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Growth vs. Basic Needs: Is There a Trade-Off?

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Growth vs Basic Needs: Is There a Trade-Off?

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The World Bank

Summary. — Critics of the basic-needs approach to development have argued that by emphasizing activities which are essentially consumption oriented, the basic-needs approach implies a reduction in the rate of growth. On the other hand, proponents of this approach point to the human capital aspects of basic needs, which could be instrumental in increasing productivity and growth in output. This paper attempts to marshal some further evidence of the growth–basic needs trade-off by undertaking econometric estimates of the variables explaining LDC growth during the 1960–1973 period. The general finding is that countries which had done well on basic needs in 1960 had above average growth rates during the period 1960–1973. Improvement in basic needs during the period are also correlated with higher growth rates of GNP, but it is impossible to ascertain if this improvement is a cause of or an effect of the higher growth in output.

1. INTRODUCTION

The failure of rather substantial growth of output in the developing countries in the past 25 yr to reduce poverty has been widely recognized. Various alternatives have been proposed to redress the problem, including employment-oriented, rural-development-oriented growth strategies, redistribution with growth and the basic-needs approach. The basic-needs approach is seen as a more direct attack on poverty than those approaches that rely largely on raising incomes and productivities of the poor. Particular emphasis is given to improvements in health, nutrition and basic education, especially through improved and redirected public services, such as rural water supplies, sanitation facilities, primary schools, etc. Some proponents of basic needs argue that the direct provision of essential goods and services will be a more efficient and more rapid way of eliminating poverty. While supporting efforts to raise productivity and income, it emphasizes that these alone may not be sufficient or efficient since:

- some basic needs can only be met efficiently through public services, such as water supplies and sanitation; and
- it is difficult to find policies, investments, etc. that will increase the productivity of all of the poor in a uniform way; very often the benefits of these innovations reach only a few.

Especially, the basic-needs approach shifts attention from the goal of output maximization to poverty minimization; the critical question is to what extent a trade-off between these two objectives is required. Furthermore, it could be argued that a basic-needs approach will raise productivity and may not reduce output, particularly in the longer run. Resources for basic needs can be found by redirecting consumption expenditures of both the poor and the rich away from non-basic-needs expenditures, and from unnecessary or even wasteful public-sector expenditures. To the degree that basic needs improve the health and education level of the labour force, one can visualize an improvement in basic productivity. Better health facilities are likely to lower infant mortality rates, and ultimately affect fertility and the net reproduction rate.

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Critics of the basic-needs approach, however, argue that it is a strategy which results in increasing the consumption level of the poor, at the cost of reducing the net level of investment and saving in the economy. In the long run, they would argue, the poor would be better off in terms of basic-needs satisfaction through the higher incomes realized by higher investment rates under a more conventional development strategy. The problem is essentially the same as that drawn by Ahluwalia and Chenery in *Redistribution with Growth*: a strategy that provides for 25 yr of consumption transfers eventually results in lower incomes (and welfare) for everyone compared to a non-interventionist baseline. On the other hand, a transfer that increases the capital assets of the poor produces a permanent improvement in their condition, and could result in higher GNP if one adopts a poverty-weighted measure of output.

While more radical basic-needs proponents would counter this argument by stating that since the point of basic needs is to shift the focus away from a heavy growth orientation, which failed to reduce poverty in the past, the fact that growth is or is not slower under basic needs is irrelevant. More conservative basic-needs proponents, however, would point to the human capital aspects of basic needs as possibly having longer-term effects sufficient to cancel out any temporary reduction in growth. The question becomes one of defining the effect of a basic-needs approach in augmenting human capital, and discerning whether returns to this form of human investment are higher than those from more conventional investment in human capital, or from investments in more traditional forms of physical capital.

The role of human capital in explaining variations in factor productivity and the rate of growth of output is one that has been given considerable attention in the literature relating to 'growth accounting'. The problem of measuring total factor productivity by developing an index of output (generally GNP) and an index of factor inputs traces its origins to work done by Stigler (1947), Schmookler (1952) and Kendrick (1961), among others. The definitive work remains that of Denison (1962, 1967, 1974) who estimated that about half the growth in GNP in the United States could be attributed to factors other than the increase in capital and labour inputs, such as economies of scale, improvements in resource allocation and a large residual which is labelled as 'advances in knowledge'.

