFA Francs	39.0	5.5	-	-	14.1	-	-	-
	1963		50.0	6.7	.596	.138	13.4	8.9	2.1	23.2
	1964		-	-	1.098	.149	-	-	-	13.6
	1965		-	-	.678	.132	-	-	-	19.5
Chile c/	1964	In Millions of Escudos	14816.0	2020.0	205.1	2.0	13.6	10.2	0.1	1.0
	1965		-	2650.0	275.8	7.0	-	10.4	0.3	2.5
Costa Rica d/	1961	In Millions of C.A. Pesos	433.9	54.2	5.0	.413	14.8	7.8	0.6	8.3
	1962		474.4	76.3	5.6	.541	16.1	7.3	0.7	9.7
	1963		516.6	81.1	8.3	.450	15.7	10.2	0.6	5.4

Table 2 - Annex 1 (Cont'd)

Earmarking Countries	Year	Units in National Currency	(1) GNP	(2) Gross Domestic Capital Formation	(3) Road Expenditure	(4) Earmarked Taxes for Roads	(5) (2:1)	(6) (3:2)	(7) (4:2)	(8) (4:3)
							Percentages			
Egypt e/	1961	In Millions of Egyptian Pounds	1461.1	218.2		1.1	14.9		0.5	
	1962		1512.8	239.8		1.2	15.9		0.5	
	1963		1679.0	287.9	5.2	1.3	17.1	1.9	0.5	25.0
	1964		1880.9	363.7		1.5	19.3		0.4	
	1965		2043.9	358.4		1.6	17.5		0.4	
Ethiopia f/	1961	In Millions of Ethiopian Dollars	2512.0	246.3	25.8	15.9	9.8	10.5	6.5	61.7
	1962		2614.0	289.7	23.6	16.7	11.1	8.1	5.8	71.0
	1963		2710.0	309.4	29.6	19.1	11.4	9.6	6.2	64.5
	1964		3056.8	327.2	32.2	20.3	10.7	9.8	6.2	63.1
	1965		3470.6	411.0	28.1	22.6	11.8	6.8	5.5	80.5
Gabon g/	1960	In Billions of CFA Francs	31.6	12.4	.828	.271	39.2	6.7	2.2	32.7
	1961		20.0	-	.977	.330	-	-	-	33.8
Ivory Coast h/	1960	In Billions of CFA Francs	154.9	21.5	2.3	1.6	13.9		7.2	67.1
	1961		172.5	29.0	2.3	1.1	16.8		3.9	49.0
	1962		182.6	21.8	2.3	1.2	11.9	7.0	5.5	52.3
	1963		208.1	32.5	2.3	1.2	15.6		3.7	52.4
	1964		249.5	48.8	2.3	1.6	19.6		3.3	68.7
Kenya i/	1955	In Millions of E.A. Pounds	208.2	43.8	1.8	0.9	21.0	4.1	2.1	51.0
	1956		206.1	43.8	2.1	1.1	21.3	4.8	2.5	52.2
	1957		219.7	45.7	2.4	1.1	20.8	5.3	2.4	46.5
	1958		222.0	40.0	2.2	1.2	18.0	5.5	3.0	53.9
	1959		229.2	40.3	2.0	1.1	17.6	5.0	2.8	55.9
	1960		241.7	41.4	2.8	1.3	17.1	6.8	3.2	47.2
	1961		242.0	31.9	4.0	1.6	13.2	12.7	5.2	40.7
	1962		264.0	33.3	4.5	1.8	12.6	13.4	5.3	39.7

(continued)

Table 2 - Annex 1 (Cont'd)

Earmarking Countries	Year	Units in National Currency	(1) GNP	(2) Gross Domestic Capital Formation	(3) Road Expenditure	(4) Earmarked Taxes for Roads	(5) (2:1)	(6) (3:2)	(7) (4:2)	(8) (4:3)
							Percentages			
Kenya i/	1963	)	281.5	30.4	2.6	-	10.8	8.5	-	-
	1964	)	305.6	32.8	2.6	-	10.7	8.0	-	-
	1965	)	313.6	38.2	4.8	-	10.2	12.7	-	-
Madagascar j/	1956	)	100.0	8.0	2.3	1.1	8.0	29.0	13.3	46.0
	1957	)	-	-	2.5	0.5	-	-	-	18.6
	1958	)	-	-	2.5	0.6	-	-	-	24.0
	1959	) In Millions of	-	-	2.8	1.2	-	-	-	44.0
	1960	) of	134.0	15.0	3.9)	1.6	11.2	26.1	11.0)	23.4
	1961	) FMG	-	-	3.1)		-	-	-)	
	1962	)	157.3	11.7	3.3	1.8	7.4	28.6	15.6	54.4
	1963	)	165.2	16.0	4.7	1.0	9.7	29.3	6.4	21.9
	1964	)	175.0	19.0	5.0	-	10.9	26.3	-	-
Mauritania k/	1958	)	-	-	.192	.040	-	-	-	20.8
	1959	)	14.5	1.3	.167	.040	9.0	12.9	3.1	23.9
	1960	) In Billions	19.4	-	.197	-	-	-	-	-
	1961	) of CFA	22.8	-	.110	-	-	-	-	-
	1962	) Francs	42.9	16.5	.090	-	38.5	0.5	-	-
	1963	)	-	-	.138	-	-	-	-	-
	1964	)	47.7	8.0	.217	-	16.8	2.7	-	-
New Zealand l/	1955	)	930.0	249.0	22.0	16.1	26.8	8.8	6.5	73.1
	1956	)	983.0	245.0	28.7	17.5	24.9	11.7	7.1	60.8
	1957	)	1031.0	240.0	32.0	18.4	23.3	13.3	7.7	57.6
	1958	) In Millions	1092.0	267.0	30.9	19.7	24.5	11.6	7.4	63.8
	1959	) of	1135.0	268.0	32.1	19.8	23.6	12.0	7.4	61.6
	1960	) New Zealand Pounds	1217.0	268.0	35.5	20.8	22.0	13.3	7.8	58.7

(continued)

Table 2 - Annex 1 (Cont'd)

Earmarking Countries	Year	Units in National Currency	(1) GNP	(2) Gross Domestic Capital Formation	(3) Road Expenditure	(4) Earmarked Taxes for Roads	(5) (2:1)	(6) (3:2)	(7) (4:2)	(8) (4:3)
							Percentages			
New Zealand 1/	1961	Pounds	1311.0	324.0	36.5	21.7	24.7	11.3	6.7	59.5
	1962		1357.0	326.0	37.2	23.7	24.0	11.4	7.3	63.6
	1963		1453.0	336.0	41.9	24.0	23.1	12.5	7.1	57.2
	1964		1595.0	404.0	43.3	26.0	24.3	10.7	6.4	60.1
	1965		1714.0	437.0	49.6	30.5	25.5	11.3	7.0	61.6
Niger m/	1960		50.1	4.6	.507	.042	9.2	11.0	0.9	8.3
	1961		54.1	5.1	.807	.008	9.4	15.8	0.2	1.0
	1962	In Billions	61.6	9.9	.794	.080	16.1	8.0	0.8	10.1
	1963	of	64.6	7.5	-	-	11.6	-	-	-
	1964	CFA Francs	64.9	6.3	-	-	9.7	-	-	-
	1965		-	6.3	.920	.136	-	14.6	2.2	14.8
Paraguay n/	1963	In Millions	46453.0	7072.0	474.0	166.0	15.2	6.7	2.3	35.0
	1964	of	49641.0	77855.0	515.0	173.0	15.8	6.6	2.2	33.6
	1965	Guaranies	52044.0	8955.0	1175.0	318.0	17.2	13.1	3.6	27.1
Peru o/	1955		30.2	5.8	.264	.190	19.2	4.6	3.3	71.8
	1956		33.5	7.2	.282	.201	21.5	3.9	2.8	71.3
	1957		35.7	8.3	.370	.324	23.2	4.5	3.9	87.4
	1958	In Billions	39.1	8.2	.319	.324	21.0	3.9	3.9	101.4
	1959	of	44.7	7.1	.369	.328	15.9	5.2	4.6	88.7
	1960	Soles	54.2	10.7	.240	.334	19.7	2.2	3.1	139.3
	1961		61.4	12.6	.325	.354	20.5	2.6	2.8	108.7
	1962		68.0	15.5	.510	.375	22.8	3.3	2.4	73.5
	1963		76.1	16.9	.516	.393	22.2	3.1	2.3	76.1
	1964		85.2	19.2	.698	.418	22.5	3.6	2.2	59.7

