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CAPITAL GROWTH AND DEVELOPMENT POLICY

THE KENYA EXPERIENCE

by

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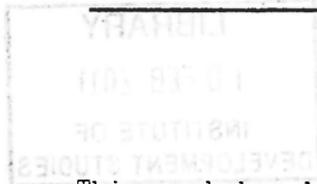
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Abstract:

The purpose of this paper is to discuss the role of capital investment in growth and development policy, with particular reference to Kenya. The conclusion reached, through the application of regression and correlation analysis, is that (a) capital investment is a necessary but a sufficient condition for the growth of the economy; (b) capital investment has little or no correlation with growth in some industrial sectors; and (c) capital investment contributes significantly in the industries which use machines and equipments. The policy for growth should distinguish between these economic sectors.



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CAPITAL GROWTH AND DEVELOPMENT POLICY:
THE KENYAN EXPERIENCE

Does capital investment cause economic growth? Is there a relationship between fixed capital formation and increased national economic output? The answers to these questions have led to controversies among economic theorists dealing with economic planning, especially of the underdeveloped countries. There is a group of economists, usually traditional and conventional ones, who believe that there is a strong relationship between capital investment and economic growth. This group maintains that the former definitely is the major cause of the latter. There is another group of economists who believe that capital investment is a necessary but not a sufficient condition for economic growth. Still a third group contend that capital investment does not cause economic growth. Thus, the answers to these questions still remain controversial and debatable.

Yet the answers have to be sought. They are very necessary for formulation of development policy. Each one of the answers suggests a different policy from the other. If it is believed that capital investment is the major source of growth, then the growth policy suggested is rapid increase in capital investment outlays; and vice versa. Clearly, an answer to these questions will definitely make a great contribution, not only to the literature on the subject, but also to development policy.

This paper attempts to make that contribution. By the use of the techniques of regression and correlation analysis, the author has been able to identify areas where ^{there} are meaningful and meaningless relationships between capital investments and economic growth. These findings are then used to suggest policy measures.

The paper proceeds as follows. Section I discusses the Kenya's development policy, which is to promote economic growth. This aim is to be achieved through increased capital investment from both domestic and foreign sources. Section II raises the question as to whether capital investment causes economic growth. Three views, already mentioned, are discussed. Section III deals with the analysis of the author's findings: Sources of data, manipulation of the data and the conclusions reached through the data analysis. The discussion is concluded in Section IV.

SECTION I: THE KENYAN DEVELOPMENT POLICY

Since independence, Kenya's development policy has hinged crucially on the promotion of economic growth of the national economy. This policy was well articulated in an important official policy document, African Socialism and Its Application to Planning in Kenya, Otherwise known as Sessional Paper No. 10 of 1965 (henceforth to be referred to as paper). From the very beginning, the document states: "With independence, Kenya intends to mobilize its resources to attain a rapid rate of economic growth for the benefit of its people." (8 p. 1). The priority placed on growth policy is stated succinctly elsewhere in the Paper (8 p. 5):

The most important of these policies is to provide a firm basis for rapid economic growth. Other immediate problems such as Agricanization of the economy, education, unemployment, welfare services, and provincial policies must be handled in ways that will not jeopardize growth. The only permanent solution to all of these problems rests on rapid growth Growth, then, is the first concern of planning in Kenya ...

This policy has continued to occupy a topmost position in all the subsequent development plans and official statements

concerning development matters. (8, 9, 10, 11).

If the promotion of economic growth is the most important of all the development policies, how is the growth to be achieved? The Paper spells out how this is to be done (8 p. 5):

The achievement of rapid growth requires careful planning and firm discipline in implementing plans to ensure that Kenya's limited resources are increased as rapidly as possible and used wisely in the promotion of growth. The critical shortages in Kenya at the present time are -

- (i) domestic capital;
- (ii) trained, educated and experienced manpower; and
- (iii) foreign exchange.