Education is considered by Denison to be a factor input, and alone accounts for 14% of the growth in GNP during the 1929-1969 period. If education were to be combined with the residual 'advances in knowledge', then the human capital component would be about 45% (see Denison, 1974, p. 128). The assumption that the residual can be attributed to improvements in the stock of human capital, however, is a supposition that remains largely unproven. It may be that the residual represents errors in the calculations of other variables, the omission of other important factors, or a faulty assumption about the shape of the underlying production function.

Studies of growth accounting for developing countries, however, show similar results. Krueger (1968) found that differences in human capital variables explained about half of the difference in per capita GNP between the United States and a sample of developing countries. Hayami and Ruttan (1970) found that differences in technical and general education could explain about one-third of the differences in agricultural productivity between developed and developing countries. Various authors have found high rates of return from investment in education, particularly primary education in developing countries. A survey of 17 countries by Psacharopoulos (1973) found an average social return of 25% for primary education. These returns range, however, from 6.6% (Singapore, 1966) to 82% (Venezuela, 1957). On the other hand, Correa (1970) found that while health and nutrition factors were very important, education advances appeared unrelated to output growth for a group of Latin American countries. Nadiri (1972) also concluded from a survey of literature that education was not very useful in explaining differences in growth rates between countries, although it did seem to explain variations in factor productivity within countries over time. Thus, there appears to be some conflicting evidence over the role of human capital, particularly education, in affecting the growth of output in developing countries.

While basic-needs satisfaction can be seen as augmenting human capital, not all human capital advances will relate to meeting basic needs (i.e. higher education), and not all basic-needs satisfaction relates to human capital formation. More direct associations between growth and progress in meeting basic needs have also been undertaken with somewhat mixed results. Morawetz (1977) comes to some rather uncertain conclusions from a large number of regressions of basic-needs indicators and GNP, both in absolute and in growth rate terms. While unable to pinpoint a clear relationship between the two, he did conclude that GNP per capita...
was not a good proxy for basic-needs fulfilment. Hicks and Streeten (1979) indicate that a better relationship between life expectancy and GNP per capita can be obtained using a semi-log transformation, since improvements in life expectancy tend to decline markedly after a certain level of income is obtained. Isenman (1978) uses a log–log relationship between life expectancy and GNP per capita to pinpoint the extent to which Sri Lanka has achieved above normal progress in basic needs. He indicates that while investing in basic needs may have reduced per capita income, the gains registered in social indicators are much greater than would have been expected even at the higher income level.

2. SOME NEW EVIDENCE

The problem with simple correlations, however, is that they cannot identify the causality links between basic-needs progress and growth. Progress in basic needs is just as likely to be a result of higher incomes, as their cause. At the same time, growth in income is clearly going to be affected by other, non-basic-needs factors. Thus, one needs to isolate basic needs and other factors which can be considered important determinants of growth, in order to avoid giving too much weight to the basic-needs variables.

The statistical analysis undertaken in the balance of this paper attempts to answer two questions:

- first, does the level of basic-needs development at the beginning of a period increase the realized growth of output during the period; and
- second, do countries which make substantial progress in basic needs during a period experience significantly lower rates of output growth or lower rates of investment?

To answer these questions, a general model of growth is assumed for developing countries, and then statistically estimated. The overall hypothesis is that constraints on the growth of productivity in developing countries arise from three areas: the shortage of physical capital, the lack of foreign exchange and the low quality of human capital as revealed by inadequate basic needs fulfilment. Thus, the initial approach of this paper, reflecting the above discussion, is to estimate a general equation that takes the form:

\[ GR Y P C = a_1 B N_b + a_2 I N V R T + a_3 G R I M P + k, \]

where \( G R Y P C \) is the growth rate of per capita GNP over a period of years, \( B N_b \) is an indicator of basic-needs attainment in the base year, \( I N V R T \) is the average level of gross investment to GDP for the period and \( G R I M P \) is the growth rate of imports over the same period.

The rationale for assuming that LDC growth is limited by foreign exchange and savings has been well developed by Chenery and Strout (1966) and others. Essentially, the above formulation adds a human capital component to the famous ‘two gaps’ of Chenery–Strout. By using per capita income growth as the dependent variable, growth in output caused by growth in the labour force is allowed for on the assumption that population and labour force growth are roughly similar. The use of growth rates also reduces problems arising from inter-country comparisons of absolute income levels.

