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SOCIAL DEVELOPMENT AND ECONOMIC GROWTH: A STATISTICAL EXPLORATION

SOCIAL POLICY AND DEVELOPMENT CENTRE

SOCIAL DEVELOPMENT AND ECONOMIC GROWTH: A STATISTICAL EXPLORATION

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This paper is an attempt to relate social development and economic growth in order to assess the success of various policy regimes. The paper also tests for a statistical relationship between the two so as to answer the question whether improvements in the social indicators can be explained by the level and changes in per capita income. The choice of component variables for forming the composite Social Development Index (SDI) is primarily governed by the availability of consistent time series data. Therefore, the results are indicative and should be interpreted accordingly.

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1. INTRODUCTION

There is a widespread dissatisfaction with per capita income as the sole indicator to measure the well-being of a nation. The emphasis has now shifted to alternative measures of development. Social indicators, quality of life, basic needs and standard of living are the new approaches, which are being discussed and propagated by international institutions and concerned scholars.

Interest in social development as a development policy objective appears to have been promoted by the observed unevenness in the economic performance of developing countries. Despite positive and high GDP growth rates, economic development failed to reach all segments of society. Pressed by high population growth rates and inflation, the poorest 40 percent of people in majority of the developing countries hardly reaped in the benefits of development.

The main objective of this paper is to relate the 'direct' or social indicator approach and 'indirect' or per capita income approach to assess the relative success or failure of various policy regimes. The paper also tests for the statistical relationship between these two approaches to answer the question as to whether the levels and changes in the per capita income can explain improvements in the social indicators.

The existing literature on economic growth and social development has not adequately clarified the interaction between these two dimensions or approaches. The debate is far from settled that:

- the social development is a byproduct of economic growth;
- the social development does not result from, but precedes, economic growth; and
- both are related but neither one of the two types of development is a primary cause of the other.

The first view that social development is a product of economic growth is based implicitly on the Rostovian model, where economic growth is the impetus for the passage through the various stages of development to a fully modernized society. This 'trickle-down' phenomenon has been generally adopted in development policy, but criticized since 1970 for being ineffective for meeting basic needs. However, researchers still suggest that social development in general and basic needs in particular flow from economic development. They argue that increases in average per capita income improves the level of basic needs fulfillment. Further, causal models recommend that basic needs indicators weakly affect the economic indicator, if at all. [Ram (1985), Goldstein (1985)].

The second view suggests a 'trickle-up' phenomenon where social development makes a major contribution to increased productivity. Streeten (1977) has been a strong proponent of the basic needs approach. He notes that some basic needs may be satisfied more effectively through public services (including access to clean drinking water, school and health services), and therefore are not directly linked to individual income. Hicks (1979, 1980) explores the connection between economic growth and basic needs and concludes that " .... the development of a critical minimum level of basic human capital may be an important prerequisite for accelerating the growth of [economic] output". His findings indicate that improvements in basic needs satisfaction do not substantially decrease GNP growth rates and, in fact, such improvements tend to be associated with increased future economic growth. However, his findings do not clearly establish basic needs as either a cause or an effect of increased economic output. Nevertheless, it seems reasonable to conclude that a healthier, and better-educated work force can contribute at a higher per capita rate to the production process.

There are some studies in economic development, which express that economic growth and social development are highly interdependent. For example, Strinivasan (1977) is of the opinion that policies both for economic growth and towards basic needs development are interwoven. He, however, suggests that too much emphasis on basic needs would, at least in

the short run, hurt economic growth. This in turn would damage future improvements in the basic needs programs.

The literature however has not yet provided a consistent and clear answer of the causal priority. More recently, Kakwani (1993) and Mazumdar (1996) presented contradictory views on this issue especially with reference to underdeveloped nations. Mazumdar suggested that " ... for the middle income and low income group, the social development index precedes per capita GDP [trickle-up effect]". On the contrary, Kakwani found that ".... the level of economic welfare and change in it have a positive and significant influence on the improvement in the standard of living [trickle-down effect] ".