The Paper points out that shortage of domestic capital is caused by low rates of domestic saving which in turn are due to low per capita incomes of the people, Hence, to compensate for the shortage of domestic capital, a policy of borrowing from abroad was instituted (8 p. 6):

It is unfortunate but true that if we had to depend solely on domestic saving and tax surpluses to grow, our growth might not even be rapid enough to keep pace with our burgeoning population. In order to compensate for our shortage of domestic capital, in order to grow rapidly, ... we must borrow from foreign governments and international institutions and stimulate the inflow of private capital from abroad.

From the foregoing, it is clear that the development policy of Kenya has relied heavily on economic growth and capital as the cause of that growth. This policy has continued to be pursued. Recently, the World Bank wrote a book, Kenya: Into the Next Decade in which the theme that capital causes growth is central. In Chapter 2 of the book, the beginning paragraph states that (23 p.)

The business of development is very largely concerned with resources: on the one hand, what volume of resources can be mobilized for development, and on the other hand, how efficiently these resources are used to achieve society's goals.

... the four major resources which have proved to be the most restrictive constraints to development (are) domestic savings, government revenue, foreign exchange, and skilled manpower.

Chapter 3 of the book makes it clear that it is the capital investment which is the most important consideration in Kenya's development efforts. Under the subtitle worded "Investment and Growth" the chapter contends that:

If Kenya wants to get the most out of her resources, she will have to seek new ways of simply getting more growth out of the very considerable investment effort she is making.

SECTION II: DOES CAPITAL INVESTMENT CAUSE ECONOMIC GROWTH?

The idea that capital investment causes economic growth and hence economic development has been dominant in the literature on development, especially of underdeveloped countries, for several decades. However, serious doubts have recently begun to emerge among economists as to whether there is that causal relationship. This doubt caused one writer to say that (17 p. 39-43):

There are fashions in economics. Capital formation was once seen as the crucial element in the development of underdeveloped economies but the trend has been running against this view. Instead of capital the key importance of the necessary preconditions, the supply of other factors of production such as entrepreneurship, or other requisites of economic development such as widening of markets or technological progress are stressed. The leading textbooks on economic development are skeptical about the central role of capital accumulation.

A careful examination of the literature reveals that there are three major positions taken by different authors on

the subject: (a) capital investment is the most important (and perhaps the single) cause of economic growth; (b) capital investment is a necessary but not a sufficient condition for growth; and (c) capital investment is not a cause of growth. These different positions will be examined in turns.

(a) Capital Investment Causes Economic Growth:

The contention that capital investment causes economic growth is dominant in literature. In the 1950's the earliest work on this subject is that of Moses Abramovitz (1 pp. 132-178) who devoted almost two-thirds of the total space to the view that capital formation causes economic growth. This was followed by the work of R. Nurkse, who stated unequivocally that, for underdeveloped countries, "The country's incremental saving ratio ... is the crucial determinant of growth." (15 p. 142) Then came the monumental work of W. Arthur Lewis, The Theory of Economic Growth, in which the author indicates that (13 p. 226):

The central problem in the theory of economic growth is to understand the process by which a community is converted from being a 5 percent saver to a 12 percent saver - with all the changes in attitudes and institutions and in techniques which accompany this conversion.

A major United Nations publication in 1955 buttressed the notion that capital causes economic growth:

The rate of economic growth may be analytically considered as being a function of two factors, (a) the rate of capital formation and (b) the capital/output ratio: accordingly development policies may be described as aiming to increase the former, reduce the latter, or do both. (20 p. 25-26):

Another major United Nations report of a group of experts added to the contention:

The final goal of development planning is ... to find the best way of breaking the vicious circle between capital shortage and underdevelopment and to design the most efficient and optimum rate of capital accumulation. Capital accumulation may very well be regarded as the core process ... (21 p. 8):

The report continued, this time being more specific as to the quantitative magnitudes of savings required to produce specified outputs:

After estimating the current rate of savings, the crucial question will be what amount of net national output can be expected from investment to be made on the basis of the estimated savings. A number of studies have been made on the amount of capital required to increase output by one unit per annum in each sector of economy and for a national economy as a whole. This amount is called the "capital-output ratio", or "capital coefficient". (21 p. 8).

Another important contributor to the literature on investment as a strategic cause of growth was Oskar Lange. He used strong and confident language when he asserted that (12 p. 3):

The most important means of achieving economic development is undoubtedly productive investment.