The investment rate is used as a proxy for capital formation. It would be preferable to include also the physical capital stock in the base year, but this data is simply not available for a large number of countries. One might also prefer the use of exports rather than imports, since much attention has been given to export-led growth. However, imports in constant prices capture the real purchasing power of export earnings, as well as the foreign exchange available from external capital borrowings. In fact, import and export growth rates tend to be highly correlated, so that the expansionary effects of rapid export growth in the domestic sector, particularly manufacturing, is still captured by using the import growth rate.

There are, unfortunately, no good single measures of progress in basic needs. About the best is life expectancy at birth, since it captures the effects of many of the basic-needs sectors which act to improve health; i.e. sanitation, nutrition, water supply and even shelter. Progress in primary education can be measured by literacy rates, although these are often inaccurate since there is no consistent definition of literacy between countries, and much uncertainty regarding the quality of data. Consequently, data on primary-school enrolments have also been used, although these are much more an input measure than a measure of results or effects. Even enrolment data suffer from definitional problems, but they are less severe than those for literacy rates.

The general equation has been estimated for the 1960–1973 period, using basic-needs data for 1960. This period has been chosen, in part because least squares trend growth rates for per capita GNP and imports are readily available in the World Bank’s World Tables, 1976. Updating these growth rates with additional
Table 1. *Summary of regression equations: Coefficients for independent variables (t ratios in parentheses)*

<table>
<thead>
<tr>
<th>Equation no.</th>
<th>Dependent variable</th>
<th>( \text{LIEX} )</th>
<th>( \text{LIT} )</th>
<th>( \text{SCH} )</th>
<th>( \text{GRIMP} )</th>
<th>( \text{INVRT} )</th>
<th>( \text{YPC} )</th>
<th>( \text{DLIEX} )</th>
<th>( \text{DLIT} )</th>
<th>( \text{DSCH} )</th>
<th>Constant</th>
<th>( \bar{R}^2 )</th>
<th>( n )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>( \text{GRYPC} )</td>
<td>0.0656</td>
<td></td>
<td>0.2085</td>
<td>0.1088</td>
<td></td>
<td></td>
<td></td>
<td>3.956</td>
<td>0.624</td>
<td>78</td>
<td>988</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>( \text{GRYPC} )</td>
<td>0.0185</td>
<td>0.2113</td>
<td>0.1301</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.04</td>
<td>0.577</td>
<td>69</td>
<td>988</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>( \text{GRYPC} )</td>
<td>0.00219</td>
<td>0.1913</td>
<td>0.1156</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.288</td>
<td>0.623</td>
<td>78</td>
<td>988</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>( \text{GRYPC} )</td>
<td>0.0968</td>
<td>-0.0139</td>
<td>0.2110</td>
<td>0.1083</td>
<td></td>
<td></td>
<td></td>
<td>4.857</td>
<td>0.624</td>
<td>69</td>
<td>988</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>( \text{GRYPC} )</td>
<td>0.0377</td>
<td>0.1969</td>
<td>0.1054</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3.279</td>
<td>0.631</td>
<td>78</td>
<td>988</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>( \text{GRYPC} )</td>
<td>0.0847</td>
<td>0.1991</td>
<td>0.1179</td>
<td>0.00159</td>
<td></td>
<td></td>
<td></td>
<td>4.605</td>
<td>0.627</td>
<td>78</td>
<td>988</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>( \text{GRYPC} )</td>
<td>0.0169</td>
<td>0.2136</td>
<td>0.1268</td>
<td>0.00039</td>
<td></td>
<td></td>
<td></td>
<td>2.021</td>
<td>0.571</td>
<td>69</td>
<td>988</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>( \text{GRYPC} )</td>
<td>0.0225</td>
<td>0.1899</td>
<td>0.1173</td>
<td>0.00018</td>
<td></td>
<td></td>
<td></td>
<td>2.305</td>
<td>0.618</td>
<td>78</td>
<td>988</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>( \text{GRYPC} )</td>
<td>0.0709</td>
<td>0.1922</td>
<td>0.1131</td>
<td>0.1614</td>
<td></td>
<td></td>
<td></td>
<td>4.911</td>
<td>0.633</td>
<td>78</td>
<td>988</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>( \text{GRYPC} )</td>
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<td>0.2197</td>
<td>0.1159</td>
<td>0.0132</td>
<td></td>
<td></td>
<td></td>
<td>1.976</td>
<td>0.580</td>
<td>69</td>
<td>988</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>( \text{GRYPC} )</td>
<td>0.02504</td>
<td>0.1872</td>
<td>0.1219</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.177</td>
<td>0.622</td>
<td>78</td>
<td>988</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>( \text{INVRT} )</td>
<td>0.1458</td>
<td></td>
<td></td>
<td>0.0084</td>
<td>0.1005</td>
<td></td>
<td></td>
<td>9.010</td>
<td>0.229</td>
<td>78</td>
<td>988</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>( \text{INVRT} )</td>
<td>0.0529</td>
<td></td>
<td></td>
<td>0.0072</td>
<td>0.0798</td>
<td></td>
<td></td>
<td>15.680</td>
<td>0.226</td>
<td>69</td>
<td>988</td>
<td></td>
</tr>
</tbody>
</table>
data until 1976 was not felt to be worth the additional work required. Data on various basic needs indicators are taken from the 'World Development Indicators' as published in the World Development Report, 1978, and from the files of the Bank's Social-Economic Data Bank. The data base constructed for this exercise covers approximately 78 non-oil developing countries having populations greater than 1 million. However, since data on literacy are not available on as wide a basis, the sample size for equations using literacy variables is limited to 69 countries.³