(continued)

Table 2 - Annex 1 (Cont'd)

Earmarking Countries	Year	Units in National Currency	(1) GNP	(2) Gross Domestic Capital Formation	(3) Road Expenditure	(4) Earmarked Taxes for Roads	(5) (2:1)	(6) (3:2)	(7) (4:2)	(8) (4:3)
							Percentages			
Senegal p/	1962)	In Millions	162.7	15.4	2.6	.700	9.5	16.9	4.5	26.8
	1963)	of	159.3	16.4	2.1	.652	10.3	12.9	4.0	30.9
	1964)	CFA Francs	164.2	16.5	3.6	.591	10.0	21.9	3.6	16.4
Turkey q/	1964	In Billions of Liras	74.2	10.2	.841	.403	13.4	8.4	4.0	47.9
Yugoslavia r/	1962)		37.7	13.3	.703	.189	35.3	5.3	1.4	26.9
	1963)	In Billions	45.8	15.9	.863	-	34.6	5.4	-	-
	1964)	of	60.9	20.4	1.108	.392	33.5	5.4	1.9	35.4
	1965)	New Dinars	75.3	-	1.027	.463	-	-	-	45.1

Table 2 - Annex 1 (Cont'd)

Sources :

a/ GNP and GDCF : Brazil Economic Mission, 1966.
Road Expenditure : IBRD Economic Report, 1965.
Earmarked Taxes for Roads : IBRD Projects Department.

b/ (GDP used instead of GNP).

GDP (1961) : Draft Economic Report, 1966.
(1963) : Basic Data
GDCF(1961) : Draft Economic Report, 1966
(1963) : Own estimate.
Road Expenditure : BCEOM Report, 1965 and Premiere Plan Quinquennal, 1966-70.
Earmarked Taxes for Roads : Premiere Plan Quinquennal, 1966-70.

c/ GNP, GDCF and Road Expenditure : IBRD Economic Report, 1966.
Earmarked Taxes for Roads : Estimate obtained from Economic Secretariat OAS.

d/ IBRD Economic Report, 1967.
Road Expenditure : Ten percent of total road expenditure own estimate to represent administration expenditure.

e/ IBRD Economic Report, 1966. Fixed Capital Formation used instead of GDCF.
Road Expenditure : Total road expenditure 1961-65 was £ 26 million, IBRD Economic Report 1966.
Earmarked Taxes : Based on 15 percent of revenue from busses operating outside cities; earmarked revenue from 1961-63 is own estimate.
IBRD Projects Department.

f/ GNP and GDCF : IBRD Economic Report, 1967.
Road Expenditure and Earmarked for Roads. Budget Data.

g/ GNP and GDCF : IBRD Economic Report, 1964. GDP used instead of GNP for 1960. IBRD estimate of GNP for 1961
Road Expenditure and Earmarked Taxes for Roads : Highway Appraisal Report, 1964.

Table 2 - Annex 1 (Cont'd)

h/ GNP, GDCF and Road Expenditure : IBRD Economic Report, 1967. Road Expenditure is a mean of total road expenditure 1960-65
Earmarked Taxes for Roads : Budget Documents.

i/ GNP and GDCF,: IBRD Economic Report, 1967.
Road Expenditure and Earmarked Taxes for Roads : Road Authority Annual Reports, and Budgets of Kenya.

j/ GDP used instead of GNP for 1956-60.
Road Expenditure : Highway Appraisal Report, 1966. Eight percent of total road expenditure own estimate to represent administration expenditure.
Earmarked Taxes for Roads: IBRD Projects Department.

k/ GNP not available. GDP and GDCF from IMF Report.
Road Expenditure and Earmarked Taxes for Roads : Highway Appraisal Report, 1967. 1964 data are estimates.

l/ GNP and GDCF : IBRD Economic Report, 1965.
Road Expenditure : Reports of the National Roads Board, (New Zealand) and IBRD Economic Report 1962 - Appendix 7.
Earmarked Taxes for Roads : Monthly Abstract of Statistics, June 1965.

m/ (GDP used instead of GNP)
Road Expenditure and Earmarked Taxes for Roads : Highway Appraisal Report, 1967.
Earmarked Taxes : Own estimate of the share allocated to maintenance for 1960-63.

n/ IBRD Economic Report, 1965. 1965 data are estimates.

o/ GNP and GDCF : IBRD Economic Report, 1965.
Road Expenditure and Earmarked Taxes for Roads : IBRD Western Hemisphere Department.

p/ (GDP used instead of GNP)
GDP and GDCF from IMF Reports.
Road Expenditure : Plan Quadriennal of Dev., 1961-64.
Earmarked Taxes for Roads : Budget Documents.
GDCF (1963) Provisional Data.
(1964) Mission Estimates
Earmarked Taxes for Roads 1962 : Estimate based on CFAF 350 million for six months. Only 1963 data were used for the cross section analysis, since they represent actual expenditure.

Table 2 - Annex 1 (Cont'd)

q/ GNP and GDCF : IBRD Economic Report, 1965.
Road Expenditure and Earmarked Taxes for Roads : Highways and Highway Transportation in Turkey, 1966 (Ministry of Public Works, Ankara).

r/ IBRD Economic Report, 1966.
Gross Material Social Product used instead of GNP. Gross Investment in Fixed Assets used instead of GDCF.
Earmarked Taxes for Roads : IBRD Projects Department.

Table 2 - Annex 2

NON-EARMARKING COUNTRIES
GNP, GROSS INVESTMENT AND ROAD EXPENDITURE
(In current Market Prices)

Country	Year	Units in National Currency	(1) GNP	(2) Gross Domestic Capital Formation	(3) Road Expenditure	(4) Percentages (2:1)	(5) Percentages (3:2)
El Salvador a/	1960	Millions of Pesos	568.0	78.9	4.7	13.9	6.0
	1961		541.6	67.1	7.7	12.4	11.5
	1962		649.9	69.2	6.1	10.6	8.8
	1963		602.8	81.0	3.4	13.4	4.2
	1964		756.0	105.1	4.2	13.9	4.0
Ghana b/	1961	Millions of Cedis	1,210.0	228.0	3.1	18.8	1.3
	1962		1,301.0	207.0	3.8	15.9	1.8
	1963		1,428.0	252.0	2.2	17.6	0.9
	1964		1,615.0	295.0	6.4	18.3	2.2
	1965		1,886.0	310.0	10.2	16.4	3.3
Greece c/	1957	Millions of Drachmas	74,286.0	15,242.0	345.0	20.5	2.3
	1958		77,044.0	17,764.0	636.0	23.1	3.6
	1959		80,184.0	19,104.0	747.0	23.8	3.9
	1960		96,955.0	24,828.0	1,234.0	25.6	5.0
	1961		111,256.0	28,025.0	1,457.0	25.2	5.2
	1962		118,994.0	28,486.0	1,231.0	23.9	4.3
	1963		132,919.0	28,210.0	1,440.0	21.2	5.1
	1964		150,078.0	37,900.0	1,959.0	25.3	5.2
Guatemala d/	1960	Millions of C.A. Pesos	1,010.0	108.8	13.8	10.8	12.7
	1961		1,031.0	116.3	11.2	11.3	9.7
	1962		1,080.3	113.4	10.7	10.5	9.4
	1963		1,200.0	135.5	11.3	11.3	8.3
	1964		1,311.2	170.4	14.8	13.0	8.7
	1965		1,409.8	194.3	13.5	13.8	7.0