He emphasized that (12 p. 10):

... essential of planning economic development ... consists in assuring an amount of productive investment which is sufficient to provide for a rise of national income substantially in excess of the rise in population, so that per capital income increases. The strategic factor is investment.

The view that capital investment causes growth led to the development of many growth models. Theodore Morgan made a survey of articles, notes, and communications published in 1964, 1965 and 1966 in two major professional journals: The American Economic Review and the Economic Journal, and showed the dominance of that view. He made a tabulation of

his findings as showed below:

Table I

	AER	EJ	Total
Total articles, notes, and communications in 1964, 1965 and 1966	146	146	292
Of these, on growth economics	19	45	64
Of these, investment-as-cause of growth approaches	14	26	40
Other approaches	5	19	24

Source: Theore Morgan (14 p. 392).

Another economist, Albert Waterson, who is also a practical development advisor for the World Bank group, lamented the preoccupation of the economics profession with nonhuman capital as the critical determinant of economic growth. This preoccupation has definitely influenced development policy. Development planners in less developed countries have been encouraged to focus their attention on investment for capital goods, and as the best proxy for that, on expenditure targets for investment. He complains that (22 p. 299):

Because some governments consider investment virtually synonymous with development, they have emphasized the fulfilment of the financial investment targets in their plans rather than the physical output targets that the investments are aimed at achieving. They have sometimes seemed to act as though the attainment of production targets follow automatically, or with minor additional effort, the realization of financial investment targets.

Indeed, the dominance of this was noted by an Indian economist, P.K. Sen, when he said that (18 p. 23)

If there is one concept that has dominated recent discussions on the growth theory and development planning, it is that of the capital-output ratio, or the capital-coefficient, as it is sometimes called. It has been extensively used in various growth models, e.g. those of Harrod, Domar, Kaldor, and Mahalanobis, and it has also helped the formulation of our first and Second Five Year Plans.

From the foregoing statements, one may conclude that capital is the sole strategic cause of growth. But such a conclusion would be erroneous. There are groups of influential authors who do not share that view. One group believes that capital investment is a necessary but not a sufficient condition for growth.

(b) Capital Formation as a Necessary but not Sufficient Condition for Growth.

The view that capital investment is a necessary but not sufficient condition for economic growth was presented by Professor Robert Solow at the Meeting of the American Economic Association in 1961. Citing previous works that he himself had done as well as the works of others during the 1950's, he concluded that (19 p. 86):

Investment is at best a necessary condition for growth, surely not a sufficient condition. Recent study has indicated the importance of such activities as research, education, and public health.

The Solow's position was strengthened by the works of Professor W.W. Rostow who gave a quantitative magnitude to the relation between capital requirement and resultant growth rate. He specified that capital investment of

from (say) 5 percent to over 10 percent of national income is a necessary but not sufficient condition for take-off into self-sustained growth. (16 p. 37).

There have been studies which investigated the international correlation of national income measures of investment and measured growth. T.P. Hill, for example, found that

the relation between growth and one kind of investment cannot be the same as that between growth and another kind ... In so far as any general association exists between growth and investment, it is largely due to investment in machinery and equipment. This is especially the case for growth in GNP per person employed, where all of the correlations, excepting that with machinery and equipment, are quite trivial. (7 p. 297-298).

The results of these studies accord with the Solow's view that a high rate of investment may be a necessary but clearly not a sufficient condition for growth.

(c) Capital Does Not Cause Economic Growth:

The proposition that capital does not cause growth has been advanced by a group of prominent economists. In the 1950's, Bauer and Yameh made this proposition in the following manner:

It is often nearer the truth to say that capital is created in the process of development than that development is a function of capital acculation (3 p. 127)

This view is still maintained by Bauer. In a recent article on the subject, he continued to articulate the stand he had already taken:

Capital resources, which are often thought to be crucial, are usually less important. Moreover, their supply and productivity depend on personal faculties, motivations and social and political arrangements. The resources are primarily an effect, a result, a dependent variable in the process of economic development rather than a cause or an independent variable (2 p. 75)

Other prominent authors who have maintained that capital does not cause economic growth include A.K. Cairncross (4) and Lauchlin Currie (5).