The results of cross-country regressions indicate a substantial influence of basic-needs indicators on the rate of growth of per capita income (for complete results, see Table 1). In general, there is a significant correlation between growth and import growth rates, and the rate of investment, with the growth of imports being the most important factor. Of the basic-needs indicators, the life expectancy variable offers the best correlation with the education/literacy indicators being somewhat weaker. The basic equation with life expectancy \( (\text{LIEX}) \) is as follows:

\[
\text{GRYPC} = -3.956 + 0.0656 \text{LIEX} \\
+ 0.2085 \text{GRIMP} + 0.1088 \text{INVRT} \\
(4.4) (5.4) (3.6)
\]

\[ \bar{R}^2 = 0.624 \quad n = 78 \tag{1} \]

where \( \text{LIEX} \) = life expectancy at birth, 1960;
\( \text{GRIMP} \) = growth rate, imports in constant prices, 1960–1973;
\( \text{INVRT} \) = average ratio of gross investment to GDP, 1960–1973;

While this equation explains only about 62% of the inter-country variation in growth rates, the coefficients of the independent variables are all significant at the 98% level, or better. The growth of imports and the investment rate together explain most of the variance in growth rates; removing the life expectancy variable would only lower the \( R^2 \) from 0.62 to 0.53. However, evaluation of this equation at the means of the independent variables reveals an important influence for life expectancy. At the margin, assuming a one standard deviation increase in the independent variables, fully one-third of the incremental growth would be derived from the increase in life expectancy. While this relationship is likely to vary with different formulations and data samples, it points to a powerful and significant influence for basic-needs attainment of the rate of growth. For instance, an increase in life expectancy of 10 yr would increase per capita income growth rates by 0.7 percentage points (over an average growth rate of 2.4).

The two education variables produce similar results, although the overall level of explained variance is slightly lower. The schooling variable is more significant than literacy, perhaps reflecting the problems associated with measuring literacy. The two equations are:

\[
\text{GRYPC} = -2.045 + 0.2113 \text{GRIMP} \\
+ 0.1301 \text{INVRT} + 0.0185 \text{LIT} \\
(4.8) (3.9) (2.8)
\]

\[ \bar{R}^2 = 0.577 \quad n = 69 \tag{2} \]

\[
\text{GRYPC} = -2.288 + 0.1913 \text{GRIMP} \\
+ 0.1156 \text{INVRT} + 0.0219 \text{SCH} \\
(4.8) (3.9) (4.3)
\]

\[ \bar{R}^2 = 0.623 \quad n = 78 \tag{3} \]

where: \( \text{LIT} \) = adult literacy rate, 1960;
\( \text{SCH} \) = primary-school enrolment rate, 1960.