The review leads to the conclusion that none of the hypotheses about the causal relation between economic growth and social development are universally supported by the empirical research. The relationship varies with change of income, change of variables and choice of methodology.

The studies mentioned above, however, were based on the data from a cross-section of countries. The present study is an attempt to investigate the issue in the context of Pakistan using time series data from 1960 to 1999. To summarize various social indicators, a Social Development Index (SDI) has been constructed. The SDI components are discussed in the next section. Methodological details to construct the SDI and to test casual priority are provided in Section 3. Empirical findings are presented in Section 4. The last section is reserved for concluding remarks.

2. THE SOCIAL DEVELOPMENT INDEX (SDI)

The choice of component variables for forming the composite Social Development Index is primarily governed by the availability of consistent time series data. Individual indicators used to create the components of the SDI represent health services, education facilities and

consumption of durable goods and energy. The constituent variables of SDI are described below, while average values of indictors are depicted in Table – 1.

Table – 1
Constituents of SDI

	MEAN [1960-1999]	**1999 [Level]**
Health:		
Physicians Per Million Population	243	634
Hospital Beds Per Million Population	581	690
Infant Survival Rate Per 1000 Live Births	875	915
Education:		
Primary Male Enrollment Rate	49	89
Primary Female Enrollment Rate	33	78
Secondary Male Enrollment Rate	11	20
Secondary Female Enrollment Rate	6	16
Tertiary Male Enrollment Rate	7	09
Tertiary Female Enrollment Rate	3	07
Consumption:		
Cars Per Million Population	4144	8912
Telephone Per Million Population	6680	21270
Television Sets Per Million Population	7969	22562
Proportion of Non-Agriculture Labor Force	48	59
Electricity Generation Per Million Population	218	486

Health. The health situation of a population depends primarily upon the health services available within a country. It is assumed that physicians and hospital beds per million population provide a general picture of the quantity of health care that is available in the country. The infant survival rate reflects the degree of existence of contagious disease. It is obvious that where the infant mortality rate is high there are many people living in conditions under which basic health needs are not being met.

Education. The educational structure in Pakistan comprises five levels; primary (grade I-V), middle (grade (VI-VIII), high (grade (IX-X), intermediate (college, grade XI-XII), and degree (college and university, grade XIII-XIV plus). The proportion of beneficiaries in the

relevant age groups at the three levels of education - primary (primary), middle, high and intermediate (secondary), and college and university (tertiary) have been computed for this analysis. Due to the low level of female education as compared to male education, male and female enrollment ratios are considered separately. The six variables, thus constituted are used in making the SDI.

Consumption. Consumption of durable goods are considered to examine the consumption pattern of the people. Durables are cars and TV receiver per million population. Energy generation (GWH per million population) is also included to explain the nation's standard of living. Further, two variables, non-agriculture labor force and telephones connection per million population are included to capture the effect of change in quality of life due to the access to these indicators.

3. METHODOLOGY

This study uses the Principal Component Technique[1] for a composite overall Social Development Index, which is formed with the fourteen constituent variables as already described. Further, the Human Development Index (health and education combined) and separate sectoral indices are also constructed to represent health, education and consumption sectors.

The multivariate method of computing principal components is a relatively straightforward device for parsimonious representation of multiplicity of relative variables for any given observation set. The method essentially consists of computing such linear combinations of the original variables that successively capture the largest proportion of the variance in the original variables. Thus, the first principal component is that linear combination which captures or 'explains' the highest fraction of the variance in the original variables. The second explains the largest part of the remaining variance, and so on. For this study, the score of first

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[1] For a simple and straightforward explanation and for computer programming see [Bolch and Huang, 1974, Chapter 7, pp 235-50].

principal component, which captures more than 95 percent variation in the original variables, is used to construct sectoral and overall indices.