Table 2 - Annex 2

Country	Year	Units in National Currency	(1) GNP	(2) Gross Domestic Capital Formation	(3) Road Expenditure	(4) Percentages (2:1)	(5) Percentages (3:2)
Honduras e/	1959	Millions of C.A. Pesos	375.0	48.0	8.0	12.8	16.7
	1960		390.0	53.0	9.1	13.6	17.2
	1961		397.0	49.0	7.2	12.3	14.7
	1962		419.0	61.0	7.7	14.6	12.6
	1963		434.0	68.0	7.0	15.7	10.3
	1964		459.0	70.0	8.2	15.3	11.7
	1965		504.0	72.0	6.1	14.3	8.5
India f/	1956	Billions of Rupees	99.8	10.3	0.6	10.4	6.1
	1957		-	14.5	0.8	-	5.7
	1958		-	12.9	0.9	-	6.7
	1959		-	13.3	0.8	-	5.9
	1960		-	13.6	0.8	-	5.9
	1961		141.9	18.7	.9	13.2	4.8
	1962		148.7	17.6	1.1	11.8	6.3
	1963		158.4	19.5	1.2	12.3	6.1
Iran g/	1960	Billions of Rials	289.4	49.7	5.5	17.2	10.1
	1961		317.8	58.8		18.5	
	1962		339.8	57.7		17.0	
	1963		348.9	45.4		13.0	
	1964		375.5	50.4		13.4	
	1965		407.0	64.1		15.7	
Israel h/	1956	Millions of Israel Pounds	2,534.0	740.0	16.2	29.2	2.2
	1957		2,943.0	910.0	15.5	30.9	1.7
	1958		3,373.0	1,005.0	20.8	29.8	2.1
	1959		3,861.0	1,114.0	24.4	28.9	2.2
	1960		4,346.0	1,218.0	26.9	28.0	2.2
	1961		5,208.0	1,565.0	30.5	30.0	1.9

Table 2 - Annex 2 (Cont'd)

Country	Year	Units in National Currency	(1) GNP	(2) Gross Domestic Capital Formation	(3) Road Expenditure	(4) Percentages (2:1)	(5) Percentages (3:2)
Jamaica	1958	Millions of Jamaica POunds	213.5	50.9	6.7	23.8	13.2
	1959		228.9	51.1	7.4	22.3	14.5
	1960		224.8	51.6	7.8	23.0	15.1
	1961		240.4	52.4	8.2	21.8	15.6
	1962		249.9	49.2	7.7	19.7	15.7
	1963		267.4	51.0	8.1	19.1	15.9
	1964		280.7	58.0	8.2	20.7	14.1
Korea j/	1958	Billions of Won	202.9	25.7	0.9	12.7	3.6
	1959		215.8	22.7	0.6	10.5	2.7
	1960		243.1	25.3	0.5	10.4	2.0
	1961		293.4	36.9	1.2	12.6	3.4
	1962		338.6	41.9	1.3	12.4	3.0
	1963		471.5	85.5	1.1	18.1	1.3
	1964		666.7	90.2	0.7	13.5	0.7
	1965		779.4	91.1	1.0	11.7	1.1
Malawi k/	1957	Millions of Pounds	41.7	8.3	1.5	19.9	18.4
	1958		43.4	8.3	-	19.1	-
	1959		45.4	3.8	-	8.4	-
	1960		48.4	8.7	1.1	18.0	12.3
	1961		49.2	8.9	1.0	18.1	11.4
	1962		52.0	6.1	1.2	11.7	19.2
	1963		51.7	7.5	1.1	14.5	14.5
	1964		53.0	5.6	0.7	10.6	12.8
	1965		58.3	11.0	1.5	18.9	13.3
Morocco l/	1960	Millions of Dirhams	9,130.0	960.0	110.2	10.5	11.5
	1961		9,410.0	900.0	119.7	9.6	13.3
	1962		11,020.0	1,250.0	124.9	11.3	10.0
	1963		12,190.0	1,470.0	159.5	12.1	10.9
	1964		12,490.0	1,370.0	138.0	11.0	10.1
	1965		13,030.0	1,450.0	131.6	11.1	9.1

Table 2 - Annex 2 (Cont'd)

Country	Year	Units in National Currency	(1) GNP	(2) Gross Domestic Capital Formation	(3) Road Expenditnre	(4) Percentages (2:1)	(5) Percentages (3:2)
Nicaragua m/	1960	Millions of C.A. Pesos	351.2	47.3	7.4	13.5	15.6
	1961		373.0	51.4	6.7	13.8	13.0
	1962		413.5	60.3	7.2	14.6	11.9
	1963		443.7	74.7	8.2	16.8	11.0
	1964		478.6	87.7	8.9	18.3	10.1
	1965		524.9	91.6	9.5	17.5	10.4
Panama n/	1958	Millions of C. A. Pesos	371.2	52.1	7.3	14.0	14.0
	1959		390.3	54.8	6.7	14.0	12.2
	1960		409.4	68.4	9.0	16.7	13.1
	1961		455.5	88.8	8.3	19.5	9.3
	1962		494.3	96.4	11.1	19.5	11.5
	1963		543.3	107.7	12.5	19.8	11.6
Portugal o/	1962	Millions of Escudos	83,077.0	15,662.0	658.0	18.9	4.2
	1963		89,332.0	15,704.0	-	17.6	-
	1964		97,538.0	17,605.0	-	18.0	-
	1965		107,543.0	18,794.0	625.0	17.5	3.3
Tanzania p/	1960	Millions of Pounds	199.4	23.2	1.7	11.6	7.2
	1961		207.7	26.5	2.4	12.8	9.0
	1962		226.4	24.4	3.1	10.8	12.8
	1963		249.4	24.3	3.0	9.7	12.3
	1964		262.9	30.1	3.1	11.5	10.3
	1965		262.9	36.9	3.3	14.0	8.9
Thailand q/	1961	Billions of Baht	59.4	9.7	0.4	16.3	4.2
	1962		64.8	12.2	0.9	18.8	7.5
	1963		68.4	15.2	0.7	22.2	4.9
	1964		74.0	16.9	0.9	22.8	5.6
	1965		79.7	17.7	1.1	22.2	6.1

Table 2 - Annex 2 (Cont'd)

Country	Year	Units in National Currency	(1) GNP	(2) Gross Domestic Capital Formation	(3) Road Expenditure	(4) Percentages (2:1)	(5) Percentages (3:2)
Trinidad & Tobago r/	1954	Millions of Trinidad and Tobago Dollars	408.1	91.7	7.8	22.5	8.5
	1956		521.2	125.5	10.5	24.1	8.4
	1958		674.3	206.2	12.1	30.6	5.9
	1959		728.6	249.3	12.9	34.2	5.2
	1960		829.3	285.9	13.7	34.5	4.8
	1961		888.4	256.3	14.2	28.8	5.5
	1962		948.1	298.2	13.0	31.5	4.4
	1963		996.9	285.5	11.5	28.6	4.0
	1964		1,029.1	292.6	13.9	28.4	4.8
	1965		1,073.0	288.9	14.3	26.9	4.9
Uganda s/	1962	Millions of Pounds	202.5	17.7	2.0	8.7	11.4
	1963		229.8	20.0	1.5	8.7	7.5
	1964		254.4	24.2	1.5	9.5	6.0
	1965		291.0	32.3	1.9	11.1	5.9

Sources:

a/ IBRD Economic Report, 1967.
Road Expenditure: 10 percent of total road expenditure own estimate to represent administration expenditure.

b/ Ghana had a road fund before 1961-62, but no data are available for this period.
GNP & Gross Domestic Capital Formation: IBRD Economic Report 1967.

Road Expenditure: 1961-63 - Economic Survey of the Republic of Ghana, 1963.
- 7.5 percent of total road expenditure own estimate to represent administration expenditure
1964-65 - IBRD Economic Report 1967.

c/ IBRD Economic Report 1965.

d/ IBRD Economic Report 1967.

e/ IBRD Economic Report 1967.
Road Expenditure: 10 percent of total road expenditure own estimate to represent administration expenditure.

f/ Reserve Bank of India Bulletin. Net Domestic Product used instead of GNP. Aggregate Investment used instead of Gross Domestic Capital Formation.
Road Expenditure: IBRD Projects Department.

g/ IBRD Economic Report, 1967.
Road Expenditure: The mean of road expenditures 1960-65 used. The mean of Gross Domestic Capital Formation 1960-65 used to get the percentage shown in column 5.

h/ GNP and Gross Domestic Capital Formation: Statistical Abstract of Isreal.
Road Expenditure: IBRD Project Department.

i/ IBRD Economic Report 1965. Gross Domestic Capital Formation for 1964 is provisional.

j/ IBRD Economic Report 1966.
Road Expenditure: Negligible local expenditure excluded. 1965 is a budget figure.

k/ IBRD Economic Report 1967.
Road Expenditure: Figure for 1965 is an estimate.

l/ GNP & Gross Capital Formation - IBRD Economic Report, 1966.
Road Expenditure: Budget Documents. Own estimate of administration expenditure.

m/ IBRD Economic Report, 1966.
Road Expenditure: 10 percent of total road expenditure own estimate to represent administration expenditure.

n/ IMF Report 1966.
Road Expenditure: Highway Appraisal Report 1966.

o/ IBRD Economic Report 1967.

p/ IBRD Economic Report 1967. Fixed Capital Formation used instead of Gross Domestic Capital Formation. All data refer to old Tanganyka territory.

q/ IBRD Economic Report 1966.
Road Expenditure: Some provincial expenditure on roads may be excluded.

r/ IBRD Economic Report 1966. GNP - Figures for 1963 and 1964 are provisional.
Road Expenditure: Central Government expenditure only, but it displays total investment in the country. It includes negligible investment in waterways.

s/ Until January 1, 1962 the Central Government in Uganda earmarked grants to local authorities for road maintenance. IBRD Economic Report 1967. GDP used instead of GNP. Fixed Capital Formation used instead of Gross Domestic Capital Formation.
Road Expenditure: Data may be slightly distorted by the inclusion of interest payment.

Table 3 - Annex 1

Countries which had Earmarked Taxes for Roads in the Period under Consideration but for which Data were Incomplete

1. Argentina (See Annex 5)
2. Cameroon 1/
3. Colombia 2/
4. Congo Brazzavile
5. Dominican Republic 3/
6. Ecuador 4/
7. Liberia 5/
8. Pakistan 6/
9. Philippines
10. Uruguay

In addition, Ghana and Uganda had earmarked taxes for a number of years. They have been classified as non-earmarking countries after the discontinuance of earmarking for roads.

1/ The road fund was discontinued in 1963-64 "As part of the extraordinary effort made by the Ministry of Finance this year to provide for a balanced budget for 1963-64, the allocation of revenue from taxes on petroleum and motor vehicle licenses to a Road Fund, earmarked for the finance of maintenance works and capital expenditures on roads and bridges, has been discontinued. This revenue will be credited to ordinary revenue in the future and the accumulated funds have been utilized in part to balance the current budget."
Source: The Economy of the Federal Republic of Cameroon. Volume I, Main IBRD Report, April 8, 1964, page 23.

2/ A NationalHighway Fund was established in 1966, the setting-up was encouraged by the IBRD. Previously, a very small amount of revenue had been earmarked for the maintenance of departmental roads.

3/ The legislation for earmarked taxes for roads was discontinued in 1966. Source: IMF.

4/ See page 10 of Main Report.

5/ Earmarking of taxes for roads never appears to have functioned as intended since the earmarked revenue has been treated similarly to ordinary revenue.

6/ Earmarking at the Central Government level.

Annex 3

Earmarking Countries
Time Series Analysis. Discontinuance and Initiating of Earmarking

1. Kenya discontinued its practice of earmarking for highway expenditure in 1962-63. In fact, an IBRD recommendation had been given to this effect.[1/] The percentage of road expenditure to gross investment fell from 13.4% in 1962 to 8.0% in 1964. In 1965, it had increased to 12%, the same as in 1961. Gross investment also fell absolutely in these two years largely because of uncertainty in connection with the declaration of independence. This instability makes it difficult to argue that there is a direct connection between the abolishing of earmarked taxes and the subsequent fall in road expenditure.

2. The road fund was discontinued in Madagascar at the end of 1963. In 1964, the percentage of road expenditure to gross investment fell from 29.3 to 26.3%. In Mauritania with the end of the Federation of French West Africa in 1959, earmarking for roads ended. From 1959 to 1964 the ratio of road expenditure to gross investment fell from 12.9% to 2.7% with a drop to 0.5% in 1962. Road expenditure even declined absolutely, not following a sharp increase in gross investment.[2/]

1/ It was argued that because of the budgetary situation, the arrangements for meeting maintenance costs should be decided annually by the Government, rather than by allocating receipts from specific taxes to the road fund.

Source: IBRD, the Economic Development of Kenya. Report of an Economic Survey Mission, December 1962, p.131.

2/ An attempt to set up a new road fund was made in 1964. Legislation was passed, but the arrangement never worked. (Draft Appraisal of Road Project in Mauritania, 1967.