The equation with schooling variable seems preferable because the country sample is the same as equation (1), whereas the literacy equation is estimated on a slightly smaller sample because of missing data. Unfortunately, when two basic-needs indicators are combined into one equation, the education variable proves to be non-significant. For instance, in the case of literacy and life

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<table>
<thead>
<tr>
<th>Table 2. Explanation of growth by equation (1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
</tr>
<tr>
<td>------</td>
</tr>
<tr>
<td>LIEX</td>
</tr>
<tr>
<td>GRIMP</td>
</tr>
<tr>
<td>INVRT</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>
expectancy, while life expectancy remains significant at the 98% level, literacy loses all of its significance. In fact, the sign of the literacy variable becomes negative.

\[
GRYPC = -4.857 + 0.0968 LIEX - 0.0139 LIT + 0.2110 GRIMP + 0.1083 INVRT
\]

\[
(3.0) (1.1) (3.4)
\]

\[
GRYPC = -4.605 + 0.0847 LIEX + 0.1991 GRIMP + 0.1179 INVRT + 0.00159 YPC
\]

\[
(5.0) (3.8) (1.3)
\]

\[
R^2 = 0.624 \quad n = 69. \quad (4)
\]

In the case of schooling and life expectancy, both variables become statistically non-significant (see equation 5, Table 1). These results would seem to suggest that the health related aspects of basic needs are at least as important to raising productivity than those associated with education. These equations which have more than one basic-needs indicator may not be reliable, however, because of the high degree of multicollinearity between the basic-needs variables. For instance, the \( r^2 \) between life expectancy and literacy is 0.80, while that between primary schooling and life expectancy is 0.68. Thus, it is difficult to disassociate fully the effect of life expectancy from the education indicators, and it is possible that Table 2 overstates the impact of life expectancy on per capita growth rates.

One might argue, furthermore, that the basic-needs variables are really proxies for the level of income attained in 1960, and that it is this higher income, not the progress in meeting basic needs, which brings about higher growth rates. Recent experience indicates that the middle-income developing countries have grown faster than the low-income developing countries (see Morawetz, 1977; Ahluwalia, Carter and Chenery, 1978). The data utilized here do indicate some correlation between the basic-needs indicators and the level of GNP attained in 1960. For example, the simple \( r^2 \) between life expectancy and the GNP in 1960 is 0.59. However, if income and the basic-needs variables are used in the same equation, the GNP variable becomes non-significant. While multicollinearity is a problem here, the fact that the GNP variable drops out, and not the basic-needs indicator, suggests that the basic-needs variable provides a better explanation of the differences in growth rates. For example, in the case of life expectancy, the basic equation with the level of per capita income in 1960 (\( YPC \)) is as follows (compare to equation 1):

\[
GRYPC = -1.660 + 0.0877 RSLIEX + 0.1999 GRIMP + 0.1265 INVRT + 0.0024 YPC
\]

\[
(3.8) (5.0) (2.7)
\]

\[
R^2 = 0.620 \quad n = 78. \quad (7)
\]

An even better approach is to 'normalize' life expectancy for variations in income, and attempt to see if the variance which is unexplained by income levels is related to the growth of income. This procedure provides a surer indication that life expectancy is not a proxy for income. In the first stage, therefore, life expectancy is related to income and the square of income (\( YPC^2 \)):

\[
LIEX = 32.209 + 0.0869 YPC - 0.0000525 YPC^2
\]

\[
(7.8) \quad R^2 = 0.652 \quad n = 79 \quad (6)
\]

The residuals between the predicted life expectancies in equation (5) and the actual life expectancies (\( RSLIEX \)) are calculated and inserted into equation (1) in place of the standard life expectancy variable. The resulting equation is:

\[
GRYPC = -4.605 + 0.0847 LIEX + 0.1991 GRIMP + 0.1179 INVRT + 0.00159 YPC
\]

\[
(4.0) (5.0) (3.8) (1.3)
\]

\[
R^2 = 0.627 \quad n = 78 \quad (5)
\]

Thus, even under this more severe test, life expectancy remains significant, and the value of the coefficient of the life expectancy variable is not reduced. In fact, a 10-yr increase in life expectancy in the base year increases growth rates by 0.9 percentage points in equation (7), compared to only 0.7 percentage points in equation (1). It is also of interest that under this formulation, the 1960 income level is significant.