The lag-lead relation between social development and economic growth may be explored by a simple test of causality. In this respect the Granger (1969) causality test is used. The concept of causality in the Granger sense is based on certain basic assumptions: (i) Future cannot cause the past, it is past and present that cause the future, and (ii) Detection of causality is only possible between two stochastic variables. The Granger approach to the question of whether X causes Y is to see how much of the current Y can be explained by past values of Y and then to see whether adding lagged values of X can improve the explanation. Y is said to be Granger-caused by X if X helps in the prediction of Y, or equivalently if the coefficients on the lagged X's are statistically significant.

Thus, Granger causality simply tests the significance of past values (time lags) of two stochastic (stationary) time series[2]. However, the result of causality tests depends on model specification. In particular, ad hoc approaches, such as considering arbitrary lag-length specification can provide misleading results. Various criteria[3] e.g. likelihood ratio test (LR), Akaike's Final Prediction Error (FPE), Schwarz Bayesian (SB) or Hannan-Quinn's (HQC) are used in the literature for determining appropriate or optimal lag length. These criteria are based on asymptotic theory and may not be particularly useful in small samples. For this analysis, optimal lag length is selected using Akaike's FPE, as FPE is preferred among all the above criteria for small sample.

4. EMPIRICAL EVIDENCE

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[2] It is important to note that the statement "X Granger causes Y" does not imply that Y is the effect or the result of X. Granger causality measures precedence and information content but does not by itself indicate causality in the more common use of the term.

[3] The statistical detail of various model selection criteria is discussed in [Urbain ,1989]

The period of analysis (1960-2000) is divided into four sub-periods to apprehend the effects of various political and economic management regimes. Due to spill over effects of development projects, it is difficult to relate development efforts to the specific regime decisively. Therefore, the sub-period analysis gives a ballpark indication of effects of alternate policies on social development.

The first period (1960-70) mainly reflects the Ayub era of controlled democracy with the emphasis on the trickle down development philosophy. During this period, inward looking and import substitution policies of economic management were adopted. The main features of the development strategy pursued included the policy of economic decontrol, pro-industrial bias in the growth strategy, neglect of the social sectors, low priority to equity and social justice, and the like.

The second period (1971-80) covers the era of socialism and nationalization of resources. Trickle up development philosophy was the proclaim consideration in this period. The main strategy of the government during this period was the emphasis on structural change, top priority to social services and a redistribution of income.

The trickle down development philosophy through de-nationalization, de-regularization and privatization, has been the main slogan since 1980. Further, during the period 1990 and thereafter, outward looking, export oriented policies with full liberalization of the economy were emphasized.

Table – 2 sketches the growth rates of various indices. The trends in the table give a rough idea about the harmonic relationship between per capita GDP and overall the Social Development Index.

Upto the third period (1981-90), the figures of both indices indicate that higher growth in GDP resulted in improvements in the SDI. The period of proclaimed trickle up policies (1971-80) also supplements the argument that higher growth in income is a prerequisite for

higher achievement in social development. Nevertheless, this result does not hold so strongly in the fourth period (1991-1999) where growth in overall SDI is a bit higher despite the low growth in per capita GDP. However, HDI representing education and health sectors decreased slightly mainly because of the collapse in the health sector.

The highest growth in per capita GDP is recorded in the period 1981-90. The SDI achieved the highest level in the period 1991-1999, while in this period the income index recorded the lowest growth.