Chart 1 - Annex 4

Brazil

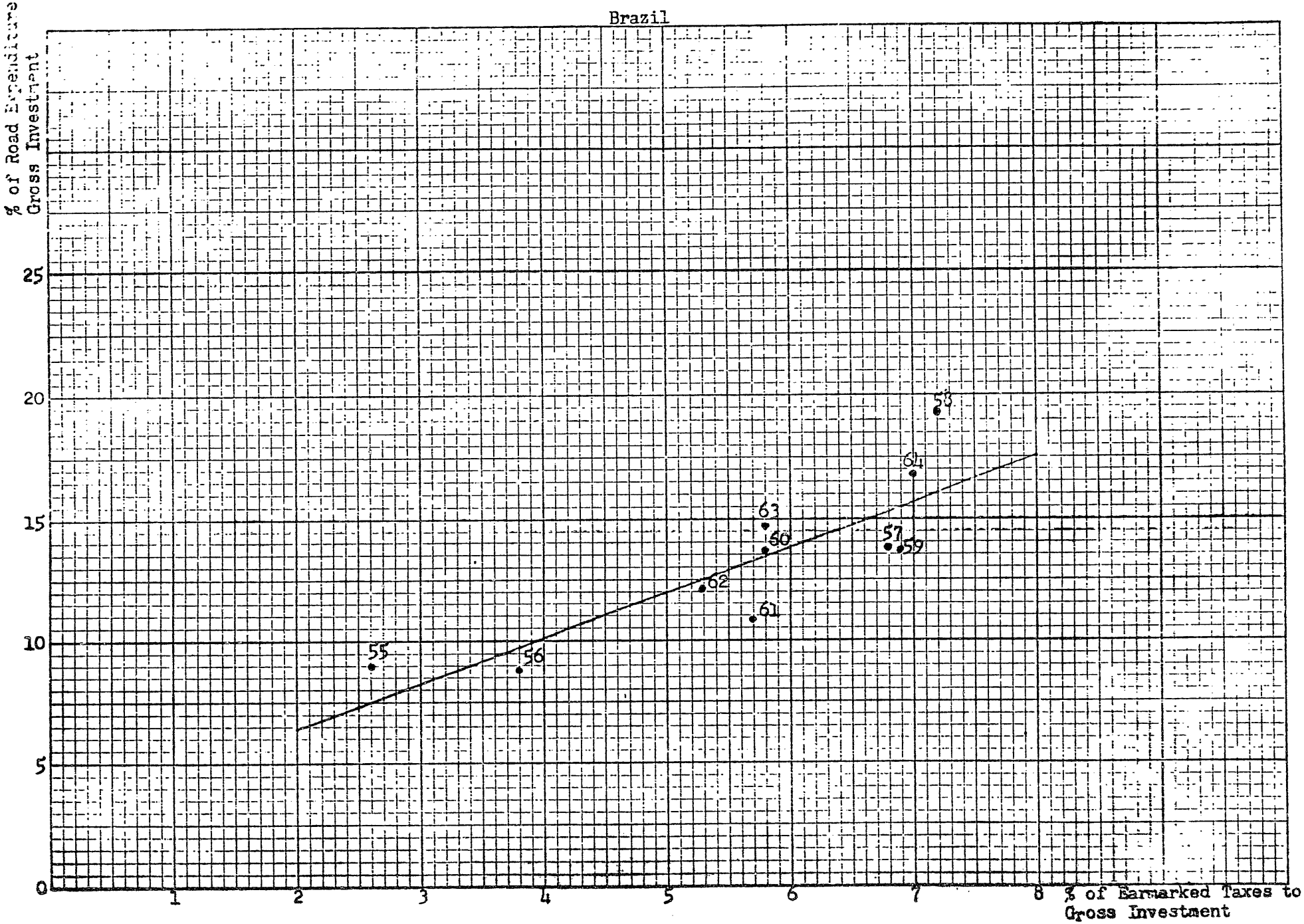


Chart 2 - Annex 4

Ethiopia

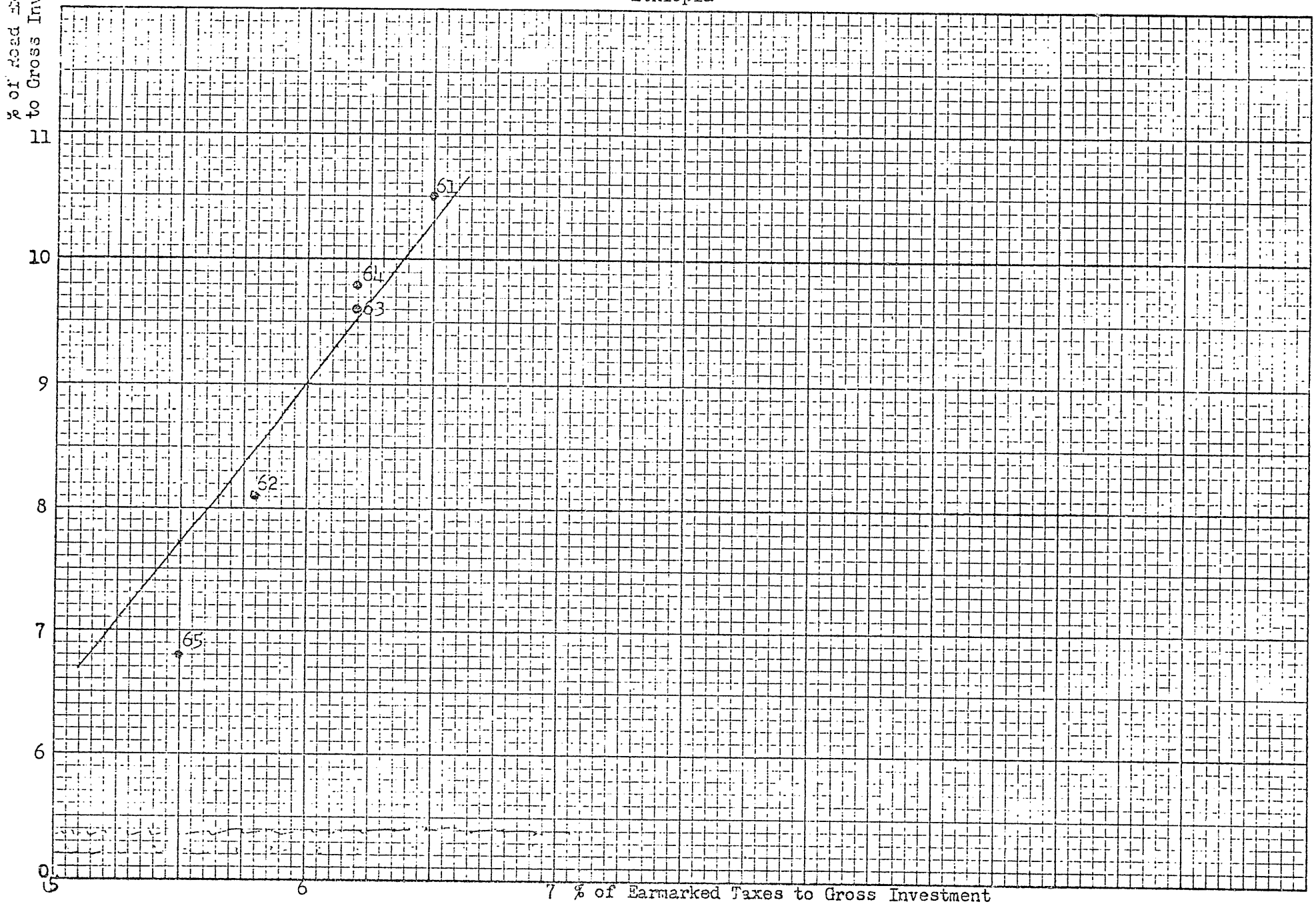


Chart 3 - Annex 4