These results seem to support the proposition that the level of basic-needs attainment is related to the rate of growth of output. The basic-needs measures appear important in their own right, and are not proxies for the level of income. Thus, the development of a critical minimum level of basic human capital may be an important prerequisite for accelerating the
growth of output. However, this type of formulation suffers, because it does not reveal to what extent growth was sacrificed during the period that basic needs were being improved. It might be expected that the redirection of resources from direct investment activities toward basic needs could act to permanently increase consumption, particularly government consumption, and thus lower the level of investment and growth in the future. Thus, the construction of more primary schools might divert resources from investment in industry as an initial effect and the continued resources needed to operate these schools could result in lower government savings and hence, capital formation in future years. Eventually, one might expect that the improvement in human capital so realized would increase productivity and hence, the level of resources available to the government in the longer run.

An equally important question is whether or not a basic-needs strategy is growth inhibiting during the period that resources are being directed toward these needs. If more rapid future growth comes only after a period of reduced growth in the near term, and the social discount rate is high, then developing human resources/basic needs may be a poor bargain. To examine this, we have added to our basic regression a new variable, which indicates the increment in the basic-needs indicators used previously. If improving basic needs is growth inhibiting during the period that resources are being directed toward these needs, one would expect a significant coefficient and a negative sign for the increase in the basic-needs indicator. In fact, the regression equations with these terms added do not show a significant negative relationship between basic needs improvement and growth. In fact, there appears to be a positive, not negative, correlation between the two. For life expectancy, the following equation has been estimated (where DLIEX is the increment to life expectancy, 1960–1970).

\[
GR YPC = -4.493 + 0.0708 LIEX \\
+ 0.1922 GRIMP + 0.1130 INVRT \\
+ 0.1614 DLIEX \\
R^2 = 0.633 \quad n = 78.
\]

Of course these results, which closely follow those of Morawetz, can be subjected to various interpretations. It could be argued, for instance, that the lack of growth of GNP prevented resources from being devoted to the social sectors, a common problem in slow-growing economies. Furthermore, the 13-yr time period may be long enough to cover both growth-augmenting and growth-inhibiting effects from basic needs improvements, thus obscuring the nature of the interactions. Another aspect, which is presently more testable, is that increasing basic needs lowers the rate of investment. This is closer to our original hypothesis that progress on basic needs reduces growth by its effect on savings and the rate of investment. Therefore, an equation with the rate of investment as the dependent variable, and income and both the level and growth of the basic-needs indicators has been estimated.

This regression analysis finds, however, little significant association between the basic indicators and the rate of investment. Once again, there appears to be a positive, not negative, correlation with the basic-needs indicators. For instance, in the case of life expectancy, the estimated equation is:

\[
INVRT = 0.010 + 0.1458 LIEX \\
+ 0.0084 YPC + 0.1005 DLIEX \\
R^2 = 0.229 \quad n = 78.
\]

The entire equation is not very useful, however, in predicting variances in the rate of investment. The \( R^2 \) indicates that only about 23% of the variance in investment is explained by the equation. Roughly similar results are obtained when basic-needs indicators other than life expectancy are used. The \( R^2 \) could be increased significantly if the growth rate of GNP is used as an independent variable, but it is likely that the higher growth of GNP is more an effect of, rather than a cause of, the higher investment rate.

The general finding of the above analysis that life expectancy is at least as strongly associated with GNP growth as education indicators, is somewhat surprising. As pointed out, however, the education measures are highly correlated with life expectancy. For instance, the level of literacy explains more of the variation in life expectancy between countries than do variables such as GNP, calorie and protein consumption, the numbers of doctors or nurses per capita and the accessibility of clean water. The levels of primary-school enrolment shows a similar high correlation, although not quite as significant as literacy. For instance, the following equation explains 84% of the variance in life expectancy for 55 countries using 1973–1975 data, but literacy alone explains 78%.
\[ LIEX = 30.42 + 0.2237 \text{LIT} \]
\[ + 0.0641 \text{WATER} - 0.000062 \text{DOC} \]
\[ + 0.0039 \text{CAL} \]
\[ R^2 = 0.840 \quad n = 55 \]

Note: data for 1973-1975 where:

- \( Do = \) population per doctor (thousand);
- \( CAL = \) calorie consumption per capita;
- \( WATER = \) percent of population with access to clean water.

The fact that literacy is highly associated with variances in the level of life expectancy has been noted by others. It seems reasonable to assume that greater literacy could aid in the understanding of the causes of ill health, and the causality links between inadequate sanitation, infection and disease. Thus, while improving literacy may raise productivity directly, there may also be very important long-term gains from improvements in literacy which occur through improvements in health status.

If the GNP per capita variable is inserted into this equation, it proves not to be significant at the 95\% level. On the other hand, a poverty income measure (average income level of the lower 40\%) is statistically significant when added to equation (9). The use of this variable further reduces the sample size to only 35 countries, thus making it a rather unrepresentative sample. It does seem to indicate, however, that it is probably the incomes of the poor, not the average level of total per capita GNP, which is an important determinant of basic needs satisfaction.

Finally, it should be recognized that there may be other effects from meeting basic needs other than those which increase productivity. One of the benefits mentioned by proponents of basic needs is the possibility that better health and nutrition may serve to lower fertility and eventually the rate of growth of population. This assumes that the fertility rate will decline as people recognize that a greater proportion of their children are apt to survive to adulthood because of improved health conditions and lower infant and child mortality. The real question is whether this will be a net decrease in fertility, or one which merely offsets the decline in pre-adult mortality. It is also likely that there will be a lag between the decline in mortality and the perception of this decline by the general population, so that in the initial period, improved basic needs could raise the growth rate of population. Recent work by Morawetz (1978), using cross-country regressions similar to those used here, indicates a significant and negative association between fertility rates and literacy, infant mortality and the distribution of income, although the exact nature of the lag is somewhat uncertain.

3. SUMMARY AND CONCLUSIONS

It is always difficult to draw precise conclusions from regression analysis where causality is uncertain and the data base is weak. Nevertheless, the findings above would suggest the following answers to the two basic questions posed earlier:

- first, it would appear that countries making substantial progress in meeting basic needs do not have substantially lower GNP growth rates; and
- second, the attainment of a higher level of basic-needs satisfaction appears to lead to higher growth rates in the future.

A secondary finding is that measures of health improvement (life expectancy) are as strongly related to growth and productivity as measures of education attainment. As a minimum, these findings would support the concept of strong complementarities between various basic-needs sectors. In addition, it is possible that past emphasis on education as a means of raising productivity may have been overdone, and health and nutrition factors may be equally important. On the other hand, education appears to be the most important factor in explaining variations between countries in health status (as measured by life expectancy). Thus, the productivity enhancing aspects of education may occur not directly, such as by improving skills, but indirectly, through improvements in the health of the labour force.

Finally, these conclusions should be treated as preliminary and in need of testing against the backdrop of country experience and better empirical evidence. However, it seems likely that countries generally have the capacity to meet basic needs without crippling other programmes aimed at growth enhancing investments. Not only does a basic-needs programme appear unrelated to a reduction in growth potentials, it appears to offer long-term benefits which will raise the rate of growth as well. What this analysis does not explain is how countries meet basic needs without reducing growth, and why some countries appear to do much better than others in meeting basic needs. These questions, however, must be left to future research.
Table 3. Lower triangle: correlation coefficients; upper triangle: No. of cases for correlation

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<th>SCH60</th>
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</table>

GRIM: Growth in Basic Needs

Note: The correlation coefficients range from -1 to 1, where 1 indicates a perfect positive correlation, -1 indicates a perfect negative correlation, and 0 indicates no correlation.
NOTES

1. See Adelman and Morris (1973), and Morawetz (1977), among many others.

2. For a fuller discussion of the distinctive features of the basic-needs approach, see Streeten (1979).

3. A complete listing of the data can be obtained from the author upon request.

4. The increment is used instead of the growth rate of the basic indicator because an equal increment in life expectancy, literacy, etc. is assumed to cost the same regardless of the level of prior achievement, whereas the growth rate will tend to decline for increments at higher levels.

5. Data for 1973-1975 are used here because of the greater availability of observations on social indicators compared to 1960.

REFERENCES


Hicks, Norman and Paul Streeten, 'Indicators of development: the search for a basic needs yardstick', World Development, Vol. 7 (June 1979), pp. 567-580.