Table – 2

Annual Growth Rates
[Percent]

	1960-70	**1971-80**	**1981-90**	**1991-99**	**1960-99**
Per Capita GDP	3.2	1.9	3.5	1.9	2.6
Overall SDI	1.7	1.1	2.1	2.2	1.6
HDI - Health and Education	2.1	0.7	2.2	2.1	1.6
SDI – Health	1.1	1.0	2.2	1.3	1.7
SDI – Education	2.5	0.5	2.2	2.5	1.6
SDI - Consumption	1.4	1.6	1.9	2.0	1.6

Note: Growth rates are calculated by regressing annual values of indices using the following logarithmic form:

$$\log X_i = \alpha + \beta\,(TIME) + \mu_i\,, \quad \text{Thus,}$$

$$\text{Growth Rate (\%)} = [EXP\,(\beta) - 1] * 100$$

The analysis reveals that considerable improvements in the enrollment ratios are recorded during 90s. However, basic health services were recorded the lowest growth during the same period. The consumption indicators reflected more or less the same growth after 80's.

The results also indicate the non-linearity in the relationship between per capita GDP and social indicators. Figures show that the growth rate in SDI remained much lower than the growth of income variable throughout all sub-periods except the last one.

Table – 3 presents the results obtained from the Granger causality test between the overall Social Development Index (SDI); Human Development Index (HDI), representing indicators of health and education; indicators of consumption of durable (CON) and per capita real GDP (GDP), indicator of economic development. Before testing causal priority, the series are converted into first difference to make these stochastic or stationary.

Table - 3
Result of Causality Tests

Null Hypothesis	Dependent Variable	Explanatory Variables [with lag periods]	F-Ratio
SDI does not cause GDP	GDP	GDP (-1 to - 4), SDI (-1 to - 6)	3.0♦
GDP does not cause SDI	SDI	SDI (-1 to - 2), GDP (-1 to - 7)	2.5♦
HDI does not cause GDP	GDP	GDP (-1 to - 4), HDI (-1 to - 7)	1.4
GDP does not cause HDI	HDI	HDI (-1 to - 2), GDP (-1 to - 7)	3.9♦
CON does not cause GDP	GDP	GDP (-1 to - 4), CON (-1 to - 2)	4.9♦
GDP does not cause CON	CON	CON (-1 to - 2), GDP (-1 to - 5)	2.1♦

Note: ♦ indicates significance at least at the 10% level. The null hypothesis is rejected, if F-Ratio is significant.

The significant F-ratios, related to economic development and overall social development reveal that both developments are interrelated. The bi-directional causality suggests that social welfare development is either synonymous with economic growth or a product of economic growth. Similar phenomenon of bi-directional causality is apparent between indicators of consumption of durable goods and economic growth.

While looking at the behavior of the Human Development Index - composed of indicators of health and education - with economic development, opposite results are marked. The statistical evidence indicates that unidirectional causality exists between HDI and economic

growth, suggesting that development in health services and education facilities are products of economic growth. This result supplements the views of Ram (1985) and Goldstein (1985), that increase in per capita income should improve the level of basic needs fulfillment.

In summary, the causality results identify that indicators related to the consumption of durable goods and energy, and indicator of economic growth are related but neither one of the two types of development is a primary cause of the other, while indicators of human development are byproducts of economic growth.

5. CONCLUDING REMARKS

The relationship between per capita real GDP and social development is analyzed for the period 1960-1999. The Social Development Index is constructed with fourteen social indicators related to health and education sectors and consumption of durable and energy. The statistical relationship is tested with the help of Granger causality approach.

The evidence, based on the selected indicators and methodology, at best suggests that development in the health and education sectors is a product of economic growth. Thus, the analysis supports the trickle down development policies to boost human development.

Nevertheless, issues such as increasing disparities in regional income, concentration of industrial economic power, and a general consensus on increased income inequality are assumed to be the results of trickle down policies. Therefore, it is argued that basic needs especially in the health and education sectors should be provided through public services to minimize the risk of social unrest and political anxiety.

Although, the analysis avoids ad hoc selection of lag length, Granger causality approach requires a large sample to prevent sensitivity of results and to achieve consistency. Further, the choice of component variables for forming the composite Social Development Index is primarily governed by the availability of consistent time series data. Therefore, the results

are indicative and should be interpreted accordingly.

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