Kenya

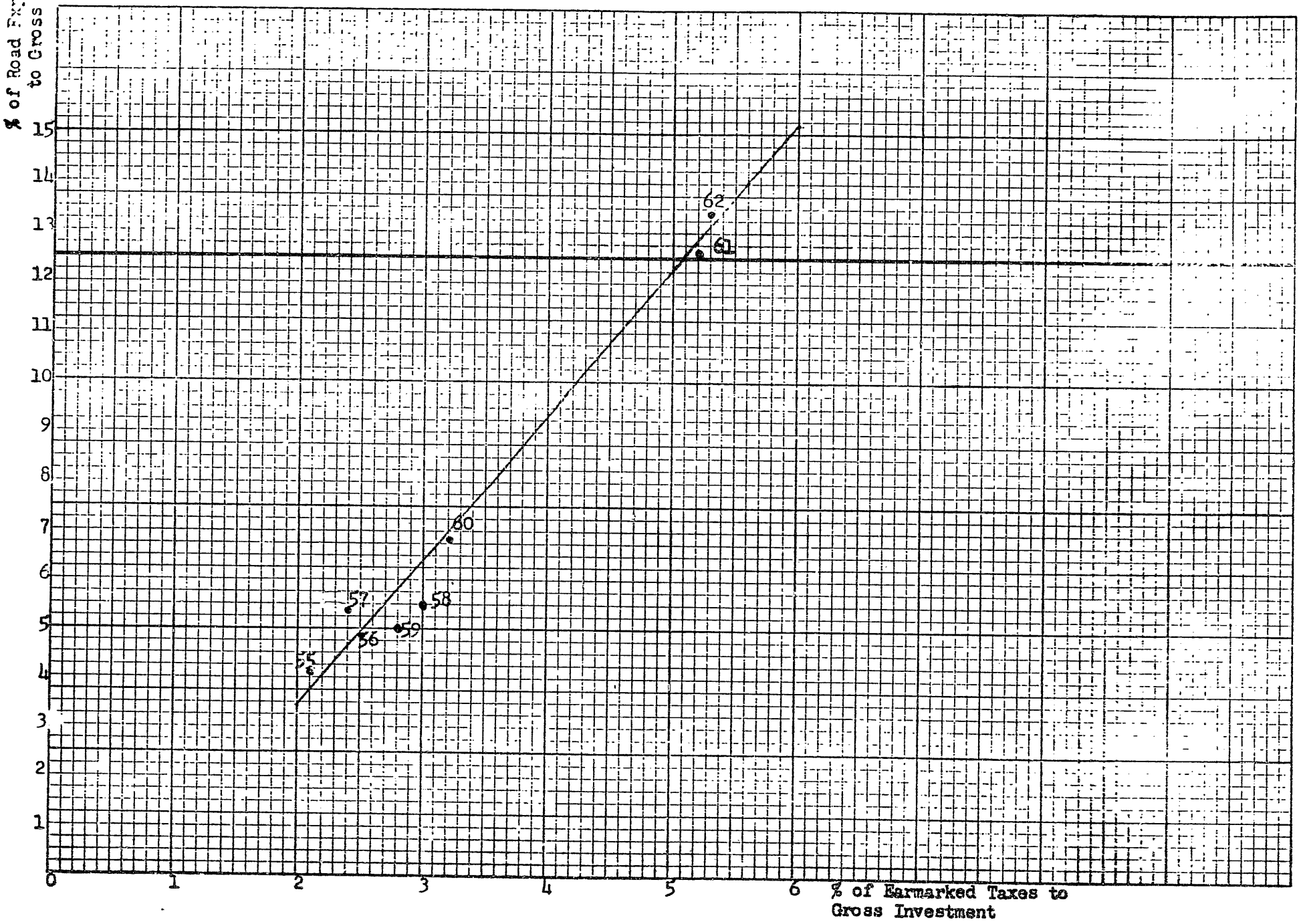


Chart 4 - Annex 4
New Zealand

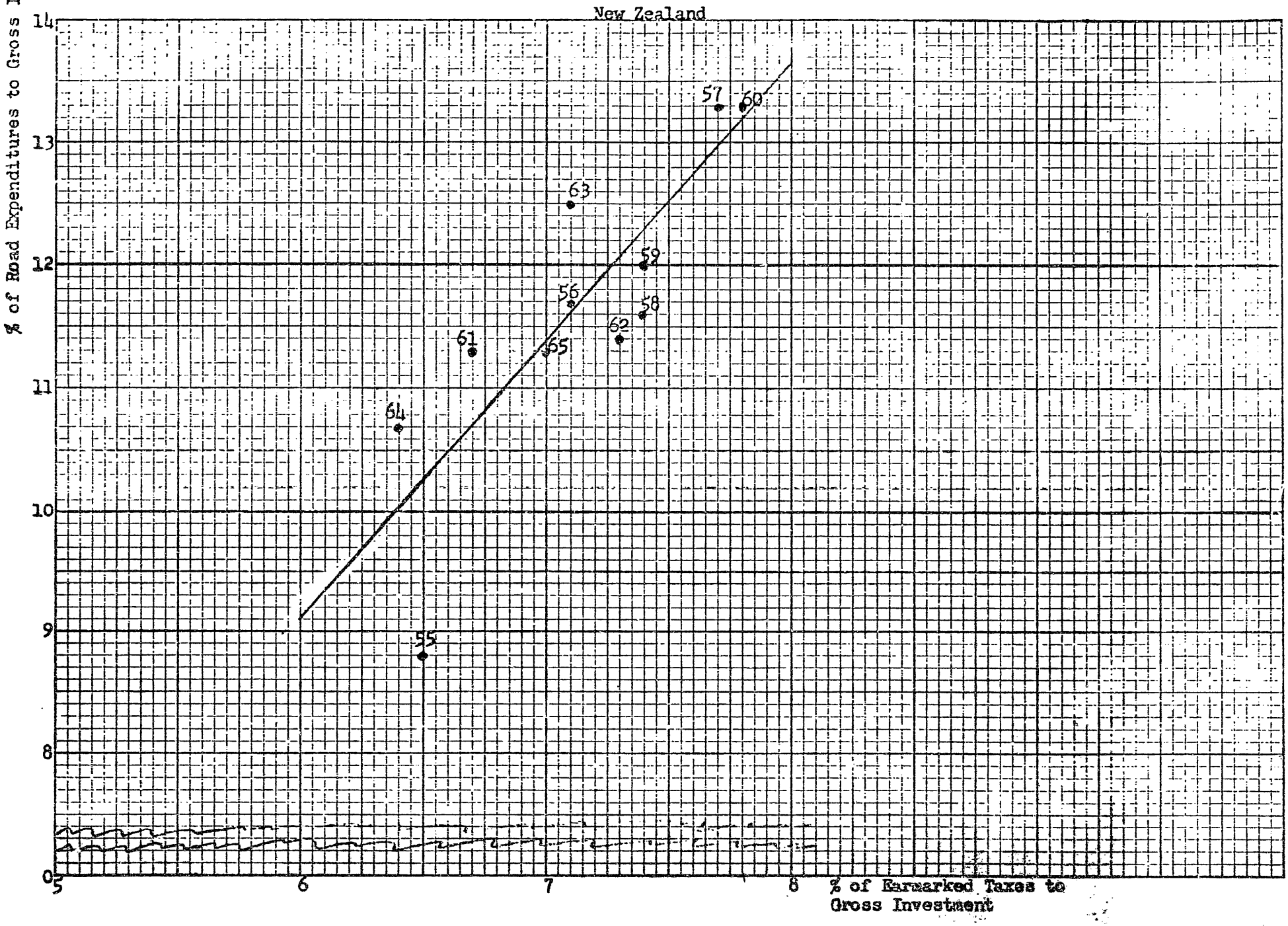


Chart 5 - Annex 4
Peru

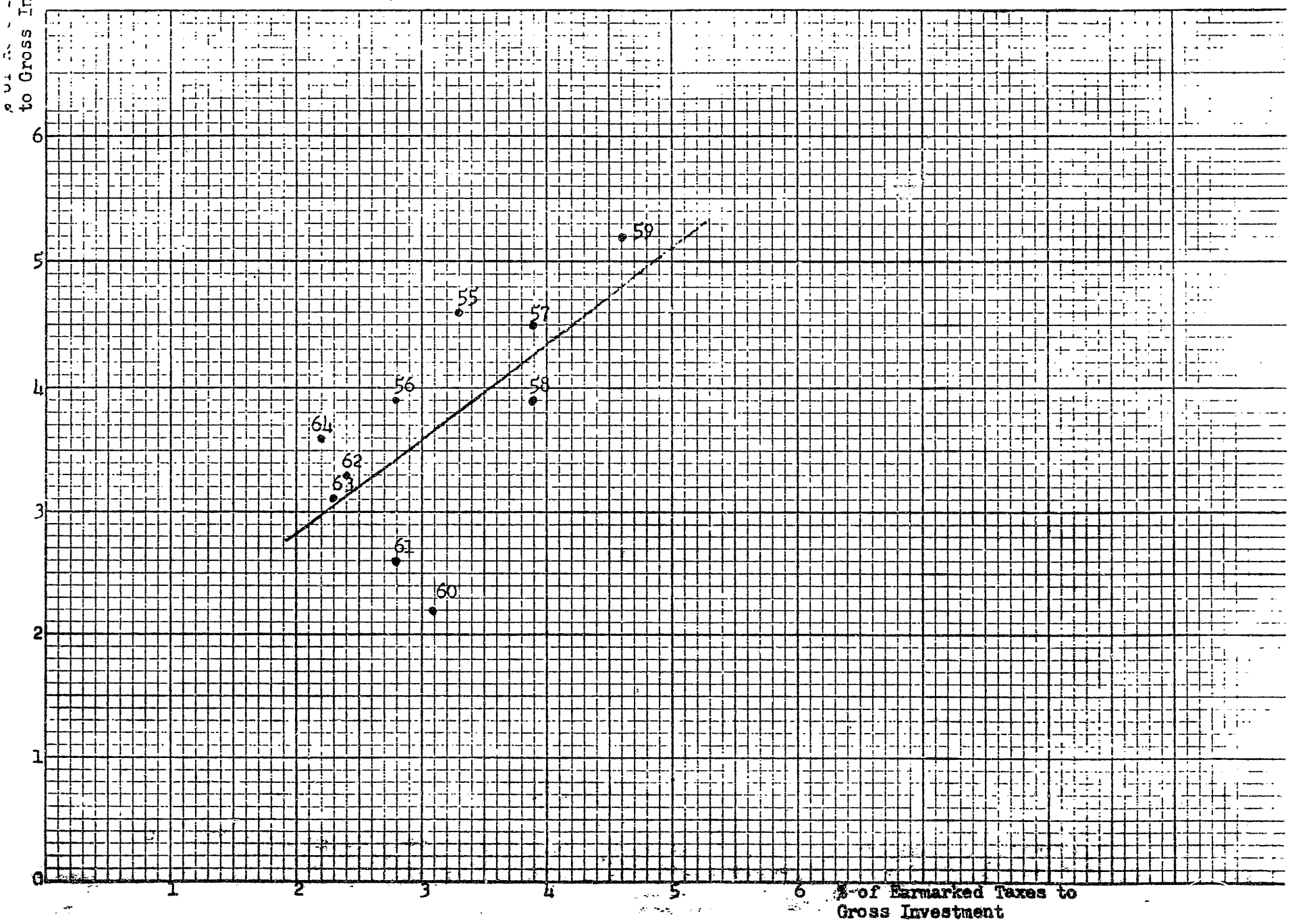


Chart 6 - Annex 4
Madagascar

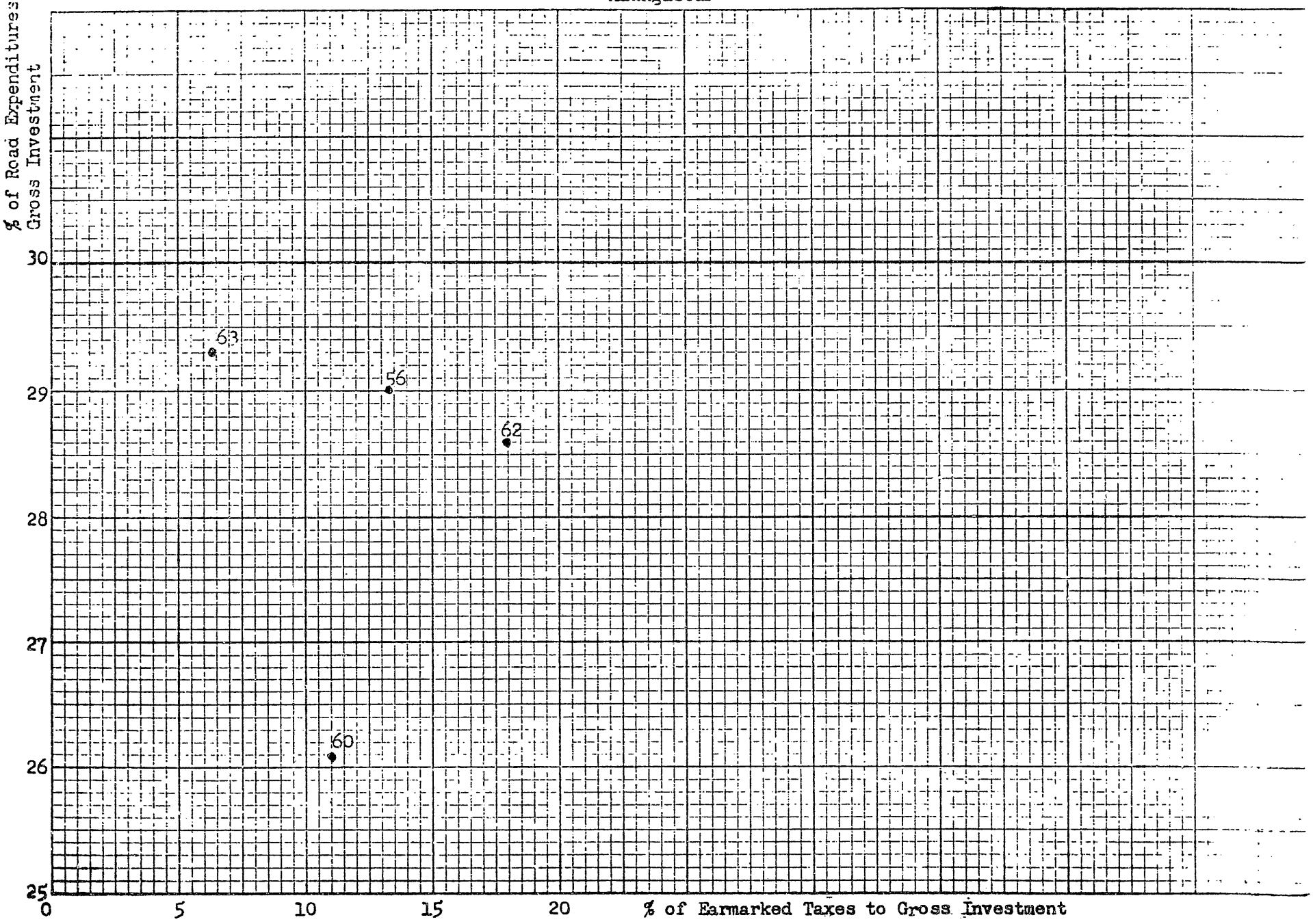
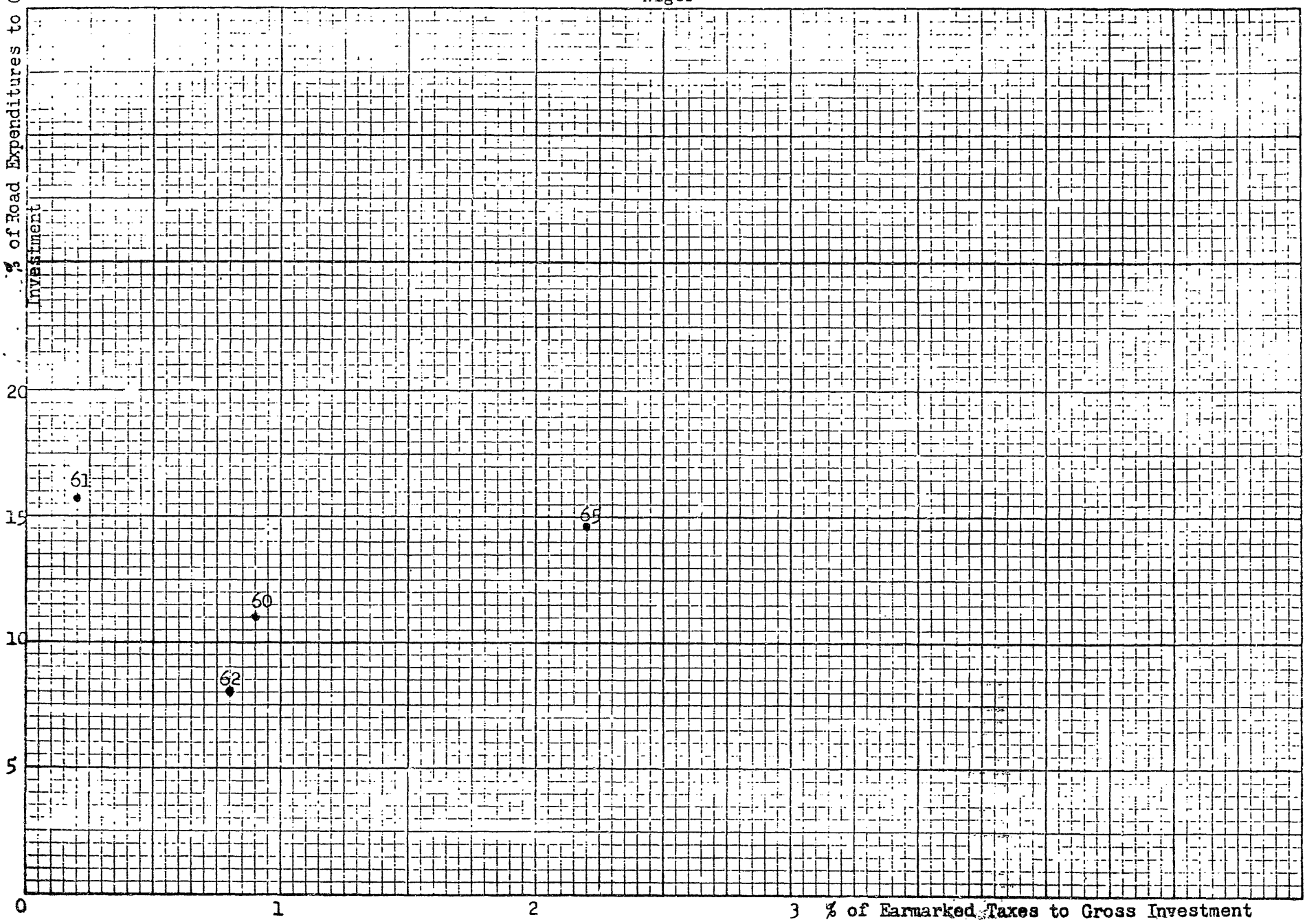


Chart 7 - Annex 4
Niger



Annex 5

Argentina

1. In Argentina a shortage of funds caused its present ten-year road program to be delayed by two years. It is reported that the major cause of the delay was a 50% shortfall in earmarked revenues in 1961 due to a new interpretation of the gasoline law; a further aggravation was the default of the revenue collecting agency in making full payment of the highway authority's legitimate revenue. 1/ Subsequently, the devaluation of the peso resulted in price increases, which raised the cost of the program to nearly the double amount in pesos. Without a proportional increase in earmarked tax revenues, and without additional funds out of the budget, the highway authority was unable to pay contractors on time, which weakened its position to make contractors comply strictly with specifications and completion dates.

2. In 1965, extra budgetary increases in fuel taxes were proposed, but never effected. A proportion of these tax receipts would have been allocated to the National Road Fund.

3. It appears that earmarking of funds for highway purposes never really was accepted in Argentina. Earmarking never provided much of a guarantee for continuity in highway expenditure.

1/ IBRD Economic Report, 1965, page 20.

October 6, 1967

Annex 6

Earmarking Countries

Cross section analysis

1. Simple regression analysis

The regression equation for the 18 earmarking countries is:

$$\frac{R}{I} = a + b\frac{T}{I}$$

where R = Road expenditure, I = Gross investment and T = Earmarked Taxes. We obtain $\frac{R}{I} = 4.8 + 1.5\frac{T}{I}$ (see page 6 above). The correlation coefficient is 0.7 and is significantly different from zero at a level of significance of one percent.

2. Multiple regression analysis

When GNP/capita is added as a second independent variable our equation becomes $R = a + b\frac{T}{I} + cZ$; where Z = GNP/Capita; we obtain the following equation for all the eighteen earmarking countries. (Figures within brackets express sampling errors of regression coefficients)

$$\frac{R}{I} = 5.2 + \underset{(0.3)}{1.5}\frac{T}{I} - \underset{(0.25)}{0.22}Z;$$ where Z = GNP/capita expressed in hundreds of US$

The coefficient of determination $\bar{R}_o^2$ is 0.50. The multiple correlation coefficient is significantly different from zero at a level of significance of 1 percent. The partial correlation coefficient of road expenditure/GDI regressed on GNP/capita is 0.0. It is seen that GNP per capita does not help in explaining more of the variation in the dependent variable.

3. If New Zealand is excluded, our regression equation becomes:

$$\frac{R}{I} = 4.3 + \underset{(0.4)}{1.6}\frac{T}{I} + \underset{(0.95)}{0.09}Z \qquad \bar{R}_o^2 = 0.50$$

The multiple correlation coefficient is significantly different from zero at a level of significance of 1 percent.

4. If Madagascar is excluded we obtain:

$$\frac{R}{I} = 7.0 + \underset{(0.4)}{0.6}\frac{T}{I} + \underset{(0.23)}{0.01}Z \qquad \bar{R}_o^2 = 0.01$$

The multiple correlation coefficient is not significantly different from zero at a level of significance of 5 percent.

5. Time Series Analysis

Analogously to the cross section analysis above, road expenditure/GDI was regressed upon earmarked taxes/GDI and GNP/capita for Brazil, Ethiopia, Kenya, New Zealand and Peru. GNP/capita was measured in domestic currency at constant prices. The earmarked taxes/GDI variable is significant at the 1 percent level for all countries but Peru, in explaining the variation in the dependent variable. (See page 8 above, for the results of the simple regression analysis) Our second independent variable GNP/capita is not significant at the 5 percent level for any of the five countries. From this we conclude that the relevant equation is the simple regression $\frac{R}{I} = a + \frac{T}{I}$.

6. Analysis with dummy variables

An additional multiple regression analysis was made to determine the explanatory value of GNP/capita. To increase the number of observations, the time series for the individual countries were grouped together by using dummy variables. For each of our five countries, the dummy variable has the value of 1 for the number of observations, otherwise it is 0. In a generalized form our equation becomes:

$$\frac{R}{I} = a + b\,\frac{T}{I} + cZ + d_1 x_1 + d_2 x_2 + \ldots + d_5 x_5$$

GNP/capita was measured in US$ constant prices at 1964 exchange rates. Again GNP/capita turned out as a non significant variable in explaining variations in $\frac{R}{I}$, while $\frac{T}{I}$ is strongly significant at the 1 percent level.1/

The dummy variables were all non significant. We conclude that in our subsample, there are no inter country characteristics which do explain the relative allocation of funds to the road sector.

7. Spurious correlation

In principle our results may be biased because of spurious correlation, since both highway expenditures and earmarked taxes have been divided by gross domestic investment. This eventuality was not considered very likely at the time of writing. But to convince ourselves, a further test was made. The relative variability of GDI, road expenditure and earmarked taxes was calculated for five countries Brazil, Kenya, Madagascar, New Zealand and Peru. We obtain a relative index of variability through dividing the standard deviation of the time series by the mean for the respective series. This allowed us to compare the relative variability for each country of GDI versus that of road expenditure and earmarked taxes. Of these five countries, only one, Peru, displayed a larger variability of GDI, than of both road expenditure and earmarked taxes. In other words for only 10 out of a total of 47 observations, might we suspect a substantial degree of spurious correlation. This evidence should be sufficient to satisfy us, that there are no significant distortions in our results because of spurious correlation.

1/ The test for serial correlation at the 5 percent level reveals no such bias..