SECTION III: ANALYSIS OF THE KENYAN DATA: THE RELATION BETWEEN CAPITAL AND GROWTH

In an attempt to explore whether or not capital causes growth, this author conducted a regression analysis of the relation between 1964 constant price incremental-capital-output-ratio (ICOR) and the rate of change of the levels of GNP.

The data base was as follows. The GDP series at 1964 constant prices was obtained for 1964-1974, and similarly for the fixed capital formation. Both series are published by the Bureau of Statistics. Next, these data were calculated on a 3-year moving average to avoid wild fluctuations in the annual variations in their levels. Then a one-year capital lag in some appropriate industries was calculated. And lastly, depreciation rates were calculated through the use of the averaged 1967 and 1971 input-output ratios, which are available.

The results obtained are shown in Table II below.

Table II

Regression Analysis of the 3-year Moving Average Changes in GDP at Factor Cost and Gross Capital Formation, 1966-1975, in constant 1964 Prices.

<u>Sector</u>	<u>B</u>	<u>r</u>	<u>R²</u>
1. Non-Monetary Economy	-1.35	-0.29	0.04
2. Forestry	-0.04	-0.09	0.008
3. Agriculture	0.79	0.48	0.23

<u>Sector</u>	\hat{B}	r	R ²
4. Fishing	-	-	-
5. Mining and quarrying	0.08	0.62	0.38
6. Manufacturing and repairing	0.38	0.89	0.79
7. Building and construction	0.05	0.10	0.01
8. Electricity and Water	0.09	0.82	0.67
9. Transport, storage and communication	-0.10	-0.24	0.05
10. Wholesale and retail trade	-0.42	-0.36	0.12
11. Banking Insurance and Real Estate	0.89	0.53	0.23
12. Ownership of Dwellings	0.16	0.75	0.56
13. Other services	0.52	0.62	0.38
14. Private Households	-	-	-
15. General Government	0.34	0.87	0.75
16. Total Monetary Economy	0.30	0.77	0.59
17. Total GDP at Factor Cost	0.45	0.78	0.60

Explanation of the symbols:

\hat{B} = calculated estimate of marginal impact of a unit of capital formation on GDP at factor cost.

r = correlation coefficient: the degree of relationship between capital investment and the rate of change of GDP.

R² = coefficient of determination: the percentage of variance in GDP change explained by the regression of GDP change on capital formation.

Analysis of the Regression Results:

A careful examination of the regression and correlation analysis results reveals that, for the total monetary economy and the total GDP at factor cost, the correlation coefficient, r = .77 and .78, respectively. This shows that there is an

association between capital investment and the change in the GDP levels. But the association is not strong. The coefficient of determination, R^2 , for the total monetary economy and the total GDP at factor cost, was $R^2 = 0.59$ and 0.60 , respectively. This means that the percentage of variance in the change of GDP explained by the regression of change in GDP on capital formation was approximately 60 percent. Thus, for the economy as a whole, capital formation explains about 60 percent of the change in economic growth. The conclusion to be drawn from

this is that capital formation is a necessary but not a sufficient condition for the growth of Kenyan economy as a whole.

For a detailed analysis, we can yet interpret the findings in different ways. The findings can be grouped into three, according to economic sectors, and according to how capital investment is associated with, and explains, the growth of GDP. Three categories can be observed: (i) capital investment and GDP change have no meaningful correlation; (ii) capital investment has little correlation with, and contributes little toward the change in GDP; and (iii) capital investment is related to and contributes meaningfully toward the change in the level of GDP.

(i) Capital Investment and the Change in GDP Levels are Negatively Associated and Capital Investment Does Not Explain the change in GDP levels:

According to the Kenya's sectoral classification of economic activities, this category includes five sectors: Building and construction, Forestry, Non-Monetary Economy, Transport and Communications, and Wholesale and Retail Trade.

In all these categories, with the exception of Building and construction, the association of capital investment and change in the level of GDP is weakly negative, meaning that GDP level may well decline as a result of an increase in capital outlay for that sector. This should be a reasonable interpretation for the non-monetary sector where it is clear that an increase in capital formation reduces the growth of the GDP for that sector.

The contribution of capital investment to the growth of the sectors is similarly very poor. The case of forestry is the most interesting, where capital investment contributes only 0.8 percent to the growth of that sector. The case of the Building and Construction sector require more care in interpretation. "There is a tendency for construction to be more closely associated with the provision of services than with the production of goods," according to Hill. Furthermore, there is a tendency for the growth of output per person in services, especially as conventionally measured, to be much slower than in the production of goods.

The table below shows the extent of association between capital formation and output for the sectors discussed.

Table III

Sector	Degree of association between GDP change and capital formation, r	Contribution of capital formation to growth: Change in GDP regressed on capital formation, R ²
Building and construction	0.10	1.0
Forestry	-0.09	0.8
Non-Monetary Economy	-0.20	4.0
Transport, Storage and communications	-0.24	5.0
Wholesale and Retail Trade	-0.36	12.0

(ii) Capital investment and output change are associated, but the contribution of capital to growth of output is weak

The sectors included in this category are Mining and Quarrying, Other Services, Banking, Insurance and Real Estate, and Agriculture. The contribution of capital to increased output in each of these sectors range from some 20 to about 40 percent of total contributions. The following table illustrates the point that capital is associated with output change, although capital investment contributes little to growth of output.

Table IV

Sector	Degree of association between GDP change and capital formation	Contribution of capital formation to output change Regression of GDP on capital formation, R ²
		<u>Percent</u>
Mining and Quarrying	0.62	38.0
Other services	0.62	38.0
Banking, Insurance, Real Estate	0.53	28.0
Agriculture	0.48	23.0

(iii) Capital Formation is strongly associated with Increased Output, and Capital Investment Contributes Importantly to Increased Output:

To the extent that there is an association between capital investment and growth, and that capital causes growth, these associations and causations are present in three main sectors: Manufacturing and Repairing, General Government, and Electricity and Water. The correlation coefficients are strong and the regression analysis shows that the regression coefficients,

R^2 , are high enough in relation to other sectors. The Manufacturing and Repairing sector, for example, indicate that the coefficient of correlation, $r = .90$ and the regression coefficient, $R^2 = .80$. The table below show these associations and causations.

Table V

Sector	Degree of association between change in GDP and capital formation	The regression of change in GDP on capital formation
	<u>r</u>	<u>R, ²</u>
Manufacturing and Repairing	0.89	0.79
General Government	0.87	0.75
Electricity and Water	0.82	0.67

The nature of economic activities undertaken in these sectors involve machines and equipment. Thus, we can conclude that investment outlays in machines and equipment cause economic growth.

SECTION IV: CAPITAL INVESTMENT AND ECONOMIC GROWTH: CONCLUSIONS

From the regression and correlation analysis, using the Kenyan data for the period 1964-1974, we can make the following conclusions, already alluded to:

- (1) For the non-monetary economy, there is no meaningful correlation between capital investment and the rate of change of output in that sector.
- (2) For the monetary economy, there is a weak relation between capital formation and the rate of change

of output. This suggests that, for the monetary economy as a whole, capital investment is a necessary but not a sufficient condition for growth.

- (3) According to sectoral analysis, the relation between capital investment and growth is very weak in some industrial sectors, but fairly strong in others.
- (4) The strong relationship exists between capital investment and change in output in industries that use machines and equipment. In this instance, capital investment definitely causes economic growth.

The policy suggestions that could be made, following the analysis of the data, are as follows:

- (1) There should be a sectoral differentiation of policies into those that do and those that do not have immediate impact on growth. For example, if growth is the overriding policy aim, then it makes sense that the policy should concentrate on increasing investment outlays in manufacturing and repairing industries, the electricity and water sector, and the general government sector.
- (2) The policy should also address itself to the time element. There are some industries in which capital outlays take time to produce visible growth. These industries should not be neglected, even in the short run. Building and construction, for example, may not lead to immediate visible growth, but the activities in that sector are crucial for development.